August 2, 2011
Project 101.00433.00003

Mr. Larry Smith
Olympic Water & Sewer, Inc.
70 Breaker Lane
Port Ludlow, Washington 98635

Re: Additional Investigation Report, Olympic Water & Sewer, Inc. Property, 781 Walker Way, Port Ludlow, Washington

Dear Larry:

SLR International Corp (SLR) has prepared this report to present the results of an additional investigation at the above-referenced property. The primary objectives of the work were to: 1) evaluate the potential groundwater impacts to surface water in a nearby intermittent stream, 2) delineate the southwestern and eastern extents of the gasoline-impacted perched groundwater, 3) further delineate the area of the gasoline-impacted soil near the garage building, and 4) further assess potential seasonal variability in the perched groundwater elevations and water quality.

PROPERTY DESCRIPTION AND HISTORY

The subject property, which is owned by Olympic Water & Sewer, Inc. (OWSI), is located at 781 Walker Way in Port Ludlow, Washington. The location of the property is shown on Figure 1. The property is located at the southwest corner of the intersection of Walker Way and Rainier Lane (see Figure 2). The property is surrounded by private residences to the south and west; by Walker Way, a commercial business (storage facility), and private residences to the north; and by Rainier Lane and private residences to the east.

The OWSI property is an approximate 2.2-acre parcel that is partially developed with an OWSI operation and maintenance facility. The facility consists of an approximate ½-acre area that includes an office/shop/garage building (garage building), a public water supply well (Well #2) and associated pump house building, and a storage trailer (see Figure 2). The ground surface within the facility is primarily unpaved, except for a narrow asphalt driveway that runs down the center of the facility from Walker Way to approximately the storage trailer. The ground surface of the facility slopes gently to the southwest. Within the OWSI property, the facility is surrounded on all sides by dense forest, and a gulley containing an intermittent stream is located within the forest to the west of the facility. The facility has been operating since 1968, after the installation of the water supply well. Prior to 1968, the property was undeveloped.

SUMMARY OF PREVIOUS ENVIRONMENTAL ACTIVITIES

UST Removals

In September 1990, Applied Geotechnology, Inc. (AGI) removed three gasoline underground storage tanks (USTs) at the property. A 1,000-gallon UST was located beneath the floor of the northern garage bay, a 2,000-gallon UST was located outside (west) of the northern garage bay, and another 2,000-gallon UST was located approximately 40 feet south of the garage. The approximate locations of the UST excavations are shown on Figure 2. After removing each UST, one soil sample was collected from the sidewalls and/or floor of each excavation for laboratory analysis. The soil sample analytical results showed that the floor samples from the 1,000-gallon UST excavation and the northern 2,000-gallon UST excavation contained total petroleum hydrocarbons (TPH; identified as gasoline) concentrations of 3,000 and 963 milligrams per kilogram (mg/kg), respectively (AGI, 1991). There was no field evidence of gasoline-impacted soil in the southern 2,000-gallon UST excavation, and a composite soil sample from the sidewalls and floor of the excavation did not contain a TPH concentration greater than the method reporting limit (MRL).

To remove additional impacted soil in the 1,000-gallon UST excavation and the northern 2,000-gallon UST excavation, soil excavation activities were conducted in October 1990. The 2,000-gallon UST excavation was extended to a depth of approximately 12 feet below ground surface (bgs). Soil samples collected from the sidewalls and floor of the expanded excavation contained TPH as gasoline concentrations of up to 30 mg/kg (AGI, 1991), which is the current Model Toxics Control Act (MTCA) Method A soil cleanup level. To prevent any structural damage to the building, the 1,000-gallon UST excavation could only be extended to a depth of approximately 10 feet bgs. A composite floor sample from the expanded excavation contained a TPH as gasoline concentration (1,237 mg/kg) that exceeded the current Method A soil cleanup level, and a composite sidewall sample contained a TPH concentration (30 mg/kg) that equaled the current Method A cleanup level. Approximately 120 cubic yards of impacted soil were removed from the northern 2,000-gallon UST excavation, and approximately 30 cubic yards of impacted soil were removed from the 1,000-gallon UST excavation. The soil was transported off-site for treatment by aeration and biodegradation methods.

In October 1990, a water sample from Well #2 at the property was collected and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) to determine if petroleum hydrocarbons had impacted the water supply. The sample did not contain BTEX concentrations greater than the MRLs (AGI, 1991).

In January 1991, AGI assessed the soil conditions beneath the 1,000-gallon UST excavation by drilling and sampling an angle boring (designated MW-1). The approximate location of the boring is shown on Figure 3. The boring was drilled at an

angle of 25 degrees east of vertical and extended to a measured depth of approximately 30 feet (27 feet vertical depth and 12 feet east of the top of the hole). Soil samples collected from the boring, at depths of approximately 15 and 30 feet, did not contain TPH concentrations greater than the MRL (AGI, 1991).

Water Supply Well Replacement

Well #2 has been operating as a public water supply well since 1968. The well, which is located at the northern end of the property, is screened at depths ranging from 214 to 245 feet bgs. After 40 years of operation, the yield of Well #2 was decreasing, and in 2009, OWSI decided to install a replacement well (designated Well #17) at the southern part of the facility. The planned construction of Well #17 was similar to the construction of Well #2.

On April 21, 2009, during the drilling of the Well #17, the driller noticed a gasoline odor emanating from the well casing at a depth of approximately 50 feet [Robinson Noble & Saltbush, Inc. (Robinson Noble), 2009]. The drilling was discontinued, and soil and perched groundwater samples were collected from the bottom of the casing for laboratory analysis. The analytical results showed that the groundwater sample contained gasoline-range organics (GRO) and benzene concentrations [5,530 and 948 micrograms per liter (µg/L), respectively] that exceeded the MTCA Method A groundwater cleanup levels (800 and 5 µg/L, respectively). Due to the presence of gasoline-impacted perched groundwater, the well was not completed and the casing was capped. The location of the casing for Well #17 is shown on Figure 2.

On April 23, 2009 and April 15, 2010, water samples were collected from Well #2 to further verify that petroleum hydrocarbons had not impacted the water supply. The sample analytical results showed that petroleum hydrocarbons were not detected above the MRLs. The analytical results of the 2009 and 2010 samples were presented in reports prepared by Robinson Noble (Robinson Noble, 2009) and SLR (SLR, 2010), respectively.

Notification of Discovery of Release

Within 24 hours after the laboratory confirmed that GRO and benzene concentrations were present above MTCA Method A cleanup levels in the perched groundwater, Mr. Greg Rae of OWSI notified the Jefferson County Health Department (Health Department) of the impacted groundwater, and the Health Department notified the Washington Department of Ecology (Ecology). Ecology added the OWSI property to it's Confirmed or Suspected Contaminated Sites database.

In 2011, the Health Department conducted a site hazard assessment, and applied the Washington Ranking Method to calculate a hazard ranking of "2" for the OWSI site (Health Department, 2011). It is our understanding that Ecology will not issue a final

hazard ranking for the site until August 2011, when the site is added to Ecology's Hazardous Sites List.

Initial Subsurface Investigation

From April through October 2010, SLR conducted a subsurface investigation at the subject property to further assess the gasoline concentrations in the soil at the area of the northern former gasoline USTs, to delineate the lateral and vertical extents of the gasoline-impacted perched groundwater, and to characterize any seasonal effects on the perched groundwater elevations and water quality. The investigation consisted of drilling and sampling four initial soil borings (MW-1A, MW-1B, MW-1C, and MW-2A) in April, drilling and sampling four additional soil borings (MW-1, MW-2, MW-3, and MW-4) in June, completing the June borings as perched groundwater monitoring wells (MW-1, MW-2, MW-3, and MW-4), and conducting groundwater sampling events in June and October. The locations of the soil borings and monitoring wells are shown on Figure 2. The initial borings (MW-1A, MW-1B, MW-1C, and MW-2A) were drilled by using hollow-stem auger methods and met refusal due to cobbles, at depths ranging from approximately 19.5 to 39 feet bgs. In June, borings MW-1, MW-2, MW-3, and MW-4 were drilled by using air rotary methods, and were advanced to depths ranging from approximately 46 to 60 feet bgs.

During the drilling of each boring, soil samples were collected by using a split-spoon sampler. The samples were collected at approximate 5-foot intervals; however, if the boring was located adjacent to a previous boring (MW-1, MW-1B, MW-1C, and MW-2) or was not located near a potential contaminant source area (MW-3 and MW-4), the soil samples were not collected until reaching the depth of the previous adjacent boring or until reaching a depth just above the estimated perched groundwater table. SLR screened each soil sample, as well as the drill cuttings, for evidence of petroleum hydrocarbons. Strong hydrocarbon-like odors were present in borings MW-1A, MW-1B, and MW-1C at depths between approximately 16.5 and 31.5 feet bgs (SLR, 2010). MW-1A, MW-1B, and MW-1C were drilled within and near the northern 2,000-gallon gasoline UST excavation (see Figure 3). There was limited or no field evidence of petroleum hydrocarbons in the soil samples and cuttings from the other borings.

During the initial drilling in April 2010, the soil sample that exhibited the greatest evidence of petroleum hydrocarbons (the 24.5-foot-deep sample from MW-1B) was submitted to an Ecology-certified laboratory [Friedman & Bruya, Inc. (F&B) in Seattle, Washington] for analysis of GRO, BTEX, methyl tertiary butyl ether (MTBE), 1,2-dibromoethane (EDB), 1,2-dichloroethane (EDC), naphthalene, and lead. The analytical results showed that the sample contained GRO and benzene concentrations (140 and 0.49 mg/kg, respectively) that exceeded the MTCA Method A soil cleanup levels (30 and 0.03 mg/kg, respectively). The sample also contained toluene, ethylbenzene, total xylenes,

naphthalene, and lead concentrations that were below the Method A cleanup levels (SLR, 2010).

Based on the previous soil sample analytical results from MW-1B, two selected soil samples from each of the June 2010 borings (MW-1, MW-2, MW-3, and MW-4) were submitted to F&B for analysis of GRO, BTEX, and naphthalene. The analytical results showed that samples from MW-2 (at depths of approximately 40 and 55.5 feet bgs) and MW-3 (at a depth of approximately 45.5 feet bgs) contained benzene concentrations (0.036 to 0.21 mg/kg) that exceeded the Method A soil cleanup level; however, those samples were collected at depths of up to 15 to 20 feet below the perched groundwater table and the benzene concentrations likely reflect dissolved benzene in pore water rather than benzene adsorbed to the soil. The soil samples from MW-1 and MW-4 did not contain analyte concentrations greater than the MRLs.

Monitoring wells MW-1 through MW-4 were constructed with 2-inch-diameter schedule 40 PVC casing and screen. The screen lengths ranged from approximately 10- to 20-feet long to try to ensure that each screen intersected the perched groundwater table. To assess the perched groundwater conditions and evaluate potential seasonal variations in groundwater elevations and quality, SLR personnel conducted groundwater sampling events on June 14 and October 20, 2010. In June, the depths to groundwater in the wells ranged from 23.92 to 41.33 feet, and in October, the depths to groundwater ranged from 26.67 to 40.71 feet (SLR, 2010).

The June 2010 groundwater samples were submitted to F&B for analysis of GRO, BTEX, MTBE, EDB, EDC, naphthalene, and total lead. The analytical results showed that the sample from MW-2 contained GRO, benzene, and ethylbenzene concentrations (8,400, 2,100, and 960 µg/L, respectively) that exceeded the MTCA Method A groundwater cleanup levels (800, 5, and 700 µg/L, respectively). The sample from MW-1 contained GRO and benzene concentrations (990 and 110 µg/L, respectively) that exceeded the Method A cleanup levels. The samples from MW-3 and MW-4 contained analyte concentrations that were either below the Method A cleanup levels or the MRLs.

The October 2010 groundwater samples were submitted to F&B for analysis of GRO, BTEX, and naphthalene. The analytical results showed that the samples from MW-1 and MW-2 contained GRO concentrations (1,900 and 3,900 µg/L, respectively) and benzene concentrations (520 and 1,300 µg/L, respectively) that exceeded the MTCA Method A groundwater cleanup levels (SLR, 2010). The samples from MW-3 and MW-4 did not contain analyte concentrations that exceeded the MRLs.

