PERIODIC REVIEW

Southwest Harbor Project Remediation Area 3 – Seattle Steel Site

Harbor Avenue and SW Hanford Street
Seattle, Washington
FSID# - 2386

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1.0 INTRODUCTION

This document is a review by the Washington State Department of Ecology (Ecology) of post-cleanup site conditions and monitoring data at the Seattle Steel portion of Southwest Harbor Project Remediation (SWHP), referred to as Remediation Area 3 (Site). Cleanup at this Site was implemented under the Model Toxics Control Act (MTCA) regulations, Chapter 173-340 Washington Administrative Code (WAC)

The purpose of this periodic review is to determine whether the cleanup remedy at the Site continues to be protective of human health and the environment.

Cleanup actions at this Site were conducted in accordance with the requirements of Consent Decree 95-2-31522-4 dated December 5, 1995 entered into between the Port of Seattle (Port) and Ecology. The remedy involved the containment of hazardous materials. Concentrations of arsenic, lead, diesel-range petroleum hydrocarbons (TPH-D), poly chlorinated biphenyls (PCBs), carcinogenic polycyclic aromatic hydrocarbons (cPAHs) remain in soil at concentrations exceeding MTCA Method A cleanup levels. Additionally, other hazardous materials typically found in municipal solid waste landfills may remain at the Site. The MTCA cleanup levels applicable to the Site for soil are established under WAC 173-340-740 and WAC 173-340-745. The MTCA cleanup levels applicable to the Site for ground water are established under WAC 173-340-720.

WAC 173-340-420 (2) requires that Ecology conduct a periodic review of a site every five years under the following conditions:

(a) Whenever the department conducts a cleanup action
(b) Whenever the department approves a cleanup action under an order, agreed order or consent decree
(c) Or, as resources permit, whenever the department issues a no further action opinion;
(d) and one of the following conditions exists:
    1. Institutional controls or financial assurance are required as part of the cleanup
    2. Where the cleanup level is based on a practical quantitation limit
    3. Where, in the department's judgment, modifications to the default equations or assumptions using site-specific information would significantly increase the concentration of hazardous substances remaining at the site after cleanup or the uncertainty in the ecological evaluation or the reliability of the cleanup action is such that additional review is necessary to assure long-term protection of human health and the environment.

When evaluating whether human health and the environment are being protected, the factors the department shall consider include [WAC 173-340-420(4)]:

- The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the site;

- New scientific information for individual hazardous substances of mixtures present at the site;
- New applicable state and federal laws for hazardous substances present at the site;
- Current and projected site use;
- Availability and practicability of higher preference technologies; and
- The availability of improved analytical techniques to evaluate compliance with cleanup levels.

The department shall publish a notice of all periodic reviews in the Site Register and provide an opportunity for public comment.

2.0 SUMMARY OF SITE CONDITIONS

2.1 Site History

The SWHP comprises approximately 185 acres of land generally bordered by Harbor Avenue and non-Port industrial and commercial properties on the west, SW Spokane Street and non-Port commercial properties on the south, Elliot Bay and Florida Street on the north, and the original Terminal 5 area on the east. Most of the SWHP overlies former tideflats that have been filled and used for various industrial purposes, including railroad yards, wood treatment, steel scrap storage, and municipal and wood waste landfilling.

The purpose of the SWHP is to redevelop and enlarge an existing container shipping terminal for American President Lines and other Port of Seattle customers in order to meet projected container service demands here and abroad. Much of the project area land has contaminated soils and sediments that require remediation. The project to facilitate cleanup and pollution prevention on more than 200 acres, restore and enhance habitat and natural resources, and increase water-dependent maritime uses and public use of shoreline.

For the purposes of upland cleanup, the project area has been divided into five remediation areas (RAs), RA1 through RA5. The remediation areas were defined based on previous ownership and land use. The Site Plan available as Appendix 6.1 shows the SWHP area and the boundaries of each RA. The five RAs within the SWHP are as follows:

- The Spokane Street Properties and BNBY (RA-1),
- The former Salmon Bay Steel Property (RA-2),
- The former West Seattle Landfill and Purdy Scrap/former Seattle Steel Inc. (SSI) property (RA-3),
- The Pacific Sound Resources Superfund site (RA-4), and
- The former Lockheed Yard 2 (RA-5).

RA-3 consists of approximately 42 acres bounded on the north by SW Florida Street; on the east by Burlington Northern Railroad's Buckley Yard; and on the west by Harbor Avenue SW. The southern boundary of the Site, which is the northern boundary of RA-2, lies approximately 800 feet south of SW Hanford Street, an abandoned east-west road that runs through the Site.

Before the 1900s, RA-3 was a tidal flat area at the mouth of Longfellow Creek. The Site has been used as a dumping area since the turn of the century. Much of the Site was underlain by the former West Seattle Municipal Landfill. The landfill operated from 1939 to 1966. After closing, the landfill was reportedly covered with a layer of silt. The area to the south of the landfill was filled primarily with steel mill slag, and the landfill's soil cover was also covered with slag. The slag surface was covered in large part by piles of construction debris, dredge spoils, and slag.

When remedial actions were initiated, the northern 10 acres of the Site adjacent to SW Florida Street, was occupied by the Purdy Company, a scrap metal processor. The Purdy Company

leased this portion of the former SSI property since 1977. This part of the Site was covered by scrap metal piles up to a height of about *25* feet. The rest of the Site was covered by refuse from steel mill operations, construction debris, and dense vegetation.

In 1974, the Municipality of Metropolitan Seattle (Metro) installed a 96-inch-diameter pipe to divert Longfellow Creek south of the subject Site to a discharge point in the West Waterway. The 96-inch pipe is now called the Longfellow Main Line, and a 72-inchdiameter pipe along the eastern boundary of the subject Site is the Longfellow Overflow Line. The Longfellow Overflow Line receives overflow storm water from the Longfellow Main Line, storm water runoff, cooling water and groundwater infiltration from the Salmon Bay Steel Facility south of Spokane Street, and discharges into Elliott Bay to the north of the Site. The Longfellow Overflow Line also receives shallow groundwater that flows from RA-3.

All properties included in the Site are zoned for industrial use.

2.2 Regulatory Issues

Although a Remedial Investigation / Feasibility Study (RI/FS) was conducted under MTCA jurisdiction, the United States Environmental Protection Agency's (USEPA) Resource Conservation and Recovery Act (RCRA) and Toxic Substances Control Act (TSCA) programs have authority on specific issues of contamination. The Remedial Investigation/Feasibility Study (RI/FS) for the Site was conducted with USEPA's jurisdictional concerns in mind. These concerns are discussed in more detail below.

2.2.1 Resource Conservation and Recovery Act Issues

Current Washington regulations implementing RCRA solid waste landfill requirements are given in WAC 173-351. WAC 173-351-010(2)(b) states that municipal solid waste landfill units that stopped receiving wastes before October 9, 1991, are subject to closure and post-closure rules under chapter 173-304 WAC. The general closure and post-closure requirements are found in WAC 173-304-407. Groundwater monitoring requirements are found in WAC 173-304-490.

RCRA Facility Assessments (RFAs) of the Site were conducted at the Site for the United States Environmental Protection Agency (USEPA) in 1993. The RFAs identified 33 Solid Waste Management Units (SWMUs) including one Area of Concern (AOC). Of the 33 SWMUs, subunits, and AOCs identified in the RFA, 15 were located on the Purdy property, 14 on other parts of the subject Site, and 4 were located on the Salmon Bay Steel property to the south of the subject Site.

USEPA and Ecology both agreed that the cleanup of the SWMU s on the subject Site would be done under MTCA. USEPA stated that they believe Site characterization and cleanup performed under Ecology MTCA agreements would also meet RCRA requirements since State Dangerous Waste (DW) and RCRA regulations are Applicable State and Federal Laws (ASFLs) under MTCA.

2.2.2 Toxic Substances Control Act Issues

The TSCA regulates the manufacture, use, and disposal of chemical substances and mixtures. Part 761 of TSCA applies specifically to the manufacture, processing, distribution, use, or disposal of PCBs.

In the course of conducting the MTCA RI/FS of the subject Site, an approximately 5,000 square-foot area was observed that contained distinctly different materials. Characterization determined that this material was dredge spoils with an average concentration of 73 mg/kg PCBs.

2.3 Remedial Investigation / Feasibility Study Summary

The USEPA and Ecology determined that containment is a preferred technology, or presumptive remedy, for municipal landfill sites such as the former SSI property. Recognizing that the presumptive remedy will apply to RA-3 allowed a more focused RI. In compliance with USEPA guidance and concurrence from Ecology, both the RI/FS and Cleanup Action Plan for the Site were completed using the presumptive remedy approach. This approach de-emphasized characterization of landfilled material because municipal landfill waste has been documented to be highly heterogeneous and difficult to characterize and because containment of the material is the recommended technology for landfill sites.

Various historical, physical, and chemical data were collected during the RI to evaluate Site conditions and the extent and nature of chemical impacts to the Site. The RI also evaluated the potential pathways for compounds of interest and their fate in the environment. The following are the major conclusions of the RI:

2.3.1 Soil and Fill

Petroleum hydrocarbons (TPH), PCBs, and lead were the most significant contaminants present in the solid materials. Lead, TPH, and PCBs were detected in nearly all the solid material samples; however, in most samples the concentration of PCBs was below the MTCA Method C industrial cleanup level of 17 mg/kg. There is no Method C industrial cleanup level for TPH or lead. Most samples contained lead below the Method A industrial cleanup level of 1000 mg/kg. Most of the samples located throughout the Site contained TPH above the 1991 Method A cleanup level of 200 mg/kg.

