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Final 2011 Annual Groundwater Monitoring Report

Former Unocal Edmonds Terminal
11720 Unoco Road
Edmonds, Washington

May 11, 2012

ARCADIS

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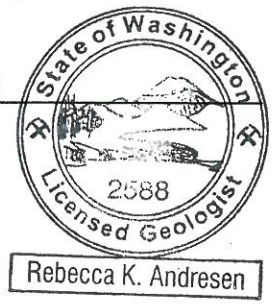

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Edmonds, Washington

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Chevron Environmental Management Company

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1. Introduction

On behalf of Chevron Environmental Management Company (Chevron), ARCADIS U.S., Inc. (ARCADIS) has prepared this 2011 Annual Groundwater Monitoring Report for former Unocal terminal located at 11720 Unoco Road in Edmonds, Washington (the Site). The Site and surrounding area are shown on Figure 1. In accordance with the approved modifications to the requirements of Washington State Agreed Order No. DE 4460 and the Interim Action Report – Work Plan for 2007 Lower Yard Interim Action, Unocal Edmonds Bulk Fuel Terminal (Work Plan; SLR International Corporation [SLR] 2007a), this report summarizes:

- Four groundwater sampling and gauging events completed between March 2011 and December 2011
- Overall Site groundwater conditions
- Proposed 2012 groundwater monitoring program.

2. Site Description

The Lower Yard occupies approximately 22 acres and lies east-southeast of BNSF Railway Company (BNSF) property, south of the Edmonds Marsh (also known as the Union Oil Marsh) and a drainage ditch (Willow Creek), and north of the Upper Yard (Figure 2).

At its nearest point (the southwest corner of the Lower Yard), the Lower Yard boundary is approximately 160 feet from the Puget Sound shoreline. Two storm water detention basins (Detention Basin No. 1 [DB-1] and Detention Basin No. 2 [DB-2]) are located along the north and northeast boundaries of the Lower Yard. DB-1 borders Edmonds Marsh and Willow Creek and acts as a retention pond for overflow from DB-2 during storm events. DB-2 serves as a collection area from which Site stormwater is discharged into Willow Creek.

Currently, a stormwater system consisting of 12 storm drains collects surface-water runoff and discharges directly into DB-2 via gravity flow. From DB-2, stormwater is discharged into Willow Creek under an Industrial Stormwater General Permit (SO3-002953C) and excess stormwater is stored in DB-1. Excess water in DB-1 is pumped to the DB-2 outfall. There are currently no permanent aboveground structures at the Site. A temporary storage shed is located along Unoco Road in the southern portion of the Lower Yard.

Previous structures in the Lower Yard included petroleum storage and transfer equipment (aboveground storage tanks and piping), two truck loading racks, several office buildings, a railcar loading/unloading station, a stormwater conveyance system including two 10,000-gallon stormwater detention tanks and two 500-gallon vapor recovery tanks, an air-blown asphalt plant, and an asphalt packaging warehouse.

2.1 Site History

Unocal operated the bulk fuel terminal from 1923 to 1991. Fuel was brought to the terminal on ships, pumped to the storage tanks in the Upper Yard, and loaded from the tanks into rail cars and trucks for delivery to customers. In addition, an asphalt plant operated at the Lower Yard from 1953 to the late 1970s.

In 2001, Unocal conducted an Interim Action in the Lower Yard, removing light nonaqueous phase liquid (LNAPL) and petroleum-impacted soil and groundwater from four areas of the Lower Yard. The results of the 2001 Interim Action are summarized in Lower Yard Interim Action As-Built Report, Unocal Edmonds Terminal – Volume 1 (Maul Foster and Alongi, Inc. [MFA] 2002). Additional Interim Actions conducted in 2003 included soil excavations in the southwest Lower Yard and DB-1. The results of

the 2003 Interim Action are summarized in the 2003 Lower Yard Interim Action As-Built Report, Detention Basin No. 1, Southwest Lower Yard, Metals Area 3, and Storm Drain Line Excavations – Volume 1 (MFA 2004). Previous excavations are shown on Figure 2.