ADDITIONAL INVESTIGATION

In April 2011, SLR conducted an additional investigation at the subject property to meet the objectives described in the first paragraph of this report. The additional investigation activities and the results of the work are presented below.

Inspect Gulley and Collect Surface Water Sample

The gulley located in the western part of the OWSI property extends south, beyond Oak Bay Road, to a low lying marshy area near Puget Sound. During the initial investigation, SLR inspected the portion of the gulley within the property in October 2010. There was no observed evidence of groundwater seepage, and there was no surface water in the gulley at that time. On April 4, 2011, SLR personnel inspected the gulley once again, and a stream was present. The stream extended south, beyond Oak Bay Road, to Port Ludlow Bay, and was also present to the north of Walker Way [upslope (north) of the subject property]. The Jefferson County Health Department reported that the intermittent stream in the gulley is classified by the Washington Department of Natural Resources as a fish habitat (Jefferson County Health Department, 2011). On April 4, 2011, groundwater seeps were not observed on the eastern bank of the gulley, within the subject property.

To assess potential groundwater impacts to the intermittent stream and to delineate the southwestern extent of the impacted perched groundwater, SLR collected a sample of the stream water (designated Stream-4411) at a location in the southwestern part of the subject property. The sample location was to the southwest of the area of impacted perched groundwater (see Figure 4). The stream sample was collected at an elevation of approximately 262.25 feet above the NAVD 88 datum, which was approximately 4 to 11 feet below the perched groundwater elevations at the northern and southern parts of the property (273.38 and 266.35 feet at monitoring wells MW-4 and MW-3, respectively) at the time of the sampling.

The stream sample was submitted to F&B for analysis of BTEX by EPA Method 8021B and GRO by Ecology Method NWTPH-Gx. The analytical results showed that the sample did not contain any analyte concentrations greater than the MRLs. A copy of the laboratory report is presented in Appendix A.

Drill and Sample Soil Borings

On April 4, 2011, three soil borings (designated SB-1, SVE-1, and SVE-2) were drilled and sampled to further delineate the area of gasoline-impacted soil near the garage building. Boring SB-1 was located along the west side of the northern part of the building, SVE-1 was located along the west side of the southern part of the building, and SVE-2 was located approximately 12 feet to the south of the south end of the building (see Figures 2 and 3). Cascade Drilling, Inc. (Cascade) of Woodinville, Washington,

conducted the drilling activities under the direction of an SLR geologist. The borings were drilled by using hollow-stem auger methods, and soil samples were collected from the borings by using 3-inch diameter split-barrel samplers. The borings were advanced to a depth of approximately 37 feet bgs, which was the measured depth of the perched groundwater table at MW-1 in October 2010. The soil cuttings are stored on the property in properly labeled 55-gallon drums, pending off-site disposal at an Ecology-approved facility.

Since boring SVE-1 was located adjacent to previous boring MW-1B, a soil sample was only collected from the boring at a depth of approximately 14 feet bgs to assess the soil conditions immediately above the MTCA direct contact pathway compliance point of 15 feet bgs. Based on the results of the previous soil sampling near the garage building, soil samples were collected from borings SB-1 and SVE-2 beginning at a depth of approximately 15 feet. The soil samples were collected at 5-foot intervals and SLR screened each sample and the drill cuttings for evidence of petroleum hydrocarbons such as sheen, staining, odor, and detectable photoionization detector (PID) readings. Strong hydrocarbon-like odors were present in the samples and/or drill cuttings from borings SVE-1 and SVE-2 at depths between approximately 13 and 22 feet bgs and 18 and 24 feet bgs, respectively. There was no field evidence of petroleum hydrocarbons in the soil at boring SB-1. The soil sample from SVE-2 that exhibited the greatest evidence of petroleum hydrocarbons (collected at 20 feet bgs), the sample from SVE-1 at 14 feet bgs, and the sample from SB-1 at a depth immediately above the perched groundwater table (approximately 35 feet bgs) were submitted to F&B for analysis. Soil boring logs that present the field screening results are presented in Appendix B.

Perched groundwater was encountered in each of the borings at depths of approximately 35 to 36 feet bgs. However, at borings SVE-1 and SVE-2, a shallower saturated zone was encountered at depths of approximately 22 and 20 feet bgs, respectively. The shallow saturated zone was not observed at boring SB-1.

Immediately after drilling, boring SB-1 was abandoned by filling with hydrated bentonite pellets. To allow for the potential future testing of soil vapor extraction (SVE) at the site, borings SVE-1 and SVE-2 were completed as SVE points. Each point was constructed of 2-inch-diameter schedule 40 PVC casing and screen. The 15- to 20-foot-long screen (0.010-inch slots) for each SVE point was installed at depths that would likely influence the remaining impacted soil. A filter pack of 2/12 Lapis Lustre silica sand was installed from the bottom of each SVE point to approximately 2 feet above the uppermost screen slot. Hydrated bentonite chips were placed above the sand pack to approximately 2 feet bgs. A flush-grade, traffic-rated, steel monument was installed in concrete to protect each SVE point. The SVE point construction details are presented on the boring logs in Appendix B.

On April 6, 2011, SLR checked the SVE points for the potential presence of groundwater, and discovered that the both of the points contained over 15 feet of groundwater. To assess the shallow groundwater conditions, Tacoma Pump and Drilling, Inc. (Tacoma Pump), of Spanaway, Washington, developed the SVE points by using surging and bailing methods. The groundwater recovered in both SVE-1 and SVE-2 after development of the wells. The development water is stored on the property in properly labeled, 55-gallon drums, pending off-site disposal at an Ecology-approved facility.

Drill and Install Groundwater Monitoring Well

To delineate the eastern extent of the gasoline-impacted perched groundwater, a groundwater monitoring well (designated MW-5) was drilled and installed to the east of the office, along the eastern property line. The location of MW-5 is shown on Figure 2. On April 6, 2011, Tacoma Pump conducted the drilling and well installation activities under the direction of an SLR geologist. The soil boring was advanced to below the groundwater table of the perched zone (encountered at approximately 30 feet bgs), to a depth of approximately 37 feet bgs. Since MW-5 was not located near a potential contaminant source area, soil samples were collected from the boring at depths below 25 feet bgs to locate the perched groundwater table. The samples were collected at 5-foot intervals and SLR screened each soil sample, as well as the drill cuttings, for evidence of petroleum hydrocarbons such as sheen, staining, odor, and detectable PID readings. There was no field evidence of petroleum hydrocarbons in the boring. To assess the soil conditions near the perched groundwater table, a soil sample collected from the boring, at a depth of approximately 25 feet bgs, was submitted to F&B for analysis. During drilling, wet drill cuttings indicated that the shallower saturated zone was present at a depth of approximately 18 to 19 feet bgs.

Well MW-5 was constructed with 2-inch-diameter schedule 40 PVC casing and screen. The 10-foot-long screen (0.010-inch slots) was installed across the groundwater table of the perched zone at a depth of approximately 26 to 36 feet bgs. A filter pack of 10x20 Colorado™ silica sand was installed from the bottom of the well to approximately 1.5 feet above the uppermost screen slot. Hydrated bentonite chips were slowly placed above the sand pack to approximately 2 feet bgs. The bentonite was placed at depths that would seal the shallow saturated zone from the well screen. The well was completed approximately 3 feet above the ground surface, and a locking steel casing was installed in concrete to protect the well. After installation, Tacoma Pump developed the well by using surging and bailing methods. The development water is stored on the property in properly labeled, 55-gallon drums, pending off-site disposal at an Ecology-approved facility. A soil boring log that describes the well construction details is presented in Appendix B.

Following installation of the well and the SVE points, Signature Surveying & Mapping, PLLC (Signature) of Shoreline, Washington, surveyed the location, and the ground

surface and top of casing elevations of each new well and SVE point relative to the NAVD 88 datum. The top of casing elevations are presented in Table 1.

Conduct Groundwater Sampling Event

To delineate the eastern extent of the gasoline-impacted perched groundwater and further assess the seasonal variations in perched groundwater elevations and water quality, SLR personnel conducted a groundwater sampling event on April 7 and 8, 2011. On April 8th, the depths to groundwater were measured in all of the monitoring wells and SVE points by using an electronic water level probe. The depth to groundwater measurements were converted to groundwater elevations by using the results of the well and SVE point elevation survey described previously, as well as the results of a previous well elevation survey conducted in 2010 (SLR, 2010).

Prior to sample collection, SLR used a submersible Grundfos RediFlo 2 pump to purge all of the wells and SVE points by low flow (0.3 liters per minute) pumping methods. The pump intake was set at a depth of approximately 3 feet below the water table in each well. During purging, field parameters could not be measured because the meter would not operate properly. Since the meter was not working, the average volume of water purged from the wells during the October 2010 sampling event was used to determine when enough water had been purged from the wells/SVE points prior to collecting each sample. The groundwater samples were submitted to F&B for analysis. The purge water is stored on the property in properly labeled, 55-gallon drums, pending off-site disposal at an Ecology-approved facility.

SAMPLE ANALYTICAL RESULTS

Soil

The selected soil samples from borings SB-1, SVE-1, SVE-2, and MW-5 were submitted to F&B for analysis of GRO by Ecology Method NWTPH-Gx and for BTEX by EPA Method 8021B. The sample analytical results showed that the sample from SVE-2 (collected at a depth of approximately 20 feet bgs) contained a GRO concentration (110 mg/kg) that exceeded the MTCA Method A soil cleanup level (30 mg/kg). Toluene, ethylbenzene, and total xylenes were detected in the sample at concentrations (0.64, 0.55, and 1.50 mg/kg, respectively) that were below the Method A cleanup levels (7, 6, and 9 mg/kg, respectively). The samples from SB-1, SVE-1, and MW-5 contained analyte concentrations that were either below the Method A cleanup levels or below the MRLs. The soil sample analytical results are presented in Table 2, and copies of the laboratory reports are presented in Appendix A.

Groundwater

The groundwater samples collected in April 2011 were submitted to F&B for analysis of GRO by Ecology Method NWTPH-Gx and BTEX by EPA Method 8021B. The analytical results showed that the samples from SVE-1, MW-1, and MW-2 contained GRO concentrations (34,000, 3,000, and 5,600 µg/L, respectively) and benzene concentrations (550, 530, and 500 µg/L, respectively) that exceeded the MTCA Method A groundwater cleanup levels (800 and 5 µg/L, respectively). The sample from SVE-1 also contained toluene, ethylbenzene, and total xylenes concentrations (5,700, 850, and 3,300 µg/L, respectively) that exceeded the Method A cleanup levels (1,000, 700, and 1,000 µg/L, respectively). The sample from MW-4 contained a benzene concentration (5.30 µg/L) that barely exceeded the Method A cleanup level, and the sample from SVE-2 contained a GRO concentration (2,000 µg/L) that exceeded the Method A cleanup level and a benzene concentration (5 µg/L) that equaled the Method A cleanup level. The samples from MW-3 and MW-5 contained analyte concentrations that were either below the Method A cleanup levels or below the MRLs. The groundwater sample analytical results from this investigation and from the previous investigation are presented in Table 3. The GRO and benzene concentrations from the April 2011 sampling event are also shown on Figure 4. Copies of the laboratory reports are presented in Appendix A.

GEOLOGY AND HYDROGEOLOGY

Based on the results of this investigation and the 2010 investigation (SLR, 2010), the soils beneath the subject property consist of dense glacial advance outwash (sand, gravel, and silt units) with interbedded lacustrine silts to the maximum depth drilled (approximately 60 feet bgs). Specifically, thin surficial gravel fill is underlain by a sand (silty to gravelly) to gravel unit that is approximately 29 to 43 feet thick. Beneath the central and southern parts of the property, a 5- to 10-foot-thick sandy silt to silt is interbedded within the sand to gravel unit. The sand to gravel unit is underlain by clayey to gravelly silt that is 15 to more than 23 feet thick. At the northern and central parts of the OWSI facility, the clayey to gravelly silt unit is overlain by a silty sand that is up to 11 feet thick. In the central part of the facility (at MW-1 and MW-2), the top of the clayey to gravelly silt occurs at an elevation of approximately 251 feet above the NAVD 88 datum, while at the northern, southern, and eastern parts of the facility (at MW-4, MW-3, and MW-5, respectively), the clayey to gravelly silt occurs at higher elevations (approximately 260 to 263 feet above the NAVD 88 datum). At MW-2, MW-3, and MW-4, a gravelly sand to sand and gravel that is approximately 5 to 7.5 feet thick is interbedded within the clayey to gravelly silt unit (SLR, 2010). At MW-1, the clayey to gravelly silt unit is underlain by silty sand that extends beyond the bottom of the boring.

According to the driller's log for the water supply well (Well #2) located in the northern part of the property, a thick sequence of clay and cemented sand occurs from

approximately 49 to 215 feet bgs (SLR, 2010). The deep water-bearing units at Well #2 occur at depths between 215 and 245 feet bgs.

On April 8, 2011, the depths to groundwater in the wells and SVE points ranged from 19.80 to 36.98 feet below the tops of the well casings, and the groundwater elevations ranged from 256.89 to 275.85 feet above the NAVD 88 datum. The depths to groundwater and the groundwater elevations from the April 2011 monitoring event, as well as from the previous monitoring events, are presented in Table 1, and the groundwater elevations from the April 2011 monitoring event are shown on Figure 4. At wells MW-1 through MW-4, the groundwater elevations in April 2011 were 3.32 to 5.68 feet higher than in October 2010, and from June 2010 to April 2011, the groundwater fluctuations in the wells ranged from 3.81 to 5.68 feet. The higher groundwater elevations in April 2011 likely reflect seasonal recharge (infiltration of precipitation during the autumn and winter).

On April 8, 2011, the groundwater table beneath the property occurred within the sand to gravel unit, and appeared to be perched on top of the underlying clayey to gravelly silt unit (see Figure 5). During periods of seasonal recharge, groundwater collects above the silt and overlying silty sand units. In areas where the silty sands and silts are present at higher elevations, the groundwater elevations are higher. For example, groundwater elevations were 266.35 feet at MW-3, 273.19 feet at SVE-1, 273.88 at MW-4, and 274.07 feet at SVE-2 (see Figure 4). This groundwater is hydraulically continuous with the deeper perched groundwater intercepted by wells MW-1 and MW-2. The horizontal hydraulic conductivity of the sand to gravel unit is expected to be significantly (i.e., orders of magnitude) greater than the vertical hydraulic conductivity of the underlying silt and silty sand. Therefore, groundwater accumulating above the 265-foot elevation is expected to primarily flow laterally towards the gravels encountered at MW-2 or towards the intermittent stream in the gulley, upstream of the April 2011 stream sampling location.

The groundwater flow within the perched zone appears to be controlled by the geometry of the clayey to gravelly silt, with flow converging into the low point of the top of the silt unit (SLR, 2010). As described above, the elevation of the silt unit is about 10 feet lower in the central part of the facility than at the northern, southern, and eastern parts of the facility. This interpretation is consistent with the high petroleum hydrocarbon concentrations occurring in the groundwater at wells MW-1 and MW-2. Based on the known clayey to gravelly silt geometry and the area of petroleum hydrocarbon-impacted groundwater, there appears to be a flow component to the south-southwest. It is likely that the perched groundwater discharges to the intermittent stream, at locations near the southern end of the property, during periods of seasonal recharge.

CONCEPTUAL SITE MODEL

The conceptual site model (CSM) describes potential chemical sources, release mechanisms, environmental transport processes, exposure routes, and receptors. The primary purpose of the CSM is to describe pathways by which human and ecological receptors could be exposed to site-related chemicals. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment, (2) an environmental transport medium for a released chemical, (3) a point of potential contact with the impacted medium (referred to as the exposure point), and (4) an exposure route (e.g., soil ingestion) at the exposure point. Based on information collected to date, elements of potentially complete exposure pathways are presented in Figure 6. The processes that affect the fate and transport of released petroleum hydrocarbons in the environment, and potential exposure scenarios, are discussed below.

Primary Source

Chemicals of concern at the site consist of gasoline-related petroleum hydrocarbons and associated chemicals (i.e., BTEX). The source of the petroleum hydrocarbons appears to have been a leaking 1,000-gallon UST located beneath the floor of the garage and a leaking 2,000-gallon UST located along the west side of the garage. As mentioned previously, both of these USTs were removed from the site in 1990. Following UST removal, petroleum-impacted soil was excavated and removed to the extent practical. To prevent structural damage to the garage building, residual impacted soil was left in place beneath the 1,000-gallon UST.

Fate and Transport

Released petroleum constituents can exist in the environment in four different phases: adsorbed to soil, dissolved in water, as vapors, and as separate nonaqueous-phase liquid (NAPL) or residual product. To date, no evidence of NAPL has been detected in the subsurface at the OWSI property. The primary processes influencing transport of petroleum constituents in the subsurface include migration as NAPL (both vertically due to gravity and laterally along less permeable soil), leaching from soil to groundwater, volatilization from soil or groundwater to air, advection and dispersion in groundwater, and natural degradation. These potential fate and transport processes are further discussed below.

After a release from a UST, NAPL flows into the shallow soils near the tank. After saturating the soil, a portion of the NAPL can migrate downward and laterally through the vadose zone, and may reach the groundwater table, where it would float on the fluctuating groundwater. As the groundwater table rises and falls, a smear zone of residual hydrocarbons can form in the soil within the zone of groundwater fluctuation. A portion

of the product can migrate with groundwater flow and based on solubility, the product also dissolves in the groundwater. However, there is no evidence that NAPL migrated to the groundwater at the OWSI property, and there is no current evidence of NAPL in the soil.

Much of the OWSI facility is covered with gravel, and as rain falls on the ground surface and infiltrates into the subsurface, residual chemicals in soil can dissolve in the water and percolate through the soils. Some of the chemicals eventually reach the groundwater. Partitioning from soil to water is determined, in part, by the solubility of a particular hydrocarbon.

Once dissolved in groundwater, petroleum hydrocarbons may be transported by diffusion and advection away from the source area. Horizontal migration with groundwater (advection) is expected to be significantly more extensive at the OWSI property than vertical migration. The top of the impacted perched groundwater occurs at depths between approximately 20 to 41 feet bgs. The primary beneficial use aquifer in the vicinity of the property is currently used as a public water supply source, and occurs at depths of approximately 215 to 245 feet bgs beneath the property. A thick sequence of clay units beneath the property area (SLR, 2010) likely act as an aquitard preventing vertical migration of the shallow groundwater to the deeper beneficial use aquifer. As a result, the petroleum constituents are unlikely to migrate to water that is currently being used for drinking.

Dispersion, retardation, and biodegradation act to reduce the dissolved petroleum hydrocarbon concentrations as groundwater migrates from the source area. A growing body of evidence suggests that in most systems, biodecay is a significant loss mechanism for many petroleum constituents such as benzene (American Petroleum Institute, 2002). An intermittent stream is located over 200 feet southwest of the contaminant source area and based on topography and water levels, the perched groundwater discharges to the stream during periods of seasonal recharge. Based on the lack of detectable petroleum hydrocarbons in the stream sample, it appears that the concentrations in the groundwater have degraded sufficiently prior to discharge that petroleum hydrocarbons are not detectable in the surface water.

Some volatile petroleum hydrocarbons that are either adsorbed to soil in the vadose zone (relatively unsaturated soil above the water table) or dissolved in groundwater may volatilize to soil pore spaces. Chemical vapors in pore spaces may eventually migrate through the soil matrix and enter outdoor air. Once in outdoor air, mixing with ambient air is expected to reduce airborne chemical concentrations rapidly and substantially. It is possible that vapors that migrate from impacted soil or groundwater may eventually enter indoor air of a building by penetrating cracks in a building floor.

Potential Exposure Scenarios

The subject property is currently used for commercial purposes, and is likely to remain as a commercial use for the foreseeable future. No residences are present on the property and it is unlikely that residences will be constructed on the property in the near future. However, the site is zoned single family residential and OWSI uses the property under a conditional use; therefore, the property could potentially be used for residential purposes in the future. Scenarios by which current and potential future human and ecological receptors may have significant exposure to the petroleum constituents in soil and groundwater are summarized below.

Soil

Residual petroleum hydrocarbons are present in subsurface soil (>10 feet bgs) beneath the southern part of the garage building and surrounding area. Because the impacted soil is in the subsurface, workers or hypothetical future residents are unlikely to directly contact chemicals in soil even if the existing building were removed at some point in the future. However, Ecology typically assumes that soil within 15 feet bgs can be excavated and placed on the ground surface [Washington Administrative Code (WAC) 173-340-740]. In the unlikely event that impacted soil in the subsurface was excavated and placed on the surface, workers or hypothetical future residents could directly contact chemicals in soil. Direct-contact exposure routes for workers and residents include incidental soil ingestion, inhalation of vapors or particulates, and dermal contact.

Vapor

At the subject property, the perched groundwater table varies between approximately 20 and 41 feet bgs. SLR assumes that volatile chemicals in the vadose zone could migrate through the soil matrix and enter outdoor air where they could then be inhaled by outdoor workers or future residents. As mentioned previously, the concentrations of volatile hydrocarbons in outdoor air are expected to be low due to mixing with ambient air. It is also assumed that hydrocarbon vapors from the soil could migrate to the floor of the garage building or a future home, penetrate the buildings through cracks in the floors or foundations, and enter indoor air.

Terrestrial Receptors

The OWSI facility is developed and does not support significant habitat for natural terrestrial ecological receptors. Based on the current and foreseeable land use, it is unlikely that the facility will be converted to natural areas in the near future. Because the petroleum-impacted soil occurs at least 10 feet bgs, terrestrial ecological receptors are unlikely to have significant exposure to site-related chemicals in soil.

Groundwater

The perched groundwater that has been impacted by petroleum hydrocarbons is not used for drinking purposes. However, deeper groundwater located almost 200 feet below the impacted shallow groundwater is a public water supply. As mentioned previously, due to a thick sequence of clay units, it is highly unlikely that the petroleum hydrocarbons could migrate from the shallow perched groundwater to the deeper aquifer. Given that OWSI's existing and proposed water supply wells target production zones at depths of 215 to 245 feet bgs, it is unlikely that the shallow perched groundwater would be used for drinking water purposes in the foreseeable future. Nevertheless, for the purpose of this CSM, it is conservatively assumed that the perched groundwater may be used for drinking water purposes by future residents. Potential exposure routes for future residents include water ingestion, dermal contact, and inhalation of vapors that migrate to indoor air through showering.

It is assumed that on-site workers and hypothetical future residents could be exposed to volatile chemicals that migrate from groundwater to outdoor air. Also, it is assumed that workers and future residents could be exposed to volatile hydrocarbons that migrate from groundwater beneath the site to indoor air.

Shallow groundwater appears to migrate southwest towards a gulley with an intermittent stream. Petroleum hydrocarbons were not detected in a recent sample from the stream. Since the shallow groundwater likely discharges to the stream during periods of seasonal recharge, it appears that natural attenuation processes are reducing the hydrocarbon concentrations before groundwater discharges to the stream. The lack of detectable hydrocarbon concentrations in the stream suggests that it is unlikely that aquatic organisms could have significant exposure to chemicals present in the shallow groundwater. As a result, this exposure scenario is considered incomplete.

CONCLUSIONS

In April 2011, SLR conducted an additional subsurface investigation at the OWSI property to: 1) evaluate the potential groundwater impacts to surface water in a nearby intermittent stream, 2) delineate the southwestern and eastern extents of the gasoline-impacted perched groundwater, 3) further delineate the area of the gasoline-impacted soil near the garage building, and 4) further assess potential seasonal variability in the perched groundwater elevations and water quality. Based on the investigation results, SLR presents the following conclusions related to the environmental conditions at the property.

Based on the soil sample analytical results from this investigation, the 2010 investigation, and from the UST removal activities, it appears that the former northern gasoline UST

area is the source of the hydrocarbon-impacted soil and perched groundwater. The remaining hydrocarbon-impacted soil occurs at the base of the 1,000-gallon UST excavation (at 10 feet bgs) and extends to the perched groundwater table (approximately 20 to 41 feet bgs). The field screening results and the soil and groundwater sample analytical results indicate that the gasoline did not migrate straight down to the groundwater zone. The seasonal shallow saturated zone likely facilitated lateral contaminant migration within the vadose zone. The estimated area of impacted soil extends beyond the western, eastern, and southern ends of the garage building and covers an area of approximately 3,140 square feet. The estimated area of the hydrocarbon-impacted soil is shown on Figure 7.

Based on the groundwater sample analytical results from this investigation, the 2010 investigation, and from the 2009 drilling of Well #17, petroleum hydrocarbon concentrations greater than the MTCA Method A groundwater cleanup levels occur near the source area (former northern gasoline UST area) and primarily extend to the south and southwest. The greatest petroleum hydrocarbon concentrations in the groundwater occurred in the seasonal shallow saturated zone beneath the western edge of the garage building (at SVE-1). Based on the presence of petroleum hydrocarbons at wells MW-4 and MW-5, there is also a limited component of impacted groundwater migration (likely within the shallow saturated zone) to the north and east. The estimated area of the hydrocarbon-impacted groundwater is shown on Figure 4. The impacted groundwater likely extends beyond the western fenceline of the OWSI facility; however, that area of the OWSI property is not accessible for investigation. Based on the lack of detectable petroleum hydrocarbon concentrations in the stream sample, it appears that the impacted perched groundwater is not adversely affecting surface water quality. Based on the groundwater and stream sample analytical results, the area of impacted groundwater has been effectively delineated in all directions.

If you have any questions, please call me at (425) 471-0479.

Sincerely,

SLR International Corp

Michael D. Staton, L.G.
Principal Geologist

Attachments: Limitations
References
Tables 1, 2, and 3
Figures 1 through 7
Appendix A – Laboratory Reports
Appendix B – Soil Boring Logs

cc: Diana Smeland, Port Ludlow Associates
Joe Rehberger, Cascadia Law Group
Sue Schroader, Olympic Property Group
Chip Goodhue, Aspect Consulting Group
Tom Kilbane, Short Cressman & Burgess, PLLC

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

REFERENCES

American Petroleum Institute. 2002. *Evaluating Hydrocarbon Removal from Source Zones and its Effect on Dissolved Plume Longevity and Magnitude.* Publication No. 4715. September.

Applied Geotechnology, Inc. 1991. *Hydrocarbon Contamination Assessment and Underground Storage Tank Removal, Port Ludlow Water District, Port Ludlow, Washington*. March 4.

Jefferson County Health Department. 2011. *Site Hazard Assessment.* April 26.

Robinson Noble & Saltbush, Inc. 2009. *Well 17 Site Contamination, Initial Findings, and Recommendations*. April 26.

SLR International Corp. 2010. *Site Characterization Report, Olympic Water & Sewer, Inc. Property, 781 Walker Way, Port Ludlow, Washington.* December 17.

TABLES

Table 1
Groundwater Monitoring Data
Olympic Water and Sewer Property
Port Ludlow, Washington

Well Number	Top of Casing Elevation[a] (feet)	Date Measured	Depth to Groundwater[b] (feet)	Groundwater Elevation (feet)
MW-1	294.02	06/14/10	41.33	252.69
		10/20/10	40.30	253.72
		04/08/11	36.98	257.04
MW-2	293.79	06/14/10	39.63	254.16
		10/20/10	40.71	253.08
		04/08/11	36.90	256.89
MW-3	289.37	06/14/10	25.19	264.18
		10/20/10	28.70	260.67
		04/08/11	23.02	266.35
MW-4	295.33	06/14/10	23.92	271.41
		10/20/10	26.67	268.66
		04/08/11	21.95	273.38
MW-5	299.40	04/08/11	23.55	275.85
SVE-1	294.41	04/08/11	21.22	273.19
SVE-2	293.87	04/08/11	19.80	274.07

Notes:

[a]Top of casing elevations were surveyed relative to the NAVD 88 datum.

[b]Depth to groundwater measured in feet below top of PVC casing.

[c]The top of the casing of MW-5 is 2.92 feet above the ground surface. All of the other wells and the soil vapor extraction points are flush-grade completions.

Table 2
Soil Sample Analytical Results
Olympic Water and Sewer Property
Port Ludlow, Washington

Soil Boring Number	Sample Name	Date Collected	Approximate Sample Depth (feet)	Analytical Results (mg/kg)				
				Benzene[a]	Toluene[a]	Ethylbenzene[a]	Total Xylenes[a]	GRO[b]
MTCA Method A Cleanup Levels[c]				**0.03**	**7**	**6**	**9**	**30**
SVE-1	SVE1-14	04/04/11	14 to 14.3	<0.02	0.04	<0.02	0.074	<2.0
SVE-2	SVE2-20	04/04/11	20 to 20.5	<0.02	0.64	0.55	1.50	**110**
SB-1	SB1-35	04/04/11	35 to 35.5	<0.02	<0.02	<0.02	<0.06	<2.0
MW-5	MW5-25	04/06/11	25 to 25.5	<0.02	<0.02	<0.02	<0.06	<2.0

NOTES:

mg/kg = milligrams per kilogram (ppm).

Values in **bold** exceed the soil cleanup levels.

NA = Not analyzed.

[a]Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B.

[b]Gasoline-range organics (GRO) by Ecology Method NWTPH-Gx.

[c]Chapter 173-340 WAC, Model Toxics Control Act (MTCA) Cleanup Regulation, Method A Cleanup Levels. Amended February 12, 2001.

Table 3
Groundwater Sample Analytical Results
Olympic Water and Sewer Property
Port Ludlow, Washington

Well Number	Date Collected	Analytical Results (µg/L)									
		Benzene[a]	Toluene[a]	Ethylbenzene[a]	Total Xylenes[a]	Naphthalene[a]	MTBE[a]	EDC[a]	EDB[b]	GRO[c]	Total Lead[d]
MTCA Method A Cleanup Levels[e]		**5**	**1,000**	**700**	**1,000**	**160[f]**	**20**	**5**	**0.01**	**800**	**15**
MW-1	06/14/10	**110**	45	1.10	186	<1	<1	<1	<0.01	**990**	<1
	10/20/10	**520**	140	110	221	15	NA	NA	NA	**1,900**	NA
	04/07/11	**530**	82	160	120	NA	NA	NA	NA	**3,000**	NA
MW-2	06/14/10	**2,100**	620	**960**	650	100	<1	<1	<0.01	**8,400**	<1
	10/20/10	**1,300**	290	430	530	35	NA	NA	NA	**3,900**	NA
	04/07/11	**500**	730	160	410	NA	NA	NA	NA	**5,600**	NA
MW-3	06/14/10	0.36	<1	<1	<3	<1	<1	<1	<0.01	<100	<1
	10/20/10	<0.35	<1	<1	<3	<1	NA	NA	NA	<100	NA
	04/07/11	<1	<1	<1	<3	NA	NA	NA	NA	<100	NA
MW-4	06/14/10	<0.35	<1	<1	<3	<1	<1	<1	<0.01	<100	<1
	10/20/10	<0.35	<1	<1	<3	<1	NA	NA	NA	<100	NA
	04/08/11	**5.30**	75	13	47	NA	NA	NA	NA	380	NA
MW-5	04/08/11	3.40	43	7.80	25	NA	NA	NA	NA	220	NA
SVE-1	04/07/11	**550**	**5,700**	**850**	**3,300**	NA	NA	NA	NA	**34,000**	NA
SVE-2	04/07/11	5.0	14	18	35	NA	NA	NA	NA	**2,000**	NA

NOTES:

µg/L = micrograms per liter (ppb).

Values shaded and in **bold** exceed the groundwater cleanup levels.

NA = Not analyzed.

[a]Benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, methyl tertiary butyl ether (MTBE), and 1,2-dichloroethane (EDC) by EPA Method 8260C, or BTEX by EPA Method 8021B.

[b]1,2-dibromoethane (EDB) by EPA Method 8011 Modified.

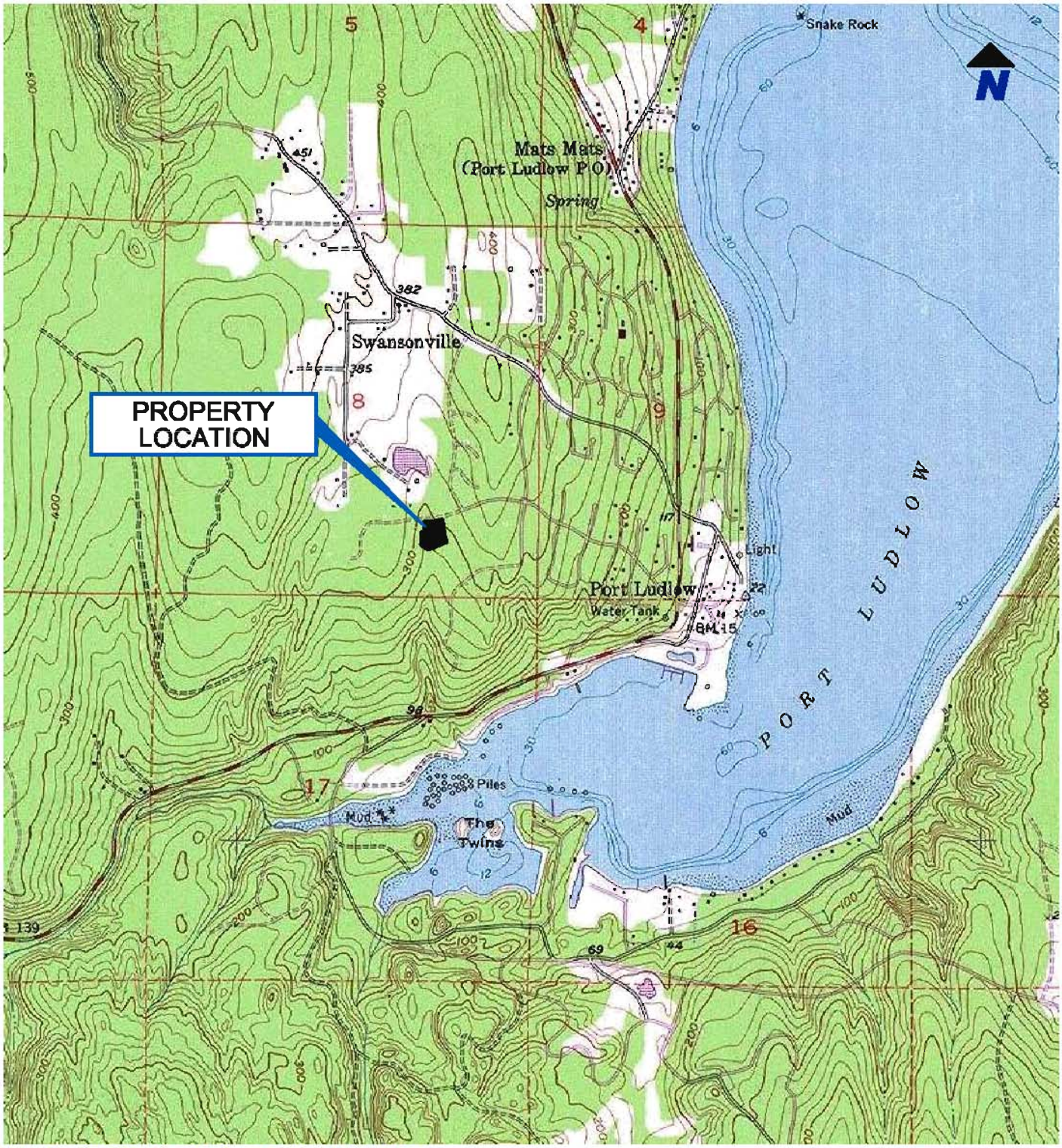
[c]Gasoline-range organics (GRO) by Ecology Method NWTPH-Gx.

[d]Total lead by EPA Method 200.8.

[e]Chapter 173-340 WAC, Model Toxics Control Act (MTCA) Cleanup Regulation, Method A Cleanup Levels. Amended February 12, 2001.

[f]The cleanup level is the total value for naphthalene, 1-methyl naphthalene, and 2-methyl naphthalene.

FIGURES



SOURCE: USGS 7.5 MINUTE QUADRANGLE PORT LUDLOW, WA 1991; CONTOUR INTERVAL, 20 FEET.

SCALE 1" = 2,000'
WHEN PLOTTED ON 8 1/2 x 11

0 1000 2000 4000

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SLR
22118 20th AVE SE
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F: 425-402-8488

OLYMPIC WATER & SEWER, INC. PROPERTY
781 WALKER WAY
PORT LUDLOW, WASHINGTON

Report
ADDITIONAL INVESTIGATION REPORT

Drawing
PROPERTY LOCATION MAP

Date MAY 10, 2011	Scale 1"=2000'	Fig. No. 1
File Name 01-01.DWG	Project No. 101.00433.00003	

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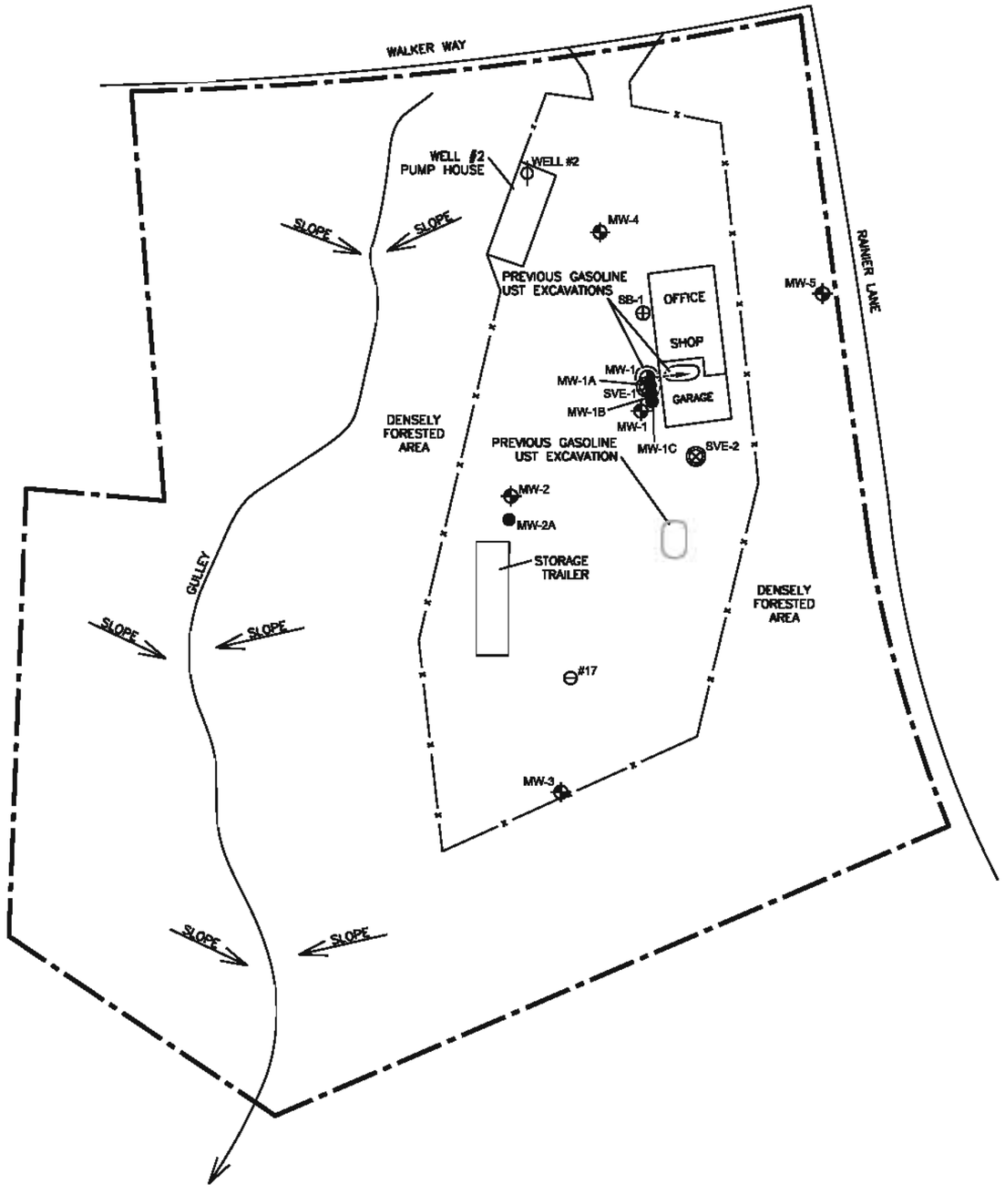

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SCALE: 1" = 50'
WHEN PLOTTED AT 11" x 17" PAGE SIZE

0 50 100 150'

N

NOTES

LEGEND

- PROPERTY BOUNDARY
- SB-1 — APPROXIMATE 2011 SOIL BORING LOCATION AND DESIGNATION
- SVE-1 — PROPOSED SOIL VAPOR EXTRACTION POINT LOCATION AND DESIGNATION
- MW-1 — GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-2A — APPROXIMATE SOIL BORING LOCATION AND DESIGNATION
- #17 — EXISTING CASING LOCATION AND DESIGNATION
- WELL #2 — EXISTING WATER SUPPLY WELL LOCATION AND DESIGNATION
- MW-1 — PREVIOUS ANGLE BORING LOCATION, DESIGNATION, AND DIRECTION FROM VERTICAL
- FENCE

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Report: ADDITIONAL INVESTIGATION REPORT

Drawing: INVESTIGATION LOCATIONS

Date	Scale	Fig. No.
May 12, 2011	AS SHOWN	2
File Name: 01-02	Project No.: 101.00433.00003	

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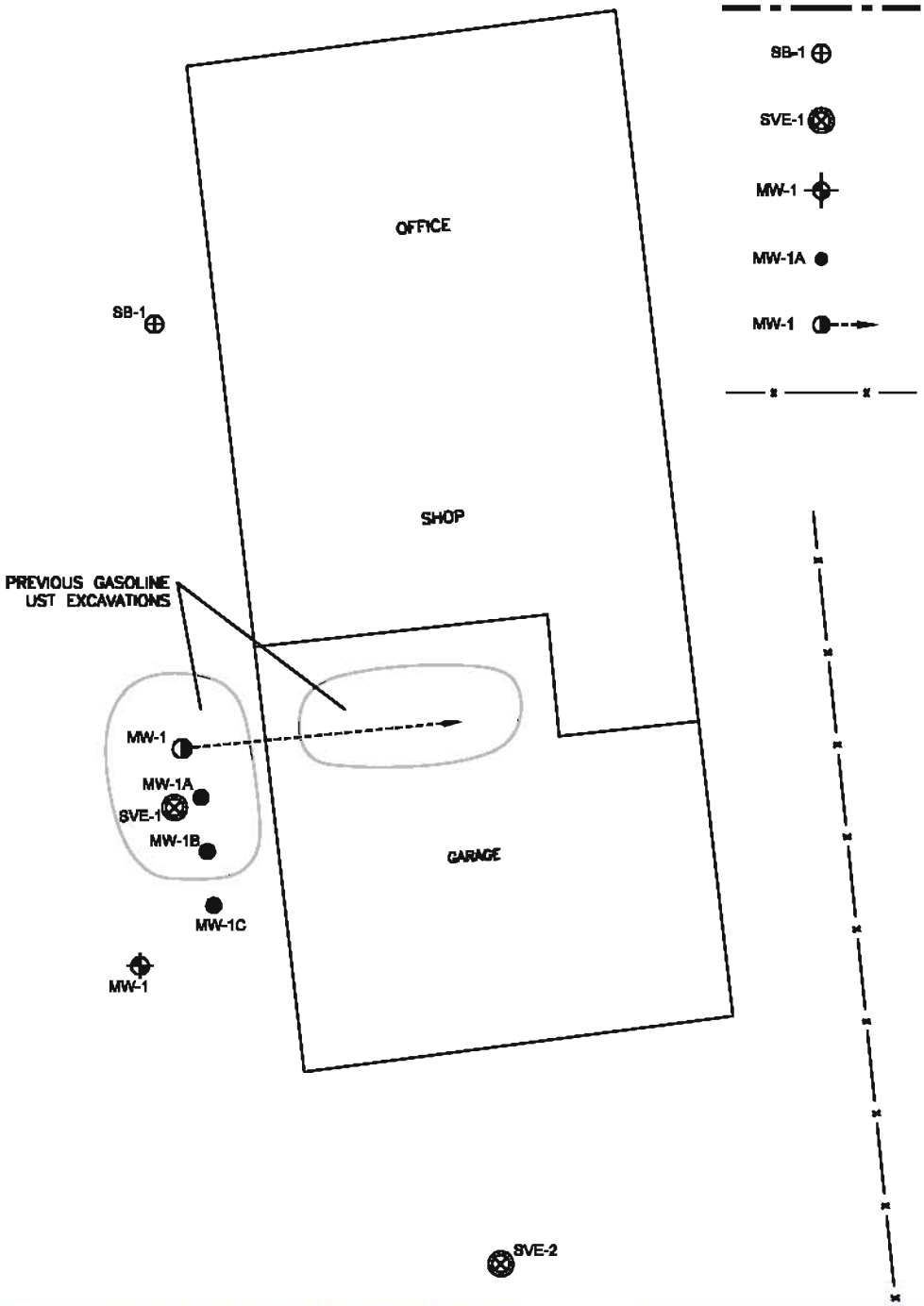

SOURCE: USGS 7.5 MINUTE QUADRANGLE PORT LUDLOW, WA 1991; CONTOUR INTERVAL, 20 FEET.

SCALE 1" = 10'
WHEN PLOTTED ON 8 1/2 x 11

0 5 10 20

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Report
ADDITIONAL INVESTIGATION REPORT

Drawing
INVESTIGATION LOCATIONS NEAR GARAGE BUILDING

Date MAY 12, 2011		Scale 1"=10'	Fig. No. 3
File Name 01-03.DWG		Project No. 101.00433.00003	

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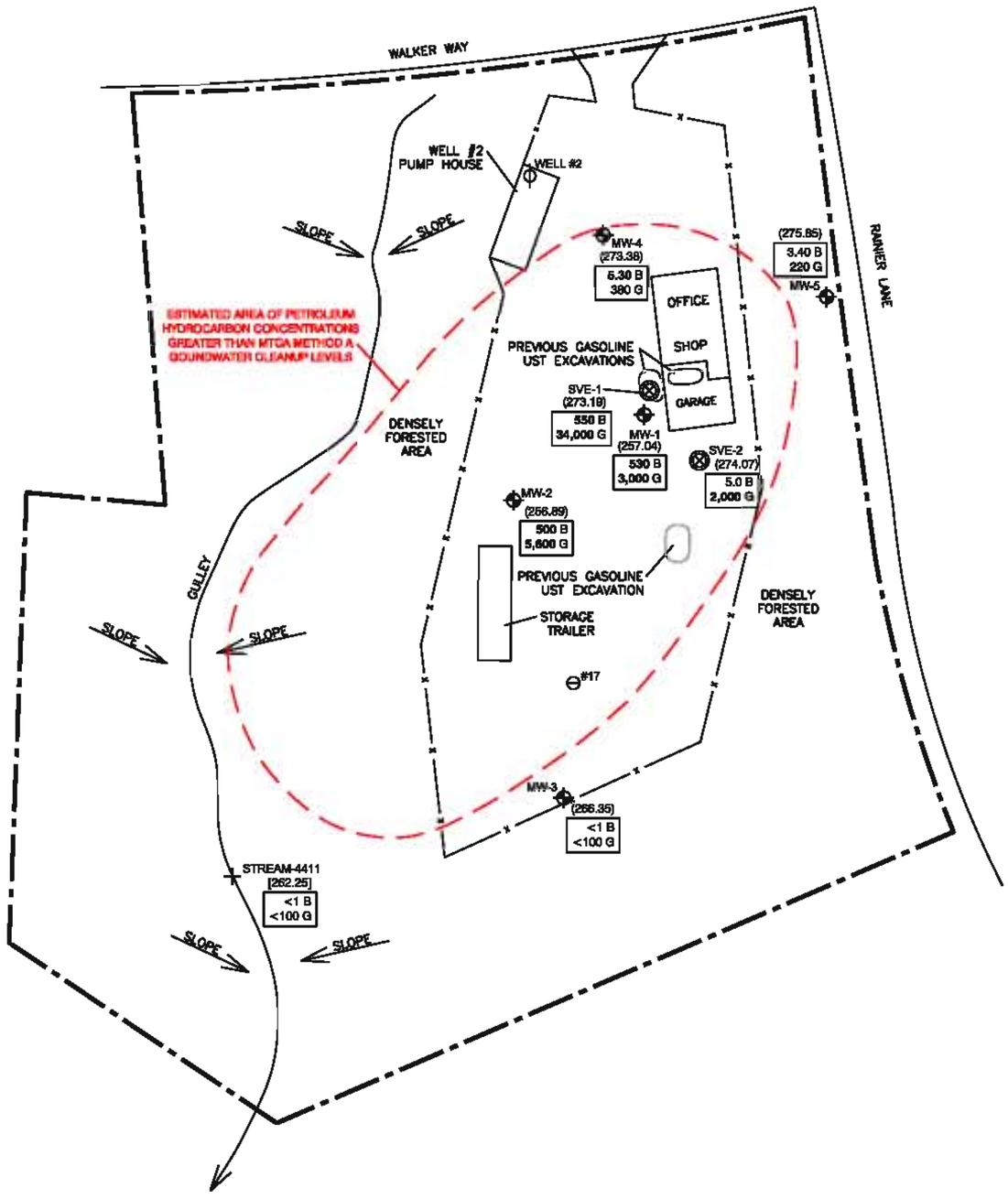