Based on the evaluation of fate and transport presented in the RI, it was determined that the chemicals of interest identified in the landfill and the slag overlying the Site, were not highly mobile in the environment. PCBs and weathered hydrocarbons have low solubilities and a high tendency to adsorb onto organics and fine-grained soils. It was assumed that metals were not likely to leach under neutral groundwater conditions, particularly with the reduction of infiltration that would be achieved by capping of the Site.

2.3.2 Groundwater

Contaminants of interest in groundwater beneath the Site included PCBs, TPH, arsenic, and ammonia. The investigations of the shallow groundwater at the Site identified two water-bearing zones separated by a low permeability silt layer. The upper water-bearing zone, the fill unit, is characterized by various fill materials ranging from landfill refuse to woodwaste and slag. The

unit below the silt layer, the estuarine unit, consists of naturally deposited sands and silts. The silt layer separating the two water-bearing units is not totally confining.

The following are the significant impacts to the two water-bearing zones identified during the RI:

2.3.2.1 PCBs

PCBs were detected in five of 35 groundwater wells. Three of these wells were resampled during Phase 2; the other two wells were installed and sampled during Phase 2 and have not been resampled. No PCBs were detected at the detection limit (0.05 micrograms per liter [ug/L]) in the resampled wells. Adsorption to organic matter in the soil is the fate of the majority of PCBs in the environment. PCBs in soils at RA-3 are also expected to remain adsorbed to organic materials within the landfill beneath the proposed cover.

2.3.2.2 TPH

TPH was detected in fill unit groundwater samples from wells within or adjacent to refuse, with four of 12 samples exceeding the SWQC (1000 ug/L). These detections are most likely due to TPH-contaminated materials and wood waste products at the location of the well. There were no detections of petroleum hydrocarbons exceeding the Surface Water Quality Criteria (SWQC) of 1000 ug/L in any of the seven estuarine unit well samples. Petroleum hydrocarbons will continue to adsorb to organic materials and may slowly degrade. Due to the age of the landfill refuse and associated contamination, the petroleum hydrocarbons remaining at the Site are mostly the highly weathered, "heavy-end" hydrocarbons which tend not to be mobile.

2.3.2.3 Arsenic

Dissolved arsenic exceeded the regional background value (5 ug/L) in 12 of 29 of the fill unit samples, and in none of the estuarine samples. Dissolved arsenic concentrations for the background well and fill unit wells scattered from north to south across the Site were generally between approximately 5 and 10 ug/L.

In general, all metals were expected to re-precipitate in the buffered neutral environment beneath RA-3. In addition, the landfill cap will essentially eliminate precipitation infiltration through the soil and refuse and into the groundwater. Therefore, it was believed that the metal in the soil will remain immobilized and will not be a source of groundwater contamination.

2.3.2.4 Ammonia

Ammonia exceeded its detection limit (0.15 mg/L) in seven of eight fill unit samples and three of five estuarine samples with maximum concentrations of 290 mg/L and 9.7 mg/L, respectively. Ammonia is a common degradation product of the refuse, including domestic garbage and is typically present in leachate. Ammonia in groundwater is not considered a threat to the environment since upon reaching surface waters it will oxidize to nitrite and then to nitrate which is nontoxic to marine organisms.

2.3.2.5 Summary

Overall, the chemicals of interest identified in the landfill and the solid materials overlying the Site were chemicals that are not particularly mobile in the environment. PCBs and weathered hydrocarbons all have low solubilities and a high tendency to adsorb onto organics and fine-grained soils. It was determined that metals were not likely to leach under the neutral

groundwater conditions, particularly with the reduction of infiltration through capping of the Site. This lack of mobility of the chemicals of concern was confirmed by the scattered detections in groundwater data even prior to the implementation of the presumptive remedy.

2.3.3 Landfill Gas

The former landfill, which makes up most of the volume of materials placed at the Site, forms a large, heterogeneous source for potential contamination. Methane was the most prevalent component of the landfill gas, and ·concentrations throughout most of the landfill were above the lower explosive limit of five percent by volume. The methane concentrations declined rapidly beyond the perimeter of the landfill, except for one location along the west side of Harbor Avenue SW, and along SW Florida Street. Methane was measured above five percent in samples recovered from several sampling locations north of SW Florida Street, and at four percent in one soil gas sample obtained on the west side of Harbor Avenue SW.

The landfill, which has been closed for nearly 30 years at the time of the RI, was in the later stages of gas and leachate development. Landfill gas production was expected to continue to decline; and landfill leachate is expected to remain neutral with little impact from chemicals of interest. From the landfill as whole, no plumes of the potential contaminants were identified in groundwater.

2.3.4 Surface Water and Sediments

Surface water and sediment samples were collected from Longfellow Overflow Line equalization basins, and sediment samples were also collected from catch basins along SW Florida Street.

A few VOCs and SVOCs organic compounds were detected at low levels in sediments and at concentrations below the screening levels in surface water samples. Metals were also detected at low levels, with only one exceedance of a screening level for dissolved nickel. Water samples collected from manholes upgradient of RA-3, nearest the source of the reported releases, generally had the highest concentrations. The few VOCs and SVOCs detected in the Longfellow Overflow Line surface water were not present in the groundwater wells upgradient from the surface water sampling locations. This indicated that the source of these contaminants is from upstream sources in the Longfellow Overflow Line and not from groundwater migrating towards the Longfellow Line.

2.3.5 Feasibility Study

Due to the use of a presumptive remedy at the Site, the alternatives evaluated only included types of cover systems (containment alternatives) and systems for collecting landfill gas. The following alternatives were developed for the landfill cover system:

Alternative 1: Construction of a Washington Minimal Functional Standards (WMFS) compliant cover system
Alternative 2: Construction of a WMFS-compliant alternative cover system
Alternative 3: Construction of a RCRA Subtitle D-compliant cover system
Alternative 4: Construction of a cover system including asphalt pavement
Alternative 5: Construction of a soil and cement or concrete cover

A modified version of Alternative 2 was selected as the most appropriate remedy for the Site. This alternative contained the following elements:

1. Institutional Controls
    - Recording of deed restrictions limiting use of the property to industrial uses, as that term is defined in RCW 70.105D.020 (13). The property has been used for industrial purposes and is zoned for industrial use by the City of Seattle, which is a city that has conducted land use planning under RCW Chapter 36. 70A
    - Recording of deed restrictions to prevent development and Site uses that are inconsistent with the long-term maintenance of an effective cover system;
2. Preparation of the Cleanup Action Plan, engineering design report, construction plans and specifications, operations and maintenance plan, monitoring plan, health and safety plan, and the substantive portions of any permit applications required by state or local jurisdictions.
3. Incidental demolition and removal of existing pavement, equipment pads, minor structures, and fencing (as necessary), clearing and grubbing, removal of utilities, and grading of slag and debris piles to form a uniform and stable working surface.
4. Grading and surface water diversion using earthen ditches and piping systems to divert surface water from adjacent property around the cover system. This will be constructed at the start of Site cleanup work and incorporated into the permanent storm water diversion system.
5. Excavation and consolidation of limited quantities of municipal waste, which may include hazardous substances, from the eastern portion of the Site to the western portion of the Site under Ecology's Area of Contamination Policy. Ecology's Area of Contamination (AOC) Policy (Ecology 1991) states that movement of material that exceeds dangerous waste criteria within the areas of contamination is not considered "generation" as defined in DW regulations. The AOC policy allows Ecology to implement a wide range of on-site disposal options for MTCA cleanups.
6. The landfill cover system will be designed to meet the requirements of the WMFS for Municipal Landfills given in Chapter 173-304 WAC. Specifically, the cover will provide protection equivalent to the synthetic cover (Alternative 2). Asphalt, controlled low-strength material (i.e., controlled density fill (CDF)) or roller-compacted concrete will be used in combination with a synthetic liner to both meet environmental protection criteria and provide subgrade support for Port of Seattle facilities.
7. A landfill gas collection system.
8. Periodic groundwater monitoring to monitor the effectiveness of the landfill containment as an interim action and to assess groundwater quality, groundwater levels, and groundwater flow rate and direction.
9. Construction of security fencing around the capped area to minimize access of unauthorized individuals.
10. Long-term inspection and maintenance of the cover system, landfill gas control system, and fence.
11. Five-year reviews to evaluate the necessity for additional remedial actions.

2.4 Cleanup Levels and Points of Compliance

2.4.1 Soil Screening Levels

Cleanup levels were not identified in the CAP. Instead of cleanup levels, screening levels were used for characterization and soil screening purposes. MTCA Method C cleanup levels were selected as screening levels for those contaminants that have MTCA Method C standards. For contaminants found at the Site without a Method C cleanup level, Method A cleanup levels for industrial land use were used.

MTCA Method C cleanup levels may be used at industrial sites provided that:

- Hazardous substances remaining at the property after remediation do not pose a threat to human health or the environment in adjacent nonindustrial areas.
- The Site is not converted to non-industrial use without approval from Ecology, which may require further cleanup at that time.
- Institutional controls are implemented that require industrial use at the Site.

RA-3 is an industrial property that meets these criteria. The Site is zoned for industrial use (classification IG2) by the City of Seattle, which is a municipality conducting land use planning under Chapter 36.70A RCW. The Site has been used for industrial purposes since it was developed. Institutional controls were implemented as a part of the remedial action. A deed restriction was recorded requiring the Port to maintain industrial uses at the Site and notify and receive approval from Ecology of any changes to nonindustrial use. Therefore, the Site meets all the requirements for using industrial soil Method C cleanup levels.

For the purpose of this review, MTCA Method C cleanup levels will be used to determine whether the remedy is protective of human health and the environment. When no MTCA Method C cleanup level exists, MTCA Method A, and Method A industrial cleanup levels will be used. Because cleanup actions were initiated in 1995, this review will use cleanup standards applicable at that time.

2.4.2 Groundwater Cleanup Levels

Because the Consent Decree for the Site did not address groundwater, groundwater cleanup levels were not established for the Site. As part of the groundwater monitoring program conducted between 2008 and 2011 (discussed in Section 2.6.1), screening levels were used to evaluate concentrations of contaminants of concern. The screening levels were developed based on protection of surface water because groundwater discharges to Elliot Bay, and groundwater at the Site is not potable and will never be used for domestic purposes.

Screening levels were selected by choosing the most stringent Applicable or Relevant and Appropriate Requirements (ARARs) for surface water for each contaminant of concern. These ARARs were identified from the Clean Water Act (Section 304), the National Toxics Rule (40 CFR 131), Washington State Water Quality Standards (WAC 173-201a), and MTCA Method B surface water cleanup standards.

The selected screening levels are available in the table below:

Analyte	Screening Level (ug/L)
TPH	
Diesel range	500
Heavy oil range	500
Metals	
Total antimony	640
Total arsenic, inorganic	0.14
Total chromium	50
Total copper	2.4
Total lead	8.1
Total nickel soluble salts	8.2
cPAHs	
Benzo(a)anthracene	0.018
Benzo(a)pyrene	0.018
Benzo(b)fluoranthene	0.018
Benzo(k)fluoranthene	0.018
Chrysene	0.018
Dibenzo(a,h)anthracene	0.018
Indeno(1,2,3-cd)pyrene	0.018
sVOCs	
bis(2-ethylhexyl) phthalate	2.2
PCBs	
Aroclor 1016	0.0058
Aroclor 1254	0.0017
Aroclor 1260	0.03
Total PCBs	0.000064
VOCs	
Tetrachloroethane;1,1,2,2-	4
Trichloroethane;1,1,1-	420000
Trichloroethane;1,1,2-	16
Dichloroethane;1,2-	37
Tetrachloroethene	0.39
Trichloroethene	6.7
Dichloroethene;1,1-	3.2
Dichloroethene;1,2-,trans	10000
Vinyl Chloride	2.4

For the purpose of this review, these screening levels represent the most stringent ARARs for surface water at the Site and they will be used as cleanup levels to determine whether the remedy is protective of human health and the environment.

2.4.3 Ground Water Point of Compliance

For groundwater, the point of compliance is the point or points where the groundwater cleanup levels must be attained for a Site to be in compliance with the cleanup standards. The groundwater standard point of compliance is established throughout the Site from the uppermost levels of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the Site.

2.4.4 Soil Point of Compliance

For soil, the point of compliance is the area where the soil cleanup levels shall be attained. For soil cleanup levels based on the protection of groundwater, as they are for this Site, the point of compliance is established as soils throughout the Site.

2.5 Remedial Actions

The cleanup action was performed in two phases. Phase I included (a) processing and relocation of solid material piles, (b) refuse consolidation; (c) interim landfill gas collection, (d) covering of refuse with an interim cover, and (e) interim surface water controls. Phase II included final landfill cover, final landfill gas collection, and permanent storm water collection system.

2.5.1 Management of Contaminated Materials

The RI determined that, in some areas of the Site, the slag and debris contained PCBs above the Method C industrial cleanup levels and TPH and lead above the Method A cleanup levels. The RI also determined that PCBs and lead were present in isolated locations at concentrations that may, when excavated, exceed TSCA and RCRA criteria. PCBs and lead are not mobile in the Site environment and, as such, present a low threat to migration into groundwater or surface water. It was proposed to leave all solid materials in place, and depending on location, to cover the material either with a final cover or first with refuse then an interim cover and later a final cover. Existing data indicate no environmental threat is posed by these materials where they are presently located and the potential for leaching contaminants to groundwater will be further reduced by the installation of a cover system. On-site containment provided similar protection to human health and the environment as off-site transportation and disposal, while minimizing traffic impacts to nearby communities.

2.5.2 Slag Pile Screening and Processing

The slag on the Site was a byproduct of steel production at the mill south of Spokane Street. Many of the slag piles consist of crushed and screened slag and were relatively free of debris. However, some of the slag piles and portions of the slag cover contained debris such as timbers, broken concrete, asphalt, bricks, and metal. Based on previous reports and communication with the past property owner, the debris material originated from the steel mill Site and was probably generated during construction and maintenance projects at the mill. During the initial phase of the interim action, these slag piles were screened and sorted to remove the debris so that the slag

could be placed in select areas of the fill, such as exterior portions of containment berms and in the interim cover layer.

2.5.3 Berm Construction

A berm was constructed parallel to the east right-of-way of Harbor Avenue SW. This berm confines the excavated and consolidated refuse while also creating a visual barrier between Harbor Avenue SW and the landfill.

2.5.4 Slag, Debris, and Refuse Excavation and Consolidation

Excavation and consolidation plans called for a portion of the Site, situated west of the Burlington Northern tracks, to be excavated. Slag in this area was first removed in increments, with debris free slag stockpiled for subsequent use and debris transported to the consolidation cell. Where refuse remained in-place below the final excavation grade line, a temporary cover system was placed daily to minimize odors, wind-blown transport of refuse and the attraction of birds and other animals to the area.

2.5.5 Interim Cover System

After completing excavation and regrading of the Site, the construction plans called for the placement of an interim cap system over the consolidation cell and those areas beyond the cell boundaries where refuse was exposed and remains in-place. The interim cap system consisted of on-site screened slag supplemented, as necessary, with imported clean soil. The slag was used because of the abundant quantities found at the Site, thus reducing traffic impacts and saving the costs associated with purchasing and importing off-site material.

The permeable cap was important on an interim basis to allow venting of gases pending final capping and installation of the landfill gas system.

2.5.6 Surface Water Management

Storm water runoff was controlled in compliance with City of Seattle, King County, and Ecology standards. There was no storm water drain system on the property prior to remediation. The final design included a storm water system capable of handling runoff from the permanent cap on the consolidation cell as well as runoff generated from newly-constructed cargo handling facilities. During excavation and construction activities, the contractor was required to provide temporary erosion controls to manage runoff from excavation areas, maximizing the infiltration of runoff to minimize impacts to off-site locations.

2.5.7 Landfill Gas Management

The interim action included the installation of a landfill gas collection and treatment system to address two areas of special concern identified during previous investigations. This system allowed odor control and off-site migration of gases during and after consolidation by using trench wells connected to a vacuum blower. The extracted gasses were treated by carbon adsorption before discharge. The interim system was incorporated into the final landfill gas system. As part of the final system, extraction wells were added off the property to the west. The landfill gas management system continues to operate. Current landfill gas information is available in Section 3.1.3.

2.5.8 Final Cover Construction

WAC 173-304-460(3)(e)[1996 ed.] required that a landfill cover meet the following criteria:

- Refuse must be covered with at least two feet of soil with low permeability; or
- Refuse must be covered with an artificial liner at least 50 mil thick.
- Final cover must be at least 6 inches of topsoil seeded with shallow-rooted vegetation.

The final cover was constructed with a granular methane collection layer placed above the interim cover to convey methane gas to collection pipes. A layer of geomembrane was placed above the granular methane collection layer to intercept infiltration. The membrane type used in areas where the membrane will be underlying railroad tracks such as the Intermodal Storage Yard was High Density Polyethylene (HDPE). HDPE membranes have a high chemical degradation resistance relative to other membrane types. This property is highly desirable for areas such as the Intermodal Storage Yard due to the potential for accidental release of materials which may damage the membrane through contact. For those areas where railroad tracks do not exist, membranes consisting of HDPE, Polyvinyl Chloride (PVC), or polypropylene were used.

The geomembrane was covered by a sand layer at least 12 inches thick to provide physical protection to the membrane. In addition, both the State and Federal landfill design regulations required a protection layer over the membrane. Given the future industrial activity over the majority of the Site, asphalt was used as a protection layer. This also provides excellent surface water run-off, which is required to prevent water ponding over the landfill cover membrane. A protection layer of topsoil and vegetation was used along Harbor Avenue where landscaping separates the street from industrial property.

2.6 Long-Term Compliance Monitoring and Maintenance

2.6.1 Compliance Monitoring

As part of the CAP, groundwater monitoring was required to be performed on a quarterly basis for a period of five years. Later, the groundwater monitoring plan was modified as part of the Phase II Groundwater Confirmation Monitoring Program in 2008. Per this program, groundwater sampling was required to take place twice annually for 3 years. Sampling was required to take place during the periods of seasonal low (September/October) and seasonal high (December/January/February) groundwater levels. At the end of three years, the monitoring program was evaluated to determine whether redevelopment and remedial actions in the area have provided sufficient protection to groundwater and to determine whether the monitoring strategy should change. An evaluation of groundwater compliance monitoring data is available in Section 3.1.2.

In an October 31, 2011 letter from Ecology to the Port of Seattle, Ecology stated that:

> "Ecology agrees that the groundwater monitoring data collected in October 2008, March 2009, September 2009, June 2010 October 2010 and February 2011 do not show any contaminants exceeding MTCA cleanup standards. The six rounds of groundwater data appear to satisfy the Phase II groundwater monitoring plan. The groundwater monitoring

program for RA-1, -2, -3 and -5 are now complete under the Consent Decrees for RA-1, -2, -3 and -5."