In June 2007, Unocal entered into an Agreed Order with the Washington Department of Ecology (Ecology) to conduct an Interim Action in the Lower Yard (Ecology 2007). This Order supersedes Agreed Order No. DE 92TC-N328, dated October 25, 1993. Specific objectives of the Interim Action included:

- Removal of soil with petroleum impacts in excess of the soil remediation levels which were established in the Work Plan (SLR 2007a).
- Removal of LNAPL
- Extraction of groundwater that is in contact with LNAPL
- Removal of soil with arsenic concentrations in excess of the soil remediation levels which were established in the Work Plan (SLR 2007a).
- Remove the sediment in the drainage ditch (Willow Creek), at locations near the Site's two stormwater outfalls that failed 2003 toxicity tests
- Obtain the data necessary to determine if the remaining soil concentrations are sources of LNAPL on the groundwater table
- Obtain the data necessary to determine if the remaining soil concentrations will cause an exceedance of the groundwater cleanup levels (CULs) at the groundwater points of compliance (POCs)
- Obtain the data necessary to determine if the petroleum hydrocarbon concentrations in the groundwater beneath the Lower Yard will naturally attenuate to below the CULs at the groundwater POCs

The 2007 Agreed Order Interim Actions were conducted in two phases from July 2007 to April 2008 (Phase I), and July 2008 to October 2008 (Phase II). Phase I Interim Action work consisted of the removal of 108,000 tons of petroleum-impacted soil for offsite disposal and the removal of approximately 9,700 gallons of LNAPL. During Phase I construction activities, approximately 2 million gallons of groundwater were extracted, treated onsite, and discharged under a National Pollutant Discharge Elimination System (NPDES) Permit to Willow Creek. The complete results of the 2007

Phase I Interim Actions are summarized in Phase I Remedial Implementation As-Built Report, Unocal Edmonds Bulk Fuel Terminal Lower Yard (ARCADIS 2009a).

Phase II Interim Action work consisted of the removal of 14,825 tons of petroleum-impacted soil for offsite disposal and the removal of 131 gallons of LNAPL. During Phase II, approximately 520,000 gallons of groundwater were extracted, treated onsite, and discharged to Willow Creek under a NPDES permit. Phase II construction activities also included the removal of 2,000 tons of impacted sediments and subsequent restoration of approximately 420 feet of Willow Creek. The complete results of the 2008 Phase II Interim Action are summarized in the FINAL – Phase II Remedial Implementation As-Built Report, Unocal Edmonds Bulk Fuel Terminal Lower Yard (ARCADIS 2010a).

In accordance with the Agreed Order, groundwater monitoring was initiated and is ongoing following completion of the interim remedial excavation activities. Groundwater sampling events were originally planned to be conducted every other month (bi-monthly) over a two year period at wells within three groundwater flow paths and the 21 POC wells. Groundwater flow paths were established within the interior of the Site and each groundwater flow path consisted of seven monitoring wells (an upgradient well, three source area wells, and three downgradient wells). The groundwater flow paths and the frequency of groundwater monitoring events were created to provide the data to utilize Ecology's Natural Attenuation Analysis Tool Package A, Modules 1, 2, and 3 (Tool Package A; Ecology 2005).

The locations of the wells inside the three groundwater flow paths were based on the presence of LNAPL on groundwater prior to remedial activities. Prior to the 2007/2008 Interim Action remedial excavations, the groundwater flow paths were believed to fit the established model of upgradient, source area, and downgradient wells. As a result of the 2007/2008 Interim Action, remedial excavations extended beyond the mapped flow path areas and it was determined that the resulting monitoring well arrangement was not suitable for use with Tool Package A.

As a result of the source removal and associated data collection, LNAPL no longer is observed across most of the Site and the flow paths as previously defined do not contain monitoring wells that could provide upgradient and downgradient water quality data in relation to specific source areas. Therefore, the monitoring well plan outlined in the Agreed Order was no longer applicable for a spatial evaluation of natural attenuation away from the source, as required for use with Tool Package A. As a result, revisions to the monitoring program were reviewed and approved by Ecology in December 2009. The current monitoring well network is sufficient to monitor and evaluate the status of the overall dissolved-phase impacts, the stability of the Site

impacted groundwater is being evaluated on a well-by-well basis and the monitoring program needed to support this analysis was reduced accordingly.

Currently, groundwater sampling events are conducted on a quarterly basis, with POC wells sampled during first and third quarter events and all Site wells (POC and interior wells) sampled during second and fourth quarter events.

In 2011, Site investigation activities were conducted in the Lower Yard including a tidal study, hydraulic conductivity testing and soil boring advancement. Tidