Lakepointe aka Kenmore Industrial Park site

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A Report Prepared For:
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GROUND WATER MONITORING WORK PLAN 2009 KENMORE INDUSTRIAL PARK

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1.0 INTRODUCTION

1.1 PURPOSE

This Work Plan specifies procedures for two semi-annual rounds of groundwater monitoring at the Kenmore Industrial Park (Site) located in Kenmore, Washington (Figure 1-1). This Work Plan was prepared at the request of the State of Washington Department of Ecology (Ecology). This Work Plan is a one-time supplement to the procedures outlined in the *Kenmore Industrial Park Compliance Monitoring Plan* (CMP) prepared in 2001 pursuant to a Consent Decree and Cleanup Action Plan between Ecology and Pioneer Towing Company, Inc., and does not expand the scope of the signed Consent Decree.

1.2 SCOPE OF WORK

The work to be performed includes the following:

- redevelopment of existing monitoring wells AW-6, AW-9, AW-10, AW-11, and AW-12
- water level measurements
- two semi annual rounds of groundwater compliance monitoring
- reporting

1.3 PROJECT SCHEDULE

Redevelopment of the existing wells at the Site will be conducted in July 2009. Groundwater monitoring will be performed in July or August 2009 (summer high-water conditions) and in January 2010 (winter low-water conditions). A letter report will be submitted to Ecology approximately 30 days after receiving the laboratory report following each semi annual groundwater monitoring event.

1.4 HEALTH AND SAFETY

The Site Health and Safety Plan for ground water monitoring at the Kenmore Industrial Park will be completed prior to the start of activities.

1.5 SITE DESCRIPTION

The Kenmore Industrial Park (Site) is located southwest of the intersection of Bothell Way N.E. and 68th Avenue N.E. (Juanita Drive), along the 6500 to 6800 blocks of N.E 175th Street in Kenmore, Washington, (Figure 1). The Site occupies approximately 45 acres of land and is bordered by the Kenmore Navigation Channel (a dredged extension of Lake Washington) to the northwest, Lake Washington to the west, and the Sammamish River to the south. The US Army Corps of Engineers controls the elevation of Lake Washington. Seasonal high lake

levels are maintained between May and October at an approximate elevation of 18.4 feet (relative to King County Aerial Survey Datum, Benchmark KC-B-16). Seasonal low lake levels are maintained between December and March at an approximate elevation of 16.5 feet.

1.6 GEOLOGY AND HYDROGEOLOGY

The Kenmore Industrial Park is underlain by demolition fill material that averages approximately 15 feet in thickness. Native peat soils underlie the southern two-thirds of the Site at the depths ranging between 15 to 35 feet below ground surface (bgs). Silts and clays grading into interbedded fine sands and sandy fine gravel underlie the southern portion of the site at the depths of 24 to 45 bgs. Sands and gravel, interpreted as Vashon glacial recessional outwash, underlie the entire Site at depths of 25 to 50 feet bgs.

Shallow unconfined groundwater is present within the debris fill layer and native granular soils. Shallow groundwater flows to the south and southwest and discharges into to the Sammamish River and Lake Washington. Shallow groundwater levels near the shoreline closely correspond to Lake Washington water elevations with the lowest groundwater levels reported during the winter seasons (when the lake is lowered) and the highest levels reported during the summer season (when the lake is raised).

2.0 MONITORING PROCEDURES

2.1 GROUNDWATER MONITORING NETWORK

Ground water samples will be collected from five wells; AW-6, AW-9, AW-10, AW-11, and AW-12. A duplicate sample will be collected from well AW-6 or AW-11 as a quality control (QC) check.

2.2 MONITORING PARAMETERS

Groundwater samples will be analyzed in the field for:

- pH
- specific conductance
- temperature
- dissolved oxygen (DO)

Groundwater samples collected from the monitoring wells will be analyzed in the laboratory for:

- diesel range total petroleum hydrocarbons (TPH)
- oil range TPH
- dissolved arsenic, barium, and lead
- semi-volatile organics SVOCs/SIM (wells AW-6 and AW-11)

A silica gel cleanup procedure will be used for the TPH analyses to minimize the potential for interference from peat and woodwaste present at the Site. Analytical methods, method reporting limits, recommended sample containers, sample preservatives, and sample holding times are presented on the following table.

Analytical Methods
Kenmore Industrial Park, Kenmore, Washington

Parameter	Method Number	Method	Unit	Method Reporting Limit
Laboratory Parameters				
Diesel Range Petroleum Hydrocarbons	NWTPH-Dx	GC/FID	mg/L	0.25
Oil Range Petroleum Hydrocarbons	NWTPH-Dx	GC/FID	mg/L	0.40
Dissolved Arsenic	USEPA 200.8	ICP/MS	µg/L	3
Dissolved Barium	USEPA 200.8	ICP/MS	µg/L	25
Dissolved Lead	USEPA 200.8	ICP/MS	µg/L	1
SVOCS/SIM	USEPA 8270	GC/MS	µg/L	Varies
Field Parameters				
pH	EPA 150.1	Probe	Standard	0.01
Conductivity	EPA 120.1	Probe	µS/cm	5
Dissolved Oxygen	EPA 360.2	Probe	mg/L	0.1
Temperature	EPA 170.1	Mercury Thermometer	ºC	0.5

Note: GC/FID = Gas chromatogram with flame ionization detector
ICP/MS = Inductively coupled plasma mass spectroscopy
GC/MS = Gas chromatogram with mass spectrometer

Sample containers will be prepared and provided by OnSite Environmental, Inc. or another State of Washington accredited laboratory. The following table provides a summary of sample containers, preservation methods, and holding times

Sample Containers, Preservation Methods, and Holding Times
Kenmore Industrial Park, King County, Washington

Parameter	Container	Preservation Method	Holding Time
TPH	Two 1-L Amber Bottle	Cool to 4ºC HCl to pH < 2	14 days
Metals, dissolved	One 1-L HDPE	Field filter Cool to 4ºC HNO_3 to pH< 2	6 months
SVOCs	Two 1-L Amber	Cool to 4ºC	7 days

Note: HDPE indicates high density polyethylene

2.3 WELL REDEVELOPMENT

Monitoring wells AW-6, AW-10, AW-11, AW-12, and AW-9 will be inspected and re-developed prior to collecting samples. Depth to water and depth to base of well will me measured and compared to well logs. Redevelopment will include impulse generation within the well using the Hydropuls® impulse generation tool. The Hydropuls tool emits short, relatively high pressure bursts of nitrogen that vibrate and loosen fine sediment, biofoul and mineral encrustations impacting the well screen and surrounding aquifer. Following use of the Hydropuls, bailing with a disposable bailer will be completed to remove any sediment that may accumulate in the well. The well will be impulsed with a sufficient energy to create ground water flow reversals in and out of the well to release and draw fines into the well.

Monitoring well development will begin at the bottom of the well to remove potentially accumulated fines, working up to the top of the well screen, and than back down to the bottom in increments of five feet or less until the discharged groundwater appears to be clear. A record of the time, volume, clarity, pH, and specific conductance of the water removed from the well will be kept in the field logs. Non-dedicated equipment will be thoroughly decontaminated prior to placement in the well.

2.4 WATER LEVEL MEASUREMENTS

Groundwater elevations will be measured at each monitoring well prior to sample collection. Depth to water measurements will be obtained with an electric water level probe. Water levels will be measured to the nearest 0.01 foot. All measurements will be taken from a surveyed and marked point on the top of the PVC well casing. Measurements will include the date, time, and name of the operator. The level of Lake Washington (obtained from the US Army Corps of Engineers) will be reported for each round of groundwater levels. The water level probe will be rinsed with deionized water between each use.

2.5 WELL PURGING

Monitoring wells will be purged using low stress methods as described by the USEPA. Each well will be purged with an adjustable rate, peristaltic pump in a manner that will minimize the entrainment of sediment or colloids. The pump will be started at a low speed setting and slowly increased in speed until discharge occurs. The pump speed will be adjusted such that there is little or no water level drawdown (less than or equal to 0.3 feet). It is anticipated that the wells will be purged at rates of approximately 0.1 to 0.5 liters per minute. If drawdown exceeds 0.3 feet at these discharge rates but remains stable, purging may continue. Each well will be purged until field parameters of pH, conductivity, temperature, and DO stabilize and until a minimum of one casing volume of water is removed. If after 4 hours of purging the field

parameters have not stabilized, purging will be discontinued and the groundwater samples will be collected. The water level will be periodically monitored (approximately every five minutes) with an electric well probe during purging. The water level, pumping rate and any pumping rate adjustments will be recorded.

2.6 FIELD MEASUREMENTS

Sampling data will be recorded on a Field Sampling Data Sheet. Sampling data will include the date and time, water level, purge rate, type and size of container and preservative (if any) used for each parameter, as well as field measurements of pH, specific conductance, temperature, and DO. Field parameters will be measured approximately every five minutes during purging with an in-line flow cell. Field parameters will be considered stabilized when three consecutive readings at three to five minute intervals are within ± 10 percent difference.

Field parameters will be measured to the following standards:

- Temperature to ±0.5°C
- pH to ±0.01 units
- Specific conductance to ±1 µS/cm (measured specific conductance < 1,000 µS/cm), or ±10 µS/cm (measured specific conductance > 1,000 µS/cm)
- Dissolved Oxygen (DO) to ±0.1 mg/L

Field meters will be calibrated before measurements are taken and approximately every 4 hours thereafter. Calibration dates, times, and procedures will be recorded in a field logbook.

2.7 GROUNDWATER SAMPLE COLLECTION

Samplers will wear new neoprene or Solvex-type gloves at each sampling location. The rate at which the well is sampled will be equal to or less than the purging rate. Groundwater samples will be transferred directly from the discharge end of the peristaltic pump into containers prepared by the laboratory for the given parameters. A duplicate sample will be collected at well AW-6 or AW-11. Groundwater samples will be collected in the following order:

- field parameters (pH, specific conductance, temperature)
- TPH
- SVOCs (wells AW-6 and AW-11)
- Dissolved metals

2.8 FIELD FILTERING

Groundwater samples collected for dissolved metals testing will be filtered at the time of sample collection. A disposable 0.45-micron, in-line filter will be attached directly to the discharge tube of the pump. Each in-line filter will be used only once. The estimated thickness of the filter removed fines will be logged on the Field Sampling Data Sheet.

2.9 SAMPLE HANDLING

Samples will be labeled, handled, and shipped using the procedures described in CMP, Section 6. Sample custody will be maintained until delivery to the laboratory. All sampling field activity and data will be recorded in a field logbook and on a FSDS as appropriate.

2.9 SAMPLE LABELING

Each sample will be assigned an alphanumeric code that will be used to identify the Site, the date of sample collection, and the source of the sample (monitoring well location, surface water, or quality control sample). A designation such as "KIP" will be used to identify the Site. The Site designation will be followed by the month and year the sample was collected. Finally, a numbered sequence of one through the total number of samples collected will be added. For example KIP-0709-1 would indicate the first sample from a sampling event that began in July 2009.

A FSDS form will be kept for each sample. The FSDS will identify the source of the sample, the sample code, and field measurements and observations.

Sample container labels will be completed before or immediately after sample collection. Container labels will include the following information:

- project name
- project number
- sample code
- name of collector
- date and time of collection
- location of sample collected
- analyses requested

2.10 SAMPLE PRESERVATION AND SHIPMENT

Water samples will be shipped to the selected laboratory the same day as collected as follows:

- sample containers will be transported in a sealed, chilled cooler

- glass bottles will be separated by absorbent, shock-absorbing material to prevent breakage and leakage
- ice or blue ice, sealed in separate plastic bags, will be placed into each shipping container with the samples
- a Chain-of-Custody/Laboratory Analysis Request Form (see Appendix B) will accompany each sample shipment in a sealed plastic bag taped to the inside lid of the shipping container
- the laboratory's name and address and sampler's return address will be placed on each container before shipping

2.11 CHAIN-OF-CUSTODY

Once a sample is collected, it will remain in the custody of the sampler or other qualified personnel until shipment to the laboratory. Upon transfer of sample containers to subsequent custodians, a Chain-of-Custody/Laboratory Analysis Request Form will be signed by the persons transferring custody of the sample container. The form will request that laboratory quality control include matrix spike/matrix spike duplicate analyses. Chain-of-custody records will be included in the report prepared by the laboratory.

2.12 DECONTAMINATION PROCEDURES

Non-dedicated water sampling equipment will be decontaminated before each use with the following procedure:

- tap water rinse
- non-phosphatic detergent (liquinox) and tap water wash
- tap water rinse
- dilute nitric acid rinse (pH <2)
- distilled water rinse
- dilute methanol rinse
- distilled water rinse

The electric well probe will be rinsed with distilled water between each well use. New polyethylene tubing will be used for purging at each well.

2.13 RESIDUALS MANAGEMENT

Water generated from the redevelopment and sampling of the groundwater monitoring wells, used decontamination solutions, and used disposable clothing and equipment will be handled as described below:

- all water generated from purging and sampling of monitoring wells will be collected and contained in a 55-gallon drum and subsequently disposed in an appropriate manner
- liquids generated from the decontamination of nondedicated sampling equipment will be contained in a 55-gallon drum and subsequently disposed in an appropriate manner
- disposable clothing and equipment will be placed in plastic bags and disposed of as solid waste

2.14 DOCUMENTATION

Accurate documentation of field activities and measurements will be maintained using field log books, and field data forms. Entries will be made in sufficient detail to provide an accurate record of field activities without reliance on memory. Field log entries will include a chronological description of task activities, names of individuals present, names of visitors, weather conditions, etc. All entries will be legibly entered in ink, dated, and initialed.

A letter report will be submitted to Ecology for review and approval approximately 30 days after receiving the laboratory report following each semi annual groundwater monitoring event. The report will include a summary of sampling activities and a discussion of results, including a summary table, QA/QC evaluation, comparisons to cleanup levels listed in the Cleanup Action Plan and previous results from 2001, and figure(s) showing the groundwater flow direction, water level contours, and geographic distribution of sampling results (if appropriate). In addition, test results will be input into Ecology's Environmental Information Management (EIM) Database.

If, after completing the dry season 2009 compliance monitoring event, the water quality results are non-detect or substantially below cleanup levels, reduced monitoring in the form of fewer wells or reduced testing may be approved by Ecology for the wet season 2010 compliance monitoring event. Similarly, if the water quality results from the dry season 2009 compliance monitoring event show significant exceedances of cleanup levels, additional parameters may suggested by Ecology for the wet season 2010 compliance monitoring event. Changes to the wet season 2010 compliance monitoring event must be approved by both Ecology and Pioneer Towing.