It was determined that monitoring data had demonstrated that the Site was not impacting groundwater, and the groundwater monitoring program was terminated with Ecology's concurrence.

There is no indication that the groundwater monitoring program was intended to satisfy the requirements of WAC 173-304-490, the Minimum Functional Standards for Solid Waste Handling.

2.6.2 Inspections and Maintenance

Requirements for post remediation inspection and maintenance of the Site were described in an Operations and Maintenance Plan. On a semi-annual basis, Port staff inspect RA1-BNBY, RA-2 and RA-3 areas. The integrity of the cover (pavement and ballast) areas, surface water collection systems, and Site security measures are inspected and recorded.

The Site is inspected to determine the condition of pavement and ballast covers including: locations of penetrations; cracks, tears, or gouges in Site covers; persistent ponding of water on pavement and ballast covers or around surface water collection system components; additional surface water drainage problems including siltation in catch basins; recent repair work and/or recent excavation activities, damaged security fencing, and adequacy of security measures.

The most recent available inspection form was from July 2012. The inspection determined that the cap appeared to be generally intact with some exceptions noted. The exceptions included small areas of asphalt lifting near railroad tracks. A summary of the inspection report is available as Appendix 6.3.

3.0 PERIODIC REVIEW

3.1 Effectiveness of completed cleanup actions

3.1.1 Soil and Direct Contact

Based upon the Site visit conducted on September 25, 2012, the Site remains owned by the Port and is used for industrial purposes. The Site has many active uses that are generally dedicated to rail loading and transfer, container storage and trucking. Site infrastructure allows for loading and unloading of containers from ships, transfer of shipping containers to truck and rail, and general use as a rail yard. The Site surface covers appear in excellent condition with some cracking and upheaval visible near rail lines. Site personnel regularly perform Site inspections, maintenance on the cap surface, fence maintenance and Site security control. The Port was conducting cap sealing on another portion of the property during the Site visit.

The capped Site surfaces continue to eliminate direct exposure pathways (ingestion, contact) to contaminated soils. Site maintenance employees continue to conduct asphalt cap repairs and maintenance as necessary. Site surfaces must be maintained to allow for Site operations. A photo log is available as Appendix 6.4.

Because soils remain at the Site with concentrations of hazardous materials exceeding MTCA Method A cleanup levels, institutional controls are required as part of the final remedy.

3.1.2 Ground Water

Groundwater monitoring was conducted for three years at the Site on a semi-annual schedule between October 2008 and February 2011. Four wells within the groundwater monitoring network were considered relevant to both RA-3 and RA-1. CMP-5 is located west of the Site boundary and was considered a background well, CMP-4 is located directly beneath RA-1 and immediately downgradient of RA-3, and MW-308N and MW-308S are located downgradient from RA-3 to the north. MW-308N is located in the fill aquifer and MW-308S is located in the estuarine aquifer and has saltwater intrusion and tidal influence.

The background well, CMP-5, contained concentrations of arsenic exceeding the selected MTCA Method A cleanup level of 5 micrograms per liter (ug/L) in 4 of 6 monitoring events with a maximum concentration of 14.2 ug/L in October 2008. MW-308N contained concentrations of arsenic exceeding MTCA Method A cleanup levels in all 6 monitoring events with a maximum concentration of 25.4 ug/L. MW-308S contained arsenic at 8 ug/L in October 2008, but did not contain arsenic at concentrations exceeding MTCA Method A cleanup levels for the final 5 monitoring events. A table containing arsenic concentrations in groundwater is available below.

Arsenic Concentrations in Groundwater (ug/L)

	10/13/2008	4/1/2009	9/2/2009	6/3/2010	10/5/2010	2/9/2011
Upgradient Wells						
CMP-5	**14.2**	1.9	**12.9**	3.6	**13.3**	**7.1**
CMP-4	2.8	1.1	3.8	1.4	2.5	1
Downgradient Wells						
MW-308N	**25.4**	**16.8**	**15.3**	**16.2**	**22.8**	**16.4**
MW-308S	**8**	3	3	2	0.5	2

Red indicates concentrations exceed MTCA Method A cleanup level

Arsenic concentrations in groundwater at concentrations exceeding MTCA Method A cleanup levels are common in the Puget Sound region; however, concentrations of arsenic are slightly elevated downgradient from the Site when compared to upgradient concentrations. This indicates the Site may be a contributing source of arsenic contamination to groundwater.

Remaining concentrations of arsenic in groundwater are not likely to pose a threat to human health or the environment for several reasons, including:

- Groundwater downgradient from the Site is not potable and will never be used for domestic purposes.
- Property implemented institutional controls will restrict groundwater use at the Site for all future uses.
- Samples collected at the Site were analyzed for total arsenic, while cleanup standards use dissolved arsenic. Dissolved arsenic concentrations at the Site area likely lower than measured total arsenic concentrations.
- MW-308S does not contain arsenic at elevated concentrations, indicating the Site is not likely contributing to contamination in the estuarine aquifer or surface waters of the Puget Sound.
- Arsenic may be becoming mobilized beneath the Site due to reducing groundwater conditions as a result of the former landfill located immediately west of the BNBY area. This mobilized arsenic will likely become fixed and biologically unavailable as soon as it encounters oxidizing conditions near Elliot Bay.
- Arsenic concentrations in groundwater do not exceed Clean Water Act Marine Standards protective of aquatic life of 36 ug/L.

There are no apparent exposure pathways to arsenic contaminated groundwater through *current* Site uses; however, to assure that the remedy remains protective of human health and the environment for future uses, institutional controls should be implemented to incorporate the area north of RA-4 that includes MW-308N and MW-308S. This may not be necessary if the Port is

able to demonstrate, through further groundwater analysis, that *dissolved* arsenic concentrations in groundwater are below the Site cleanup level of 5 ug/L.

3.1.3 Landfill Gas

The most recent landfill gas data available for this review was for the quarter ending in June 2012. The landfill gas collection and treatment system continued to operate continuously through this period. The landfill gas collection system provides approximately 1.3 inches of mercury in vacuum. The system conveyance flow meter averaged approximately 120 cubic feet per minute (cfm) gas flow during the quarter, consistent with the flow rate recorded during the past several quarters.

System effluent methane concentrations recorded during April, May, and June Site visits averaged 5.4 percent. This is an increase from 4.6 percent last quarter and also higher than the second quarter 2011 average of 4.0 percent. Carbon dioxide values averaged 6.2 percent, compared to an average of 6.7 percent for the same period in 2011. The landfill gas treatment oxygen average value of 11 percent is only slightly higher than the second quarter 2011 value of 10.4 percent.

Field values recorded at system conveyance sample port monitoring locations were within the ranges of values recorded in the previous year. Methane measurements recorded ranged from 0 to 11.5 percent, carbon dioxide ranged from 0.8 to 15 percent, and oxygen ranged from 0.1 to 20.1 percent. Negative pressure was measured across the Site at conveyance piping monitoring locations.

No methane was detected at the off-site monitoring probes on Harbor Avenue during the quarter. Oxygen levels were generally lower for the on-site monitoring points and higher for the off-site probes.

The landfill continues to produce methane at low concentrations, and the landfill gas collection and treatment system continues to effectively manage methane production. Landfill gas monitoring data from the second quarter of 2012 is available as Appendix 6.5.

3.1.4 Institutional Controls

Institutional controls are required at the Site per the Consent Decree and CAP, and as a result of the use of MTCA Method C Industrial cleanup levels for soil. As stated in the CAP, these institutional controls should include:

- Site Fencing and Security
- Health and Safety guidance for future excavation work
- Conformational monitoring requirements and procedures
- Procedures for periodic inspection and maintenance of facility constructed cover
- Restriction of Site use to industrial only

These institutional controls have been implemented at the Site. A restrictive covenant was recorded in 1995 with the following restrictions:

1. No groundwater may be taken for domestic purposes from any well in the area encompassed by the SWHP.
2. Any activity on the Site that may interfere with the Cleanup Action is prohibited. Any activity on the Site that may result in the release to the environment of a hazardous substance that was contained as a part of the Cleanup Action is prohibited unless approved by Ecology or in compliance with the approved Operations and Maintenance Plan.
3. The Site shall not be used for any activities other than traditional industrial uses, as described in RCW 70.105D.020(23), and defined in and allowed under the City of Seattle's zoning regulations.
4. The owner of the Site must give written notice to the Department of Ecology, or to a successor agency, of the owner's intent to convey any interest in the Site.
5. The owner must notify and obtain approval from the Department of Ecology, or from a successor agency, prior to any use of the Site that is inconsistent with the terms of this Restrictive Covenant.
6. The owner shall allow authorized representatives of Ecology the right to enter the Site at reasonable times for the purpose of evaluating compliance with the Cleanup Action Plan and the Consent Decree, to take samples, to inspect Cleanup Actions conducted at the Site and to inspect records that are related to the Cleanup Action.
7. The owner of the Site and the owner's assigns and successors in interest reserve the right under WAC 173-340-440 (1991 ed.) to record an instrument which provides that this Restrictive Covenant shall no longer limit use of the Site or be of any further force or effect.

Based on evaluation of groundwater monitoring data collected at the Site between 2008 and 2011, the coverage area of institutional controls should extend beyond the footprint of the remediation areas to include the property in the vicinity of MW-308N and MW-308S where arsenic concentrations in groundwater exceed Site cleanup levels; however, this does not prevent the remedy from being protective of human health and the environment. This was discussed in more detail in Section 3.1.2.

If institutional controls are added or modified to incorporate the waterfront area, they should conform to the Uniform Environmental Covenant Act (UECA). UECA was passed in Washington State in 2007, and it requires that certain procedures are followed when restrictive covenants are implemented and they contain specific language so that they will remain enforceable through changes in property ownership.

The existing restrictive covenant is available as Appendix 6.6.

3.1.5 Other Regulatory Issues

The CAP states,

> "Washington regulations implementing RCRA requirements are given in WAC 173-351. WAC 173-351-010(1) states that municipal solid waste landfill units that stopped receiving wastes after October 9, · 1991, are subject to closure and post-closure rules under chapter 173-304 WAC. ***Since the West Seattle Landfill was closed in the late 1960s, the standards given do not apply to RA-3***."

This contradicts WAC 173-340-710(7)(c), which says,

> "For solid waste landfills, the solid waste closure requirements in chapter 173-304 WAC shall be minimum requirements for cleanup actions conducted under this chapter."

And WAC 173-351-010(2)(b), which says,

> "Municipal Solid Waste Landfill units that stopped receiving waste prior to October 9, 1991, are subject to closure and post-closure rules under chapter 173-304 WAC, the Minimum Functional Standards for Solid Waste Handling."

Though this contradiction in the CAP does not appear to immediately effect whether the remedy is protective of human health and the environment, the landfill closure and groundwater monitoring requirements in WAC 173-304 should be evaluated prior to determining whether the Port has satisfied the requirements of Consent Decree 95-2-31522-4.

3.2 New scientific information for individual hazardous substances for mixtures present at the Site

There is no new relevant scientific information for the contaminants related to the Site.

3.3 New applicable state and federal laws for hazardous substances present at the Site

Screening levels at the Site are based on current primary and secondary ground water standards, and MTCA Method A, B and C cleanup levels. There are no new relevant state or federal standards applicable to the Site, with the exception of standards for petroleum hydrocarbons. MTCA petroleum hydrocarbon cleanup levels have generally increased since the CAP was written for the Site; however, these changes do not impact whether the remedy is protective of human health and the environment.

3.4 Current and projected Site use

The Site is an active railyard with container storage, tractor-trailer and forklift traffic. These uses are not likely to have a negative impact on the risk posed by hazardous substances contained at the Site as long as the Site surface is actively maintained.

3.5 Availability and practicability of higher preference technologies

The remedy implemented included containment of hazardous substances and it continues to be protective of human health and the environment. While higher preference cleanup technologies may be available, they are still not practicable at this Site.

3.6 Availability of improved analytical techniques to evaluate compliance with cleanup levels

The analytical methods used at the time of the remedial actions were capable of detection below cleanup levels for contaminants of concern at the Site. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

4.0 CONCLUSIONS

- The cleanup remedy implemented at the Site is currently protective of human health and the environment.
- Unrestricted use soil cleanup levels have not been met at the Site; however, under WAC 173-340-740(6) (f), the cleanup action is determined to comply with cleanup standards, since the long-term integrity of the containment system is ensured.
- There are three issues that should be address to ensure long-term protectiveness:
    - The coverage area of institutional controls should be expanded to include the waterfront property containing MW-308N.
    - When institutional controls are added or amended, they should be updated to meet the requirements of the Uniform Environmental Covenants Act.
    - Compliance with closure and groundwater monitoring requirements in WAC 173-304 should be evaluated prior to determining the Port has satisfied the conditions of Consent Decree 95-2-31522-4.

  These issues will be re-evaluated during the next periodic review to be conducted in five years.

Based on this review, additional actions may be required to assure that the remedy for the Site remains permanently protective. Additionally, it is the property owner's responsibility to continue to inspect the Site to assure that the integrity of the cap is maintained.

4.1 Next Review

The next review for the Site will be scheduled five years from the date of this periodic review. In the event that additional cleanup actions or institutional controls are required, the next periodic review will be scheduled five years from the completion of those activities.

5.0 REFERENCES

Woodward-Clyde. *Cleanup Action Plan – Former SSI Property*. 1995.

Woodward-Clyde. *Operation and Maintenance Plan.* March 1995.

Woodward-Clyde. *Engineering Design Report.* March 1995.

Port of Seattle. *Restrictive Covenant.* July 10, 1995.

Ecology. *Consent Decree No. 95-2-31522-4.* February 22, 1995.

Hart Crowser. *Draft Groundwater Quality Monitoring Evaluation Report.* September 23, 2010.

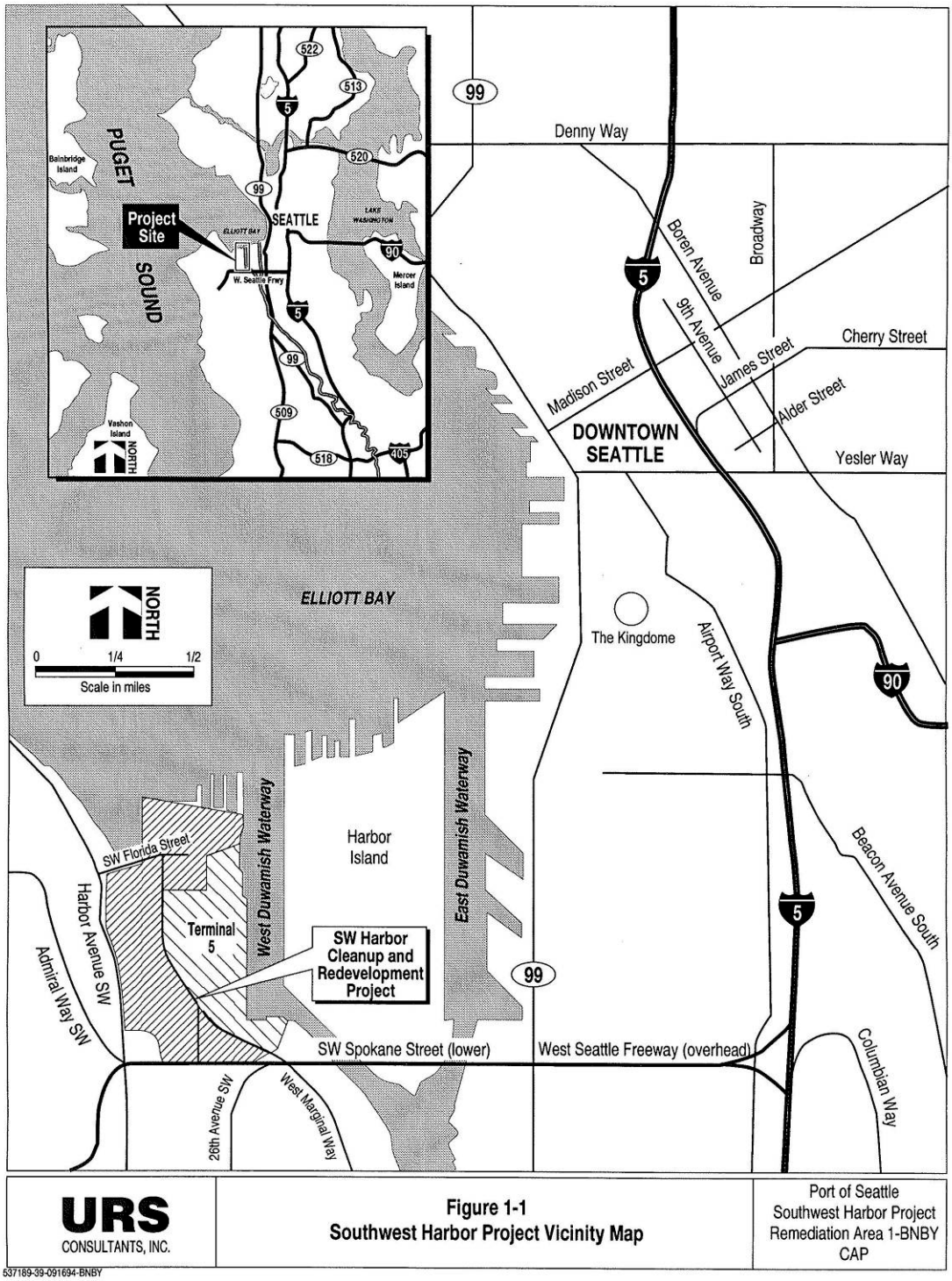
Ecology. *Groundwater Monitoring Program Completion Letter*. October 31, 2011.

Port of Seattle. *Progress Report, RA1, 2, 3 Remediation Projects – Southwest Harbor Project.* August 13, 2012.