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SCALE: 1" = 50'
WHEN PLOTTED AT 11" x 17" PAGE SIZE
0 50 100 150'

N

NOTES

LEGEND

- PROPERTY BOUNDARY
- MW-1 — GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- STREAM-4411 — APPROXIMATE STREAM SAMPLE LOCATION AND DESIGNATION
- SVE-1 — SOIL VAPOR EXTRACTION POINT LOCATION AND DESIGNATION
- #17 — EXISTING CASING LOCATION AND DESIGNATION
- WELL #2 — EXISTING WATER SUPPLY WELL LOCATION AND DESIGNATION
- FENCE
- (273.19) — PERCHED GROUNDWATER ELEVATION (IN FEET ABOVE NAVD 88 DATUM) ON APRIL 8, 2011
- [262.25] — APPROXIMATE SURFACE WATER ELEVATION (IN FEET ABOVE NAVD 88 DATUM) ON APRIL 4, 2011
- 5.30 B / 380 G — B=BENZENE CONCENTRATION IN APRIL 2011 GROUNDWATER SAMPLE (IN µg/L); G=GRO CONCENTRATION IN APRIL 2011 GROUNDWATER SAMPLE (IN µg/L)

NOTE: CONCENTRATIONS IN BOLD EXCEED THE MTCA METHOD A GROUNDWATER CLEANUP LEVELS.

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Report: ADDITIONAL INVESTIGATION REPORT

Drawing: ESTIMATED AREA OF GASOLINE-IMPACTED PERCHED GROUNDWATER

Date: May 16, 2011	Scale: AS SHOWN	Fig. No. 4
File Name: 01-04.DWG	Project No.: 101.00433.00003	

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NORTH
A

SOUTH
A'

MW-4

SVE-1
(PROJECTED 20 FEET)

MW-1
(PROJECTED 19 FEET)

MW-2
(PROJECTED 26 FEET)

MW-3

OFFICE/GARAGE BUILDING
(PROJECTED 30 FEET)

ELEVATION (FEET)

300
295
290
285
280
275
270
265
260
255
250
245
240
235
230

[<0.02]
[0.49*]
[<0.03]
[<0.03]
[<0.03]
[0.21]
[0.21]
[<0.03]
[<0.03]
[0.038]

LEGEND

- INFERRED LITHOLOGIC CONTACT
- MW-4 — EXPLORATION LOCATION AND DESIGNATION
- SCREEN LOCATION
- INFERRED GROUNDWATER TABLE SURFACE DURING APRIL 2011
- INFERRED GROUNDWATER TABLE SURFACE DURING OCTOBER 2010
- [0.21] — BENZENE CONCENTRATIONS IN SOIL SAMPLE (IN MG/KG)
- GRAVEL AND SANDY GRAVEL (GP)
- SAND, GRAVELLY SAND, AND SAND AND GRAVEL (SP)
- SILTY SAND (SM) AND SILTY GRAVEL (GM)
- SILT, CLAYEY SILT, SAND SILT, AND GRAVELLY SILT (ML)

NOTES

1) CROSS SECTION LOCATION IS SHOWN ON FIGURE 6 OF SLR, 2010
2.) ELEVATIONS ARE RELATIVE TO NAVD 88 DATUM
3.) CONCENTRATIONS IN BOLD EXCEED THE MTCA METHOD A SOIL CLEANUP LEVEL
4.) *= SAMPLE COLLECTED FROM ADJACENT BORING MW-1B.

0 20 40 60'
HORIZONTAL SCALE (FEET)

0 10 20 30'
VERTICAL SCALE (FEET)

SLR

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PORT LUDLOW, WASHINGTON

Report
ADDITIONAL INVESTIGATION REPORT

Drawing
HYDROGEOLOGIC CONDITIONS IN OCTOBER 2010 AND APRIL 2011

Date	MAY 17, 2011	Scale	AS SHOWN	Fig. No.
File Name	06-05.DWG	Project No.	101.00433.00003	5

Last Saved: Tuesday, August 02, 2011 9:37:51 AM by egoodwin Drawing path: N:\Portland\Figures\Bothell\Olympic Water and Sewer\06-05.dwg

Primary Source	Primary Release Mechanism	Secondary Sources	Secondary Release Mechanism	Tertiary Source	Point of Potential Contact	Exposure Route	On-Site Worker	Hypothetical Resident	Aquatic Biota
Soil					Surface soil[1]	Ingestion Dermal Contact Inhalation (dust)	✓ ✓ ✓	✓ ✓ ✓	∅ ∅ ∅
Soil					Subsurface soil	Ingestion Dermal Contact Inhalation (dust)	∅ ∅ ∅	∅ ∅ ∅	∅ ∅ ∅
Soil	Volatilization	Indoor air			Indoor air	Inhalation	✓	✓	∅
Soil	Volatilization	Outdoor air			Outdoor air	Inhalation	✓	✓	∅
Soil	Leaching	Groundwater			Groundwater[2]	Ingestion Dermal Contact Inhalation	∅ ∅ ∅	✓ ✓ ✓	∅ ∅ ∅
Soil	Leaching	Groundwater	Diffusion / Advection	Surface Water	Surface Water[3]	Ingestion Dermal Contact Gill uptake	∅ ∅ ∅	∅ ∅ ∅	∅ ∅ ∅

Notes:

Primary pathway →
Pathway assumed to be possible -->
Potentially complete exposure route ✓
Incomplete exposure route ∅

1 Impacted soil is in subsurface and pathway is currently incomplete. Assumes that a future excavation deposits soil on the surface. Pathway would be complete for a resident if homes are built on the site in the future.
2 Pathway could be complete if perched groundwater was used as domestic water source.
3 Petroleum consituents were not detected in surface water and pathway appears to be incomplete.

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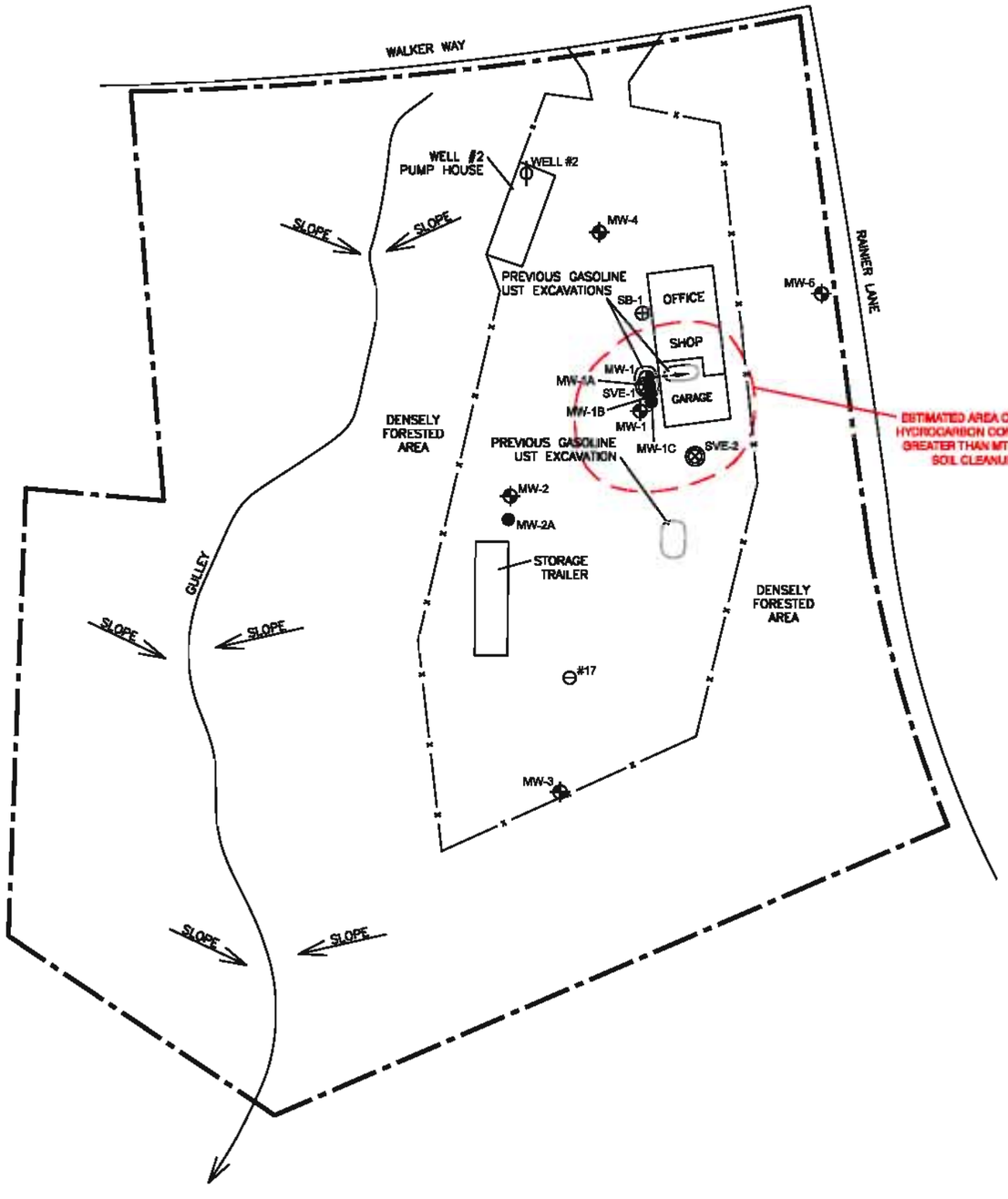
PORT LUDLOW, WASHINGTON

Report
ADDITIONAL INVESTIGATION REPORT

Drawing
CONCEPTUAL SITE MODEL

Date May 13, 2011
Scale AS SHOWN
Fig. No. 6
File Name 05-06-3
Project No. 101.00433.00003

SLR



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SCALE: 1" = 50'
WHEN PLOTTED AT 11" x 17" PAGE SIZE
0 50 100 150'

NOTES

LEGEND

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- FENCE

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PORT LUDLOW, WASHINGTON

Report: ADDITIONAL INVESTIGATION REPORT

Drawing: ESTIMATED AREA OF PETROLEUM HYDROCARBON-IMPACTED SOIL

Date	May 16, 2011	Scale	AS SHOWN	Fig. No.
File Name	01-07	Project No.	101.00433.00003	7

SLR
22118 20th AVE SE
BLDG. G, SUITE 202
BOTHELL, WA 98021
T: 425-402-8800
F: 425-402-8488

C:\DRIVE_E\Clients\SLR\101\101.00433.00003\01-07.dwg, 5/16/2011 7:25:44 PM, BDT

APPENDIX A

LABORATORY REPORTS

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

April 18, 2011

Mike Staton, Project Manager
SLR International Corp.
22118 20th Ave. SE., G-202
Bothell, WA 98021

Dear Mr. Staton:

Included are the results from the testing of material submitted on April 5, 2011 from the 101.00433.00003, F&BI 104040 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Kurt Johnson
Project Manager

Enclosures
SLR0418R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 5, 2011 by Friedman & Bruya, Inc. from the SLR International Corp. 101.00433.00003 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SLR International Corp.
104040-01	Stream-4411

All quality control requirements were acceptable.