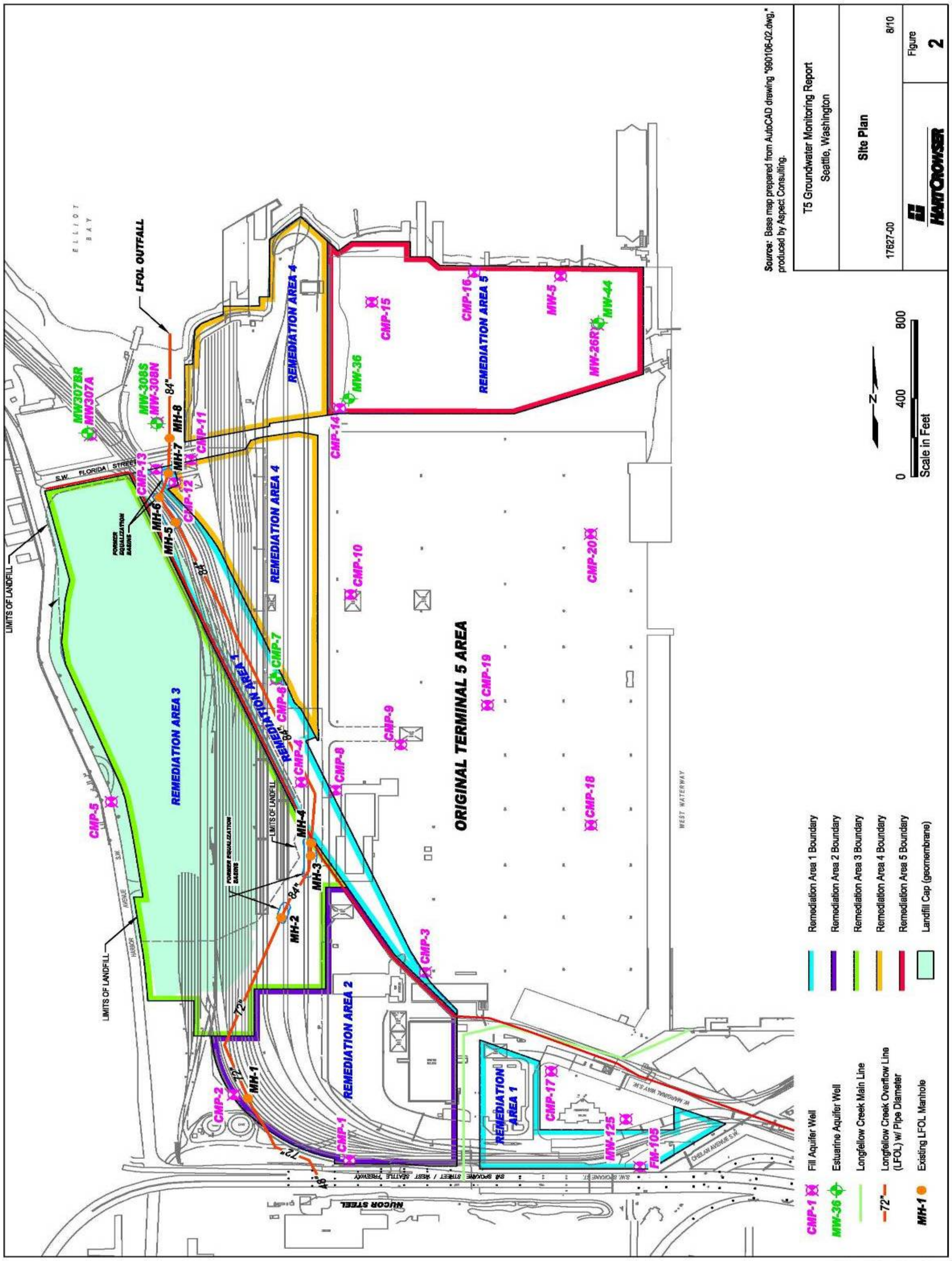
Ecology. *Site Visit.* September 25, 2012.

6.0 APPENDICES

6.1 Vicinity Map



6.2 Site Plan


Source: Base map prepared from AutoCAD drawing "980106-02.dwg," produced by Aspect Consulting.
T5 Groundwater Monitoring Report
Seattle, Washington
Site Plan
17827-00
8/10
Figure
2
Scale in Feet
0
400
800
ORIGINAL TERMINAL 5 AREA
REMEDIATION AREA 1
REMEDIATION AREA 2
REMEDIATION AREA 3
REMEDIATION AREA 4
REMEDIATION AREA 5
LFOL OUTFALL
LIMITS OF LANDFILL
ELLIOTT BAY
WEST WATERWAY
NUCOR STEEL
Remediation Area 1 Boundary
Remediation Area 2 Boundary
Remediation Area 3 Boundary
Remediation Area 4 Boundary
Remediation Area 5 Boundary
Landfill Cap (geomembrane)
Fill Aquifer Well
Estuarine Aquifer Well
Longfellow Creek Main Line
Longfellow Creek Overflow Line (LFOL) w/ Pipe Diameter
Existing LFOL Manhole

6.3 Maintenance and Inspection Report Summary

Windward environmental LLC

200 West Mercer St. • Suite 401 • Seattle, WA 98119
Phone: 206.378.1364 • Fax: 206.217.0089 • www.windwardenv.com

MEMORANDUM

To: Brick Spangler, Port of Seattle
From: Warren Hansen, Windward Environmental LLC
Subject: Semiannual Inspection of T-5 Ecology-Lead Sites: 2012 Mid-Year Inspection
Date: July 11, 2012

INTRODUCTION

The attached inspection report form is provided in fulfillment of the semiannual inspection requirements for Terminal 5, Ecology Lead Sites RA1, RA2 and RA3 set forth in the Terminal 5 Operations and Maintenance Manual for Environmental Components (Onsite and JMN 1998)

SUMMARY OF FINDINGS

With the exception of several limited areas of asphalt cap damage and cracking the environmental components at the subject areas within Terminal 5 are performing as expected and are in acceptable condition. The localized areas of damage consist of asphalt "uplift" adjacent to the IY rails where they turn from the east-west to north-south alignment in the southern portion of the terminal (within the RA-2 area).

Another issue noted in this same area is the degradation of concrete supporting the fence posts for the fence dividing the IY entrance area from the rail area to the east. The concrete post footings have degraded and soil is being forced to surface; apparently by frost-heave. Other areas of cracking and asphalt uplift noted in the 2011 report have been addressed by the tenant.

The issues noted above are new. The tenant is coordinating with BNSF to address the asphalt issue. According to Eagle Marine, BNSF has recommended that the asphalt simply be rolled back into place, rather than repaired by removal/repaving. While this is probably satisfactory in terms of maintaining the pavement, it is likely the problem will re-occur until the underlying cause is assessed and corrected. The Port should follow up with the tenant as soon as possible to repair the fence posts.

6.4 Photo log

Photo 1: Asphalt Surface with Degradation Near Tracks – from the south

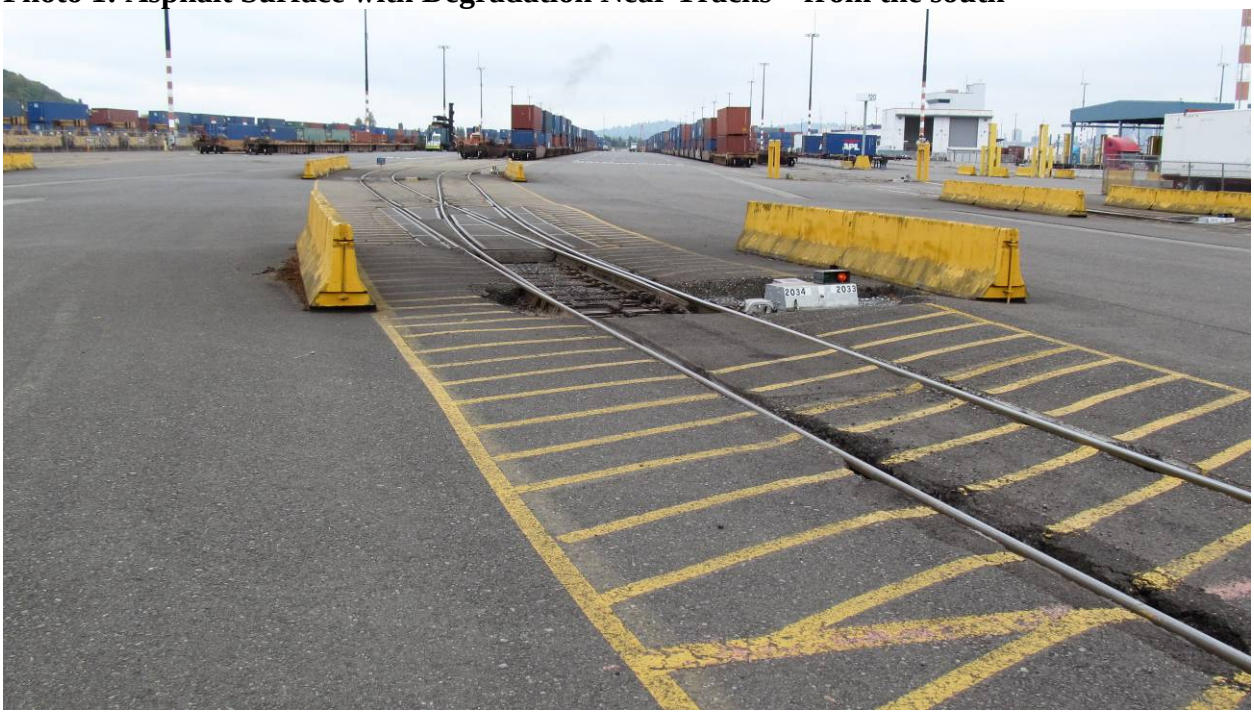


Photo 2: Surface-Sealing Activities North of RA-3 – from the southwest

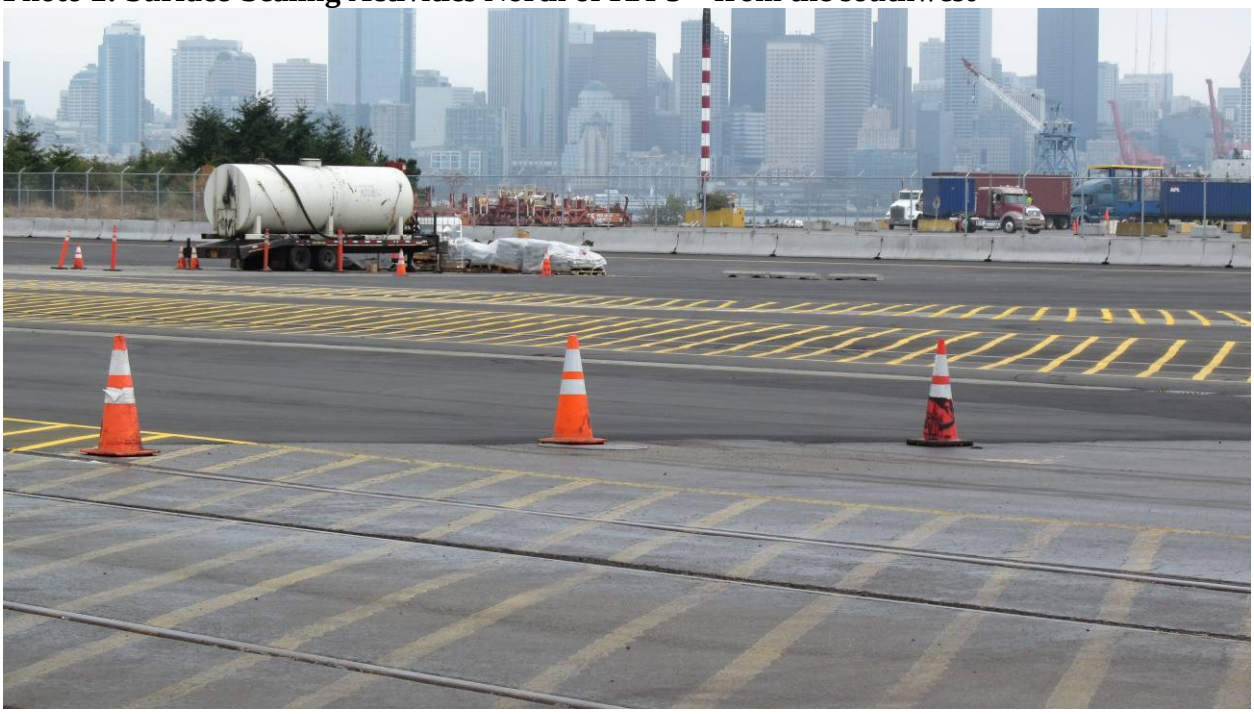


Photo 3: Landfill Gas Collection System - from the northwest

Photo 4: Landfill Cap Surface – from the south

6.5 Landfill Gas Monitoring Data

Attachment A-1: 7/6/2012

Terminal 5 / RA-3 Landfill Gas Treatment System

Monthly Monitoring Results April 2010 - June 2012

Parameter: METHANE
(LMS-40 instrument field measurement - percent by volume.)

Port of Seattle

	Monitoring Location																
Month	*SG-302*	*SG-303*	*SG-304*	*SG-329*	*SP-01*	*SP-02*	*SP-03*	*SP-04*	*SP-05*	*SP-06*	*SP-07*	*SP-08*	*SP-09*	*SP-10*	*SP-11*	*SP-12*	*SP-13*
Jun-12	0	0	0	0	1.9	8.8	4.8	2.2	8.4	11.0	0.4	0.5	8.9	8.8	9.4	0	0
May-12	0	0	0	0	1.8	9.0	6.6	5.8	10.2	11.5	0.1	0	9.4	6.0	10.5	0	0
Apr-12	0	0	0	0	1.4	7.8	5.7	4.9	10.0	11.0	0	0	8.5	6.2	8.8	0	0
Mar-12	0	0	0	0	1.3	7.7	5.1	1.9	7.8	8.5	0	0	7.3	5.3	9.0	0	0
Feb-12	0	0	0	0	1.8	7.8	6.6	4.2	9.5	12.0	0	0	7.6	8.1	--	0	0
Jan-12	0	0	0	0	1.5	6.5	4.1	2.9	7.6	11.0	0	0	8.8	8.5	--	0	0
Dec-11	0	0	0	0	1.9	8.2	7.0	7.0	10.0	13.0	0.1	0	9.1	8.1	9.0	0	0
Nov-11	0	0	0	0	1.4	7.5	5.2	2.1	8.5	11.2	0.0	0.3	11.5	9.6	13.0	0	0
Oct-11	0	0	0	0	3.1	10.0	11.0	13.0	17.0	19.0	2.6	4.6	14.0	9.0	17.0	0	0
Sep-11	0	0	0	0	2.0	7.1	7.1	8.6	11.0	13.5	0.2	0.5	12.5	9.0	12.5	0	0
Aug-11	0	0	0	0	2.7	8.4	7.2	10.0	11.5	14.5	0.4	0.1	13.5	9.2	13.0	0	0
Jul-11	0	0	0	0	1.1	7.1	4.4	1.0	9.0	10.0	0	0.1	9.6	7.3	12.5	0	0
Jun-11	0	0	0	0	0.8	7.2	4.7	7.5	8.5	11.0	0	0	5.5	6.4	5.9	0	0
May-11	0	0	0	0	0.6	6.7	3.7	3.9	8.2	11.0	0	0	4.5	5.6	5.0	0	0
Apr-11	0	0	0	0	0.6	6.7	3.7	3.9	8.2	11.0	0	0	4.5	5.6	5.0	0	0
Mar-11	0	0	0	0	1.5	9.2	6.5	5.2	8.5	12.5	0.0	0.8	4.4	5.0	5.3	0	0
Feb-11	0	0	0	0	0.8	5.9	4.6	5.2	7.7	11.5	0.0	0.0	5.0	6.3	6.0	0	0
Jan-11	0	0	0	0	2.1	8.3	7.0	5.4	8.9	11.0	0.0	0.0	4.6	5.8	4.8	0	0
Dec-10	0	0	0	0	2.6	10.5	7.8	6.9	12.5	14.5	2.9	0.0	13.5	11.5	13.5	0	0
Nov-10	0	0	0	0	2.7	8.6	9.0	8.8	8.3	18.0	2.0	15.0	10.5	11.0	11.5	0	0
Oct-10	0	0	0	0	3.7	10.0	11.0	12.0	15.0	18.5	3.0	13.0	14.5	10.5	17.0	0	0
Sep-10	0	0	0	0	3.7	12.0	9.5	15.0	2.2	19.0	3.3	1.2	18.0	14.5	18.5	0	0
Aug-10	0	0	0	0	1.9	7.4	5.9	8.1	11.0	13.5	0.8	0.7	11.5	8.5	13.5	0	0
Jul-10	0	0	0	0	1.8	8.1	7.2	8.1	11.5	14.0	1.2	9.9	10.5	6.9	14.0	0	0
Jun-10	0	0	0	0	2.3	9.8	8.8	7.2	12.5	14.0	0.9	20.5	9.6	6.7	13.0	0	0
May-10	0	0	0	0	1.0	6.9	3.9	3.5	8.3	9.0	0	0	8.2	6.7	8.7	0	0
Apr-10	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
# Readings	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*24*	*26*	*26*
Min. value	*0*	*0*	*0*	*0*	*0.6*	*5.9*	*3.7*	*1.0*	*2.2*	*8.5*	*0*	*0*	*4.4*	*5.0*	*4.8*	*0*	*0*
Max. value	*0*	*0*	*0*	*0*	*3.7*	*12.0*	*11.0*	*15.0*	*17.0*	*19.0*	*3.3*	*20.5*	*18.0*	*14.5*	*18.5*	*0*	*0*
AVERAGE	***0***	***0***	***0***	***0***	***1.8***	***8.2***	***6.5***	***6.3***	***9.7***	***12.9***	***0.7***	***2.6***	***9.4***	***7.9***	***10.7***	***0***	***0***
Location	*SG-302*	*SG-303*	*SG-304*	*SG-329*	*SP-01*	*SP-02*	*SP-03*	*SP-04*	*SP-05*	*SP-06*	*SP-07*	*SP-08*	*SP-09*	*SP-10*	*SP-11*	*SP-12*	*SP-13*

*No data available April 2010.

T5_Landfill_Q2_2012_Tbl

6.6 Restrictive Covenant

When Recorded Return To:

Christopher M. Carletti, Esq.
Preston Gates & Ellis
701 Fifth Ave., Suite 5000
Seattle, WA 98104

EXHIBIT C
RESTRICTIVE COVENANT

The property that is the subject of this Restrictive Covenant has been the subject of remedial action under Chapter 70.105D RCW. The work done to clean up the property (hereafter the "Cleanup Action") is described in the Consent Decree entered in State of Washington Department of Ecology v. Port of Seattle, King County Superior Court Cause No. 95 2-05455? and in attachments to the Decree and in documents referenced in the Decree. This Restrictive Covenant is required by Ecology under Ecology's rule WAC 173-340-440 (1991 ed.) because the Cleanup Action on the Site resulted in residual concentrations of total petroleum hydrocarbons, polychlorinated biphenyls, arsenic, lead, cadmium, and other hazardous substances which exceed Ecology's Method A and B cleanup levels for soil established under WAC 173-340-740(3). Method C and A industrial soil cleanup standards were used in the Cleanup Action. A closed municipal solid waste landfill and overlying soil and slag, including materials that exceed Method A and C cleanup standards, are contained on site under various covers. The property also contains a system of monitoring wells and a landfill gas collection and treatment system.