Date of Report: 04/18/11
Date Received: 04/05/11
Project: 101.00433.00003, F&BI 104040
Date Extracted: 04/07/11
Date Analyzed: 04/07/11

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
Stream-4411 104040-01	<1	<1	<1	<3	<100	114
Method Blank 01-0605 MB	<1	<1	<1	<3	<100	115

Date of Report: 04/18/11
Date Received: 04/05/11
Project: 101.00433.00003, F&BI 104040

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 104042-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	111	72-119
Toluene	ug/L (ppb)	50	95	71-113
Ethylbenzene	ug/L (ppb)	50	97	72-114
Xylenes	ug/L (ppb)	150	93	72-113
Gasoline	ug/L (ppb)	1,000	95	70-119

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

104048

SAMPLE CHAIN OF CUSTODY

(KJ) ~~HE~~ 04-05-11 VI

Page # 1 of 1

Send Report To Mike Staton

Company SLR International Corp

Address 22118 20th Ave SE, Suite 6202

City, State, ZIP Bothell, WA 98021

Phone # (425) 471-0479 Fax #

SAMPLERS (signature)

PROJECT NAME/NO. 101.00433.00003

PO#

REMARKS

TURNAROUND TIME
- [X] Standard (2 Weeks)
- [ ] RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- [X] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS							Notes
ANALYSES REQUESTED																		
Stream - 4411	01A-C	4/4/11	9:40	W	3		X	X										

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Chris Krome	SLR	4/5/11	1540
Received by:	DO VO	FTBI	11	11
Relinquished by:				
Received by:		Samples received at 1 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

April 26, 2011

Mike Staton, Project Manager
SLR International Corp.
22118 20th Ave. SE., G-202
Bothell, WA 98021

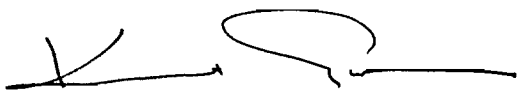
Dear Mr. Staton:

Included are the amended results from the testing of material submitted on April 5, 2011 from the 101.00433.00003, F&BI 104041 project. The sample ID for the sample SVE1-14 has been changed per your request.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Kurt Johnson
Project Manager

Enclosures
SLR0420R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

April 20, 2011

Mike Staton, Project Manager
SLR International Corp.
22118 20th Ave. SE., G-202
Bothell, WA 98021

Dear Mr. Staton:

Included are the results from the testing of material submitted on April 5, 2011 from the 101.00433.00003, F&BI 104041 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Kurt Johnson
Project Manager

Enclosures
SLR0420R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 5, 2011 by Friedman & Bruya, Inc. from the SLR International Corp. 101.00433.00003, F&BI 104041 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SLR International Corp.
104041-01	SVE1-14
104041-02	SVE2-20
104041-03	SVE2-35
104041-04	SB1-35

All quality control requirements were acceptable.

Date of Report: 04/20/11
Date Received: 04/05/11
Project: 101.00433.00003, F&BI 104041
Date Extracted: 04/06/11
Date Analyzed: 04/16/11 and 04/18/11

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
SVE1-14 104041-01	<0.02	0.040	<0.02	0.074	<2	90
SVE2-20 104041-02	<0.02	0.64	0.55	1.5	110	123
SB1-35 104041-04	<0.02	<0.02	<0.02	<0.06	<2	86
Method Blank 01-0603 MB	<0.02	<0.02	<0.02	<0.06	<2	86

Date of Report: 04/20/11
Date Received: 04/05/11
Project: 101.00433.00003, F&BI 104041

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 103355-01 (Duplicate)

Analyte	Reporting Units	(Wet Wt) Sample Result	(Wet Wt) Duplicate Result	Relative Percent Difference (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	78	69-120
Toluene	mg/kg (ppm)	0.5	76	70-117
Ethylbenzene	mg/kg (ppm)	0.5	84	65-123
Xylenes	mg/kg (ppm)	1.5	82	66-120
Gasoline	mg/kg (ppm)	20	120	71-131

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

104041

SAMPLE CHAIN OF CUSTODY

KJ ME 04-05-11, VS2

Page # 1 of 1

Send Report To Mike Station

Company SLR

Address Mstation@slrconsulting.com

City, State, ZIP

Phone #(425) 402-8800 Fax #

SAMPLERS (signature) Chris Kramer

PROJECT NAME/NO. 101.00433.00003

PO#

REMARKS

TURNAROUND TIME
☐ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS						Notes
SVE1-14	01A-D	4/4/11	900	S	4		X	X									
SVE2-20	02A-D	"	1220	"	4		X	X									
SVE2-35	03A-D	"	1240	"	4											→	HOLD
SB1-35	04A-D	↓	1545	↓	4		X	X									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Chris Kramer	Chris Kramer	SLR	4/5/11	1540
Received by: Dave	Dave	F+BI	11	11
Relinquished by:				
Received by:		Samples received at 1 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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e-mail: fbi@isomedia.com

April 18, 2011

Mike Staton, Project Manager
SLR International Corp.
22118 20th Ave. SE., G-202
Bothell, WA 98021

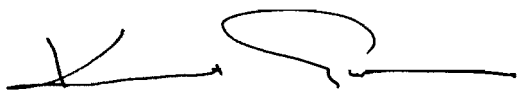
Dear Mr. Staton:

Included are the results from the testing of material submitted on April 8, 2011 from the 101.00433.00003, F&BI 104082 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Kurt Johnson
Project Manager

Enclosures
SLR0418R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on April 8, 2011 by Friedman & Bruya, Inc. from the SLR International Corp. 101.00433.00003 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SLR International Corp.
104082-01	MW5-25

All quality control requirements were acceptable.

Date of Report: 04/18/11
Date Received: 04/08/11
Project: 101.00433.00003, F&BI 104082
Date Extracted: 04/11/11
Date Analyzed: 04/12/11

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW5-25 104082-01	<0.02	<0.02	<0.02	<0.06	<2	72
Method Blank 01-0628 MB	<0.02	<0.02	<0.02	<0.06	<2	89

Date of Report: 04/18/11
Date Received: 04/08/11
Project: 101.00433.00003, F&BI 104082

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 104108-01 (Duplicate)

Analyte	Reporting Units	(Wet Wt) Sample Result	(Wet Wt) Duplicate Result	Relative Percent Difference (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	80	66-121
Toluene	mg/kg (ppm)	0.5	77	72-128
Ethylbenzene	mg/kg (ppm)	0.5	80	69-132
Xylenes	mg/kg (ppm)	1.5	77	69-131
Gasoline	mg/kg (ppm)	20	90	61-153

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

104082

SAMPLE CHAIN OF CUSTODY

~~MC~~ KJ 04/08/11

VSI

Page # 1 of 1

Send Report To Mike Staton

Company SCR

Address MStaton@SCRcommHwy.com

City, State, ZIP

Phone #(425) 702-8800 Fax #

SAMPLERS (signature) Chris Kan

PROJECT NAME/NO. 101.00433.00003

PO#

REMARKS

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS						Notes
MW5-25	01 A-D	4/6/11	1430	S	4		X	X									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Chris Kan	SCR	4/8/11	1305
Received by:	Nhan Phan	FcBI	4/8/11	✓
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

April 19, 2011

Mike Staton, Project Manager
SLR International Corp.
22118 20th Ave. SE., G-202
Bothell, WA 98021

Dear Mr. Staton:

Included are the results from the testing of material submitted on April 8, 2011 from the 101.00433.00003, F&BI 104083 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Kurt Johnson
Project Manager

Enclosures
SLR0419R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 8, 2011 by Friedman & Bruya, Inc. from the SLR International Corp. 101.00433.00003, F&BI 104083 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SLR International Corp.
104083-01	MW3-411
104083-02	SVE2-411
104083-03	MW1-411
104083-04	SVE1-411
104083-05	MW2-411
104083-06	MW4-411
104083-07	MW5-411

All quality control requirements were acceptable.

Date of Report: 04/19/11
Date Received: 04/08/11
Project: 101.00433.00003, F&BI 104083
Date Extracted: 04/12/11
Date Analyzed: 04/12/11 and 04/16/11

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW3-411 104083-01	<1	<1	<1	<3	<100	52
SVE2-411 104083-02	5.0	14	18	35	2,000	87
MW1-411 104083-03 1/20	530	82	160	120	3,000	116
SVE1-411 104083-04 1/20	550	5,700	850	3,300	34,000	118
MW2-411 104083-05 1/20	500	730	160	410	5,600	117
MW4-411 104083-06	5.3	75	13	47	380	118
MW5-411 104083-07	3.4	43	7.8	25	220	116
Method Blank 01-0676 MB	<1	<1	<1	<3	<100	64

Date of Report: 04/19/11
Date Received: 04/08/11
Project: 101.00433.00003, F&BI 104083

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 104111-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	96	65-118
Toluene	ug/L (ppb)	50	87	72-122
Ethylbenzene	ug/L (ppb)	50	94	73-126
Xylenes	ug/L (ppb)	150	89	74-118
Gasoline	ug/L (ppb)	1,000	102	69-134

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

104083

SAMPLE CHAIN OF CUSTODY ~~MK~~ KJ 04/08/11 V3

Page # 1 of 1

Send Report To Mike Station
Company SLR
Address MStation@SLRconsulting.com
City, State, ZIP
Phone # (425) 402-8800 **Fax #**

SAMPLERS (signature) Chris Kan

PROJECT NAME/NO. 601.00433.00003

PO #

REMARKS

TURNAROUND TIME
- [X] Standard (2 Weeks)
- [ ] RUSH

Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS						Notes
MW3-411	01 A-C	4/7/11	1330	W	3		X	X									
SVE2-411	02	"	1435	"	"		X	X									
MW1-411	03	"	1510	"	"		X	X									
SVE1-411	04	"	1545	"	"		X	X									
MW2-411	05	"	1615	"	"		X	X									
MW4-411	06	4/8/11	830	"	"		X	X									
MW5-411	07	"	930	"	"		X	X									

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Chris Kan	SLR	4/8/11	1305
Received by:		Nhan Phan	FEBI	4/8/11	1305
Relinquished by:					
Received by:					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

Samples received at 4 °C

APPENDIX B

SOIL BORING LOGS

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone: 425.402.8800
Fax: 425.402.8488

BORING NUMBER SB-1

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101 00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA
DATE STARTED 4/4/11 COMPLETED 4/4/11
GROUND ELEVATION HOLE SIZE 8.25-inch-diameter
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
SHALLOW PERCHED GROUNDWATER DEPTH: ---
LOGGED BY C. Kramer CHECKED BY M. Staton
▼ PRIMARY PERCHED GROUNDWATER DEPTH: 36.0 ft
NOTES

DEPTH (ft)	INTERVAL	TYPE	NAME	RECOVERY %	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0								0.5 ASPHALT	
						SP		SAND, brown, fine-grained, trace fines, trace gravel, damp, no hydrocarbon-like odors	0.0
5									
10								10.0	0.8
						ML		SANDY SILT, brown to gray, some fine sand, trace gravel, moist, no hydrocarbon-like odors.	
								13.0	
15						SP		SAND, brown to gray, very fine-grained, trace fines, trace gravel, very dense, dry, no hydrocarbon-like odors.	

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▼ Primary perched groundwater at time of drilling.

(Continued Next Page)

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone: 425.402.8800
Fax: 425.402.8488

BORING NUMBER SB-1

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA

DEPTH (ft)	INTERVAL	TYPE	NAME	RECOVERY %	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
15	X	D&M		95	50/6"	SP		SAND, brown to gray, very fine-grained, trace fines, trace gravel, very dense, dry, no hydrocarbon-like odors. *(continued)*	1.1
20	X	D&M			50/6"			@ 20.0 feet: Few gravel.	0.2
								23.0	
25	X	D&M			50/6"	SM		SILTY SAND gray, very fine-grained, some fines, trace gravel, very dense, moist to wet, no hydrocarbon-like odors.	0.1
30	X	D&M			50/6"				0.0

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▼ Primary perched groundwater at time of drilling.

(Continued Next Page)

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone: 425.402.8800
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BORING NUMBER SB-1

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA

DEPTH (ft)	INTERVAL	TYPE	NAME	RECOVERY %	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
35						SM		**SILTY SAND** gray, very fine-grained, some fines, trace gravel, very dense, moist to wet, no hydrocarbon-like odors. *(continued)*	
	X	D&M	SB1-35*		50/6"				0.0
								▼ @ 36.0 feet: Wet.	
								37.0 Boring completed at 37.0 feet.	

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▼ Primary perched groundwater at time of drilling.

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone: 425.402.8800
Fax: 425.402.8488

SVE POINT NUMBER SVE-1

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA
DATE STARTED 4/4/11 COMPLETED 4/4/11
GROUND ELEVATION 294.73 ft HOLE SIZE 8.25-inch-diameter
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
▽ SHALLOW PERCHED GROUNDWATER DEPTH: 22.0 ft / Elev 272.7 ft
LOGGED BY C. Kramer CHECKED BY M. Staton
▼ PRIMARY PERCHED GROUNDWATER DEPTH: 35.0 ft / Elev 259.7 ft
NOTES

DEPTH (ft)	INTERVAL	TYPE	NAME	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0							GRAVEL, crushed rock parking lot surface. 0.5 294.2		CONCRETE SURFACE SEAL
					SP		SAND, brown, fine-grained, few fine gravel, moist, no hydrocarbon-like odors.		
5							6.0 288.7	0.0	HYDRATED BENTONITE CHIPS
					SM		SILTY SAND brown, fine-grained, some fines, moist, no hydrocarbon-like odors.		
10							12.0 282.7	0.0	BLANK PVC RISER
					ML		SILT, gray, few fine-grained sand, moist, moderate to strong hydrocarbon-like odor.		
	☒	SS	SVE1-14*	50/3"				352	
15							15.0 279.7		

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling.

(Continued Next Page)

SLR
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SVE POINT NUMBER SVE-1

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA

DEPTH (ft)	INTERVAL	TYPE	NAME	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15							SAND, gray, very fine-grained, very dense, dry to wet, slight to strong hydrocarbon-like odor.		10x20 SILICA SAND PACK
20							@ 20.0 feet: Few fine gravel, damp.		0.010"-SLOT PVC SCREEN
					SP		▽ @ 22.0 feet: Wet.		
25							@ 25.0 feet: Damp.	8.0	
30							30.0 — 264.7 SILTY SAND brown to gray, very fine-grained, some fines, moist to wet, slight hydrocarbon-like odor.		
					SM				

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling

(Continued Next Page)

SLR
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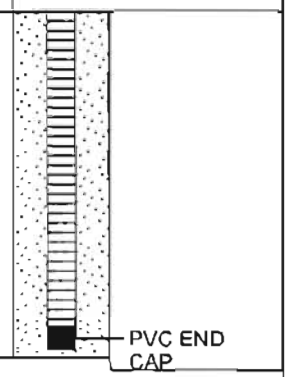
Bothell, Washington 98021
Telephone: 425.402.8800
Fax 425.402 8488

SVE POINT NUMBER SVE-1

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA

DEPTH (ft)	INTERVAL	TYPE	NAME	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
35					SM		SILTY SAND brown to gray, very fine-grained, some fines, moist to wet, slight hydrocarbon-like odor. *(conlinued)* ▼ @ 35.0 feet: Wet.		



37 0 257.7

Boring completed at 37 0 feet.

SVE POINT COMPLETION DETAILS

0.0 to 17.0 feet: Flush-threaded, 2.0-inch-diameter PVC blank riser pipe
17.0 to 36.6 feet. Flush-threaded, 2.0-inch-diameter 0.010"-machine slotted PVC well screen
36.6 to 36.9 feet: Flush-threaded, 2.0-inch-diameter PVC end cap

0.0 to 2.0 feet: Concrete surface seal
2.0 to 15.0 feet: Hydrated medium bentonite chips
15.0 to 37.0 feet: 2x12 silica sand pack

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector
* = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling.

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone: 425.402.8800
Fax 425 402.8488

SVE POINT NUMBER SVE-2

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA
DATE STARTED 4/4/11 COMPLETED 4/4/11
GROUND ELEVATION 294.40 ft HOLE SIZE 8.25-inch-diameter
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
▽ SHALLOW PERCHED GROUNDWATER DEPTH: 20.0 ft / Elev 274.4 ft
LOGGED BY C Kramer CHECKED BY M Staton
▼ PRIMARY PERCHED GROUNDWATER DEPTH: 35 5 ft / Elev 258.9 ft
NOTES

DEPTH (ft)	INTERVAL	TYPE	NAME	RECOVERY %	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0								SAND, brown, fine-grained, trace fines, trace gravel, dry, no hydrocarbon-like odors.	0 0	CONCRETE SURFACE SEAL
5						SP				HYDRATED BENTONITE CHIPS
10								@ 10.0 feet: Becomes very fine-grained, few gravel, slight hydrocarbon-like odor	0.0	BLANK PVC RISER
									0.4	
15										

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling

(Continued Next Page)

SLR
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Bothell, Washington 98021
Telephone: 425 402 8800
Fax 425 402.8488

SVE POINT NUMBER SVE-2

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA

DEPTH (ft)	INTERVAL	TYPE	NAME	RECOVERY %	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15	X	D&M		100	50/6"	SP		SAND, brown, fine-grained, trace fines, trace gravel, dry, no hydrocarbon-like odors. *(continued)*	2.5	
								18.0 — 276.4		
						SM		SILTY SAND, gray, very fine-grained, some fines, trace gravel, very dense, damp to wet, moderate to strong hydrocarbon-like odor.		10x20 SILICA SAND PACK
20	X	D&M	SVE2-20'	40	84			▽ @ 20.0 feet: Wet.	830	
								@ 23.0 feet: Moist.		
25	X	D&M		100	50/6"				24.1	0.010"-SLOT PVC SCREEN
								26.0 — 268.4		
						SP		SAND, gray, very fine-grained, trace fines, moist, slight hydrocarbon-like odor.		
								28.0 — 266.4		
						SM		SILTY SAND, brown to gray, very fine-grained, some fines, trace gravel, very dense, damp, slight hydrocarbon-like odors.		
30	X	D&M		40	50/6"				28.8	

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
' = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling.

(Continued Next Page)

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone: 425.402.8800
Fax: 425.402.8488

SVE POINT NUMBER SVE-2

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA

DEPTH (ft)	INTERVAL	TYPE	NAME	RECOVERY %	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
						SM		33.0 (261.4) SAND, gray, fine-grained, trace gravel, few cobbles, very dense, moist to wet.		PVC END CAP
35		D&M	SVE2-35*	100	50/6"	SP		▼ @ 35.5 feet: Wet.	0.4	NATIVE SLOUGH
								37.0 (257.4) Boring completed at 37.0 feet.		

SVE POINT COMPLETION DETAILS

0.0 to 20.0 feet: Flush-threaded, 2.0-inch-diameter PVC blank riser pipe
20.0 to 34.6 feet: Flush-threaded, 2.0-inch-diameter 0.010"-machine slotted PVC well screen
34.6 to 34.9 feet: Flush-threaded, 2.0-inch-diameter PVC end cap

0.0 to 2.0 feet: Concrete surface seal
2.0 to 18.0 feet: Hydrated medium bentonite chips
18.0 to 35.0 feet: 2x12 silica sand pack
35.0 to 37.0 feet: Native slough

REMARKS

D&M = Samples collected by using an 18-inch-long, 3.0-inch outside diameter Dames & Moore split-barrel sampler driven by a 300 lb wireline hammer
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling.

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone: 425.402.8800
Fax: 425.402.8488

WELL NUMBER MW-5

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA
DATE STARTED 4/6/11 COMPLETED 4/6/11
GROUND ELEVATION 296.48 ft HOLE SIZE 8-inch-diameter
DRILLING CONTRACTOR Tacoma Pump & Drilling
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary
▽ SHALLOW PERCHED GROUNDWATER DEPTH: 18.0 ft / Elev 278.5 ft
LOGGED BY C. Kramer CHECKED BY M. Staton
▼ PRIMARY PERCHED GROUNDWATER DEPTH: 30.0 ft / Elev 266.5 ft
NOTES

DEPTH (ft)	INTERVAL	TYPE	NAME	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0							TOPSOIL		
							1.0 295.5		
							SAND, brown to gray, fine-grained, few gravel, damp, no hydrocarbon-like odors.	0.0	CONCRETE SURFACE SEAL
5					SP			0.0	HYDRATED BENTONITE CHIPS
10								0.0	BLANK PVC RISER
15									

REMARKS

SS = Samples collected by using an 18-inch-long, 3 0-inch outside diameter split-spoon sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling

(Continued Next Page)

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone: 425.402.8800
Fax: 425.402.8488

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc. Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA

DEPTH (ft)	INTERVAL	TYPE	NAME	BLOW COUNTS PER FOOT (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15					SP		SAND, brown to gray, fine-grained, few gravel, damp, no hydrocarbon-like odors. *(continued)*	0.0	
							▽ @ 18.0 feet: Wet		
							@ 19.0 feet: Damp.		
20							20.0 — 278.5		
					SM		SILTY SAND brown to gray, fine-grained, some fines, few gravel, damp, no hydrocarbon-like odors.	0.0	
25							25.0 — 271.5		
	X	SS	MW5-25*	50/6"	SP		SAND, gray, very fine- to fine-grained, trace fines, trace gravel, very dense, damp, no hydrocarbon-like odors.	0.0	10x20 SILICA SAND PACK
30							30.0 ▼ @ 30 feet: Wet — 266.5		
	X	SS		50/6"	SM		SILTY SAND gray, very fine- to fine-grained, some fines, trace gravel, very dense, wet, no hydrocarbon-like odors.	0.0	0.010"-SLOT PVC SCREEN

REMARKS

SS = Samples collected by using an 18-inch-long, 3.0-inch outside diameter split-spoon sampler driven by a 300 lb. wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling

(Continued Next Page)

SLR
22122 20th Avenue SE
Bothell, Washington 98021
Telephone 425 402 8800
Fax 425 402 8488

WELL NUMBER MW-5

CLIENT Olympic Water and Sewer, Inc.
PROJECT NAME Olympic Water and Sewer, Inc Property
PROJECT NUMBER 101.00433.00001
PROJECT LOCATION 701 Walker Way, Port Ludlow, WA

DEPTH (ft)	INTERVAL	TYPE	NAME	BLOW COUNTS PER FOOT (N VALUE)	U S C S	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
35					SM		SILTY SAND gray, very fine- to fine-grained, some fines, trace gravel. very dense, wet, no hydrocarbon-like odors. *(continued)* @ 35.0 feet: Few gravel.		
					ML		36.0 / 260.5 SILT, gray, moist, no hydrocarbon-like odors. 37.0 / 259.5		PVC END CAP

Boring completed at 37.0 feet.

WELL COMPLETION DETAILS

+2.96 to 26.5 feet Flush-threaded, 2.0-inch-diameter PVC blank riser pipe
26.5 to 36.5 feet: Flush-threaded, 2.0-inch-diameter 0.010"-machine slotted PVC well screen
36.5 to 36.8 feet: Flush-threaded, 2.0-inch-diameter PVC end cap

0.0 to 2.0 feet: Concrete surface seal
2.0 to 25.0 feet: Hydrated medium bentonite chips
25.0 to 37.0 feet: Carmeuse Industrial Sands 10x20 Colorado silica sand pack

REMARKS

SS = Samples collected by using an 18-inch-long, 3.0-inch outside diameter split-spoon sampler driven by a 300 lb wireline hammer.
PID = Photoionization detector.
* = Sample submitted for laboratory analysis.

▽ Shallow perched groundwater at time of drilling. ▼ Primary perched groundwater at time of drilling.