9507100874

The undersigned, Port of Seattle, is the fee owner of real property in the County of King, State of Washington (legal description attached), hereafter referred to as the "Site." The Site refers to the former Seattle Steel, Inc., property located in Seattle and bounded on the north by S. W. Florida Street; on the east by Burlington Northern railroad tracks; and on the west by Harbor Avenue S.W. The south boundary extends approximately 800 feet south of abandoned Hanford Street. The Port of Seattle makes the following declaration as to limitations, restrictions, and uses to which the Site may be put, and specifies that such declarations shall constitute covenants to run with the land, as provided by law, and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Site.

9507100874 03:05:00 PM KING COUNTY RECORDS 005 SM 11.00

Section 1. No groundwater may be taken for domestic purposes from any well in the area encompassed by the Port's Southwest Harbor Project, which includes the area bounded to the north by Elliott Bay, to the West by Harbor Avenue, to the south by Spokane Street, and to the East by the West Waterway.

Section 2. Any activity on the Site that may interfere with the Cleanup Action is prohibited. Any activity on the Site that may result in the release to the environment of a hazardous substance that was contained as a part of the Cleanup Action is prohibited unless approved by Ecology or in compliance with the approved Operations and Maintenance Plan. Some examples of activities that are prohibited in the capped areas unless approved by Ecology or in compliance with the approved Operations and Maintenance Plan include; drilling, digging, placement of any objects or use of any equipment which deforms or stresses the surface beyond its load bearing capability, piercing the surface with a rod, spike or similar item, bulldozing or earthwork.

Section 3. The Site shall not be used for any activities other than traditional industrial uses, as described in RCW 70.105D.020(23), and defined in and allowed under the City of Seattle's zoning regulations.

Section 4. The owner of the Site must give written notice to the Department of Ecology, or to a successor agency, of the owner's intent to convey any interest in the Site. No conveyance of title, easement, lease or other interest in the Site shall be consummated by the owner without adequate and complete provision for the continued operation, maintenance and monitoring of the Cleanup Action.

Section 5. The owner must notify and obtain approval from the Department of Ecology, or from a successor agency, prior to any use of the Site that is inconsistent with the terms of this Restrictive Covenant. The Department of Ecology or its successor agency may approve such a use only after public notice and comment.

Section 6. The owner shall allow authorized representatives of the Department of Ecology or of a successor agency, the right to enter the Site at reasonable times for the purpose of evaluating compliance with the Cleanup Action Plan and the Consent Decree, to take samples, to inspect Cleanup Actions conducted at the Site and to inspect records that are related to the Cleanup Action.

Section 7. The owner of the Site and the owner's assigns and successors in interest reserve the right under WAC 173-340-440 (1991 ed.) to record an instrument which provides that this Restrictive Covenant shall no longer limit use of the Site or be of any further force or effect. However, such an instrument may be recorded only with the consent of the Department of Ecology, or of a successor agency. The Department of Ecology or a successor agency may consent to the recording of such an instrument only after public notice and comment.

9507100874

Dated: 6-19-95

Name: M.R. Dinsmore
Title: M.R. Dinsmore
For The Port of Executive Director

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

This is to certify that on the 19th day of June, 1995, before me, the undersigned Notary Public, personally appeared M.R. Dinsmore, to me known to be the Executive Director of the Port of Seattle described in and who executed the

foregoing document, and acknowledged to me that he signed and sealed the same as his free and voluntary act and deed, for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year first above written.

NOTARY PUBLIC
State of Washington
DIANA PARKER
Commission Expires April 9, 1998

NOTARY PUBLIC in and for the State of Washington, residing at Seattle
My Commission Expires: 4-9-98
Print Name: DIANA PARKER

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EXHIBIT A

THOSE PORTIONS OF BLOCKS 433, 437, 438, 439, 440 AND 442 IN SEATTLE TIDE LANDS; AND OF BLOCKS 439A, 440A, AND 442A IN HALLER'S SUPPLEMENTAL PLAT OF PORTIONS OF BLOCKS 428, 432, 433, 439, 440, 441, 442, SEATTLE TIDE LANDS, AS PER PLAT RECORDED IN VOLUME 12 OF PLATS, PAGE 9; RECORDS OF KING COUNTY; AND TRACTS A AND B IN PROSPECT TRACTS, AS PER PLAT RECORDED IN VOLUME 10 OF PLATS PAGE 13, RECORD OF KING COUNTY; AND LOTS 1 THROUGH 9 IN BLOCK 1 OF READ'S 1ST ADDITION TO THE CITY OF SEATTLE, AS PER PLAT RECORDED IN VOLUME 16 OF PLATS, PAGE 88, RECORDS OF KING COUNTY; AND OF 28TH AVENUE SOUTHWEST AS VACATED BY CITY OF SEATTLE ORDINANCE NOS. 86694 AND 93905; AND OF 29TH AVENUE SOUTHWEST AS VACATED BY CITY OF SEATTLE ORDINANCE NO 89246 AND 93905; AND OF SOUTHWEST HANFORD STREET AS VACATED BY CITY OF SEATTLE ORDINANCE NO 94599; AND OF SOUTHWEST LANDER STREET AS VACATED BY CITY OF SEATTLE ORDINANCE NO 93905, ALL IN SECTIONS 12 AND 13 OF TOWNSHIP 24 NORTH, RANGE 3 EAST, W.M., DESCRIBED AS FOLLOWS:

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BEGINNING AT THE INTERSECTION OF THE CENTERLINE OF SAID SOUTHWEST HANFORD STREET AS VACATED BY ORDINANCE NO 94599 WITH THE EAST MARGIN OF HARBOR AVENUE SOUTHWEST;
THENCE NORTHWESTERLY, ALONG SAID EASTERLY MARGIN OF HARBOR AVENUE SOUTHWEST, TO THE MOST WESTERLY CORNER OF LOT 1 IN SAID BLOCK 442 AND THE SOUTHERLY MARGIN OF SOUTHWEST FLORIDA STREET;
THENCE NORTH 76°42'13.5" EAST, ALONG SAID SOUTHERLY MARGIN, 382.167 FEET.
THENCE SOUTH 22°43'31" EAST, ALONG THE EASTERLY LINE OF THE PROPERTY CONVEYED IN DEED RECORDED UNDER RECORDING NO. 7208280278. A DISTANCE OF 932.61 FEET TO AN ANGLE POINT IN SAID EASTERLY LINE;
THENCE SOUTH 23°18'50" EAST, 1,002.01 FEET;
THENCE SOUTH 31°27'17" EAST, TO AN INTERSECTION WITH THE CENTERLINE OF SAID VACATED SOUTHWEST HANFORD STREET;
THENCE WESTERLY ALONG SAID CENTERLINE, TO AN INTERSECTION WITH THE CENTERLINE OF SAID VACATED 28TH AVENUE SOUTHWEST;
THENCE SOUTHERLY ALONG SAID CENTERLINE, TO AN INTERSECTION WITH THE EASTERLY PRODUCTION OF THE NORTH LINE OF LOT 40 IN SAID BLOCK 437;
THENCE WESTERLY, ALONG SAID NORTH LINE, TO THE NORTH-SOUTH CENTERLINE OF SAID BLOCK 437;
THENCE SOUTHERLY ALONG SAID NORTH-SOUTH CENTERLINE; TO THE NORTHEAST CORNER OF LOT 13 IN SAID BLOCK 437;

THENCE WESTERLY, ALONG THE NORTH LINE OF SAID LOT 13, TO THE NORTHWEST CORNER OF SAID LOT 13 ON THE EASTERLY MARGIN OF 29TH AVENUE SOUTHWEST;
THENCE NORTHERLY, ALONG SAID MARGIN, TO THE EASTERLY PRODUCTION OF THE SOUTH LINE OF LOT 9 IN BLOCK 1 OF SAID READ'S 1ST ADDITION;
THENCE WESTERLY, ALONG SAID PRODUCED LINE, TO THE SOUTHWEST CORNER OF SAID LOT 9 ON THE EASTERLY MARGIN OF HARBOR AVENUE SOUTHWEST;
THENCE NORTHERLY, ALONG SAID EASTERLY MARGIN, TO THE SOUTHERLY MARGIN OF SAID SOUTHWEST HANFORD STREET AS SHOWN ON SAID PLAT;
THENCE EASTERLY, ALONG SAID SOUTHERLY MARGIN, TO AN INTERSECTION WITH THE SOUTHERLY PRODUCTION OF THE EASTERLY LINE OF SAID HARBOR AVENUE SOUTHWEST AS ESTABLISHED BY ORDINANCE NO 92187;
THENCE NORTHERLY, ALONG SAID SOUTHERLY PRODUCTION, TO THE POINT OF BEGINNING;
SITUATE IN THE CITY OF SEATTLE, COUNTY OF KING, STATE OF WASHINGTON.
ALSO TOGETHER WITH AN EASEMENT FOR INGRESS, EGRESS AND UTILITIES AS DELINEATED IN INSTRUMENT RECORDED MAY 23, 1991 UNDER KING COUNTY RECORDING O. 9105230531;

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ALSO TOGETHER WITH AN EASEMENT FOR THE CONSTRUCTION, INSTALLATION, OPERATION, ILLUMINATION, MAINTENANCE AND REPAIR OF A SIGN AS DELINEATED IN INSTRUMENT RECORDED MAY 23 1991 UNDER KING COUNTY RECORDING NO 9105230532;

SITUATE IN THE CITY OF SEATTLE, COUNTY OF KING, STATE OF WASHINGTON.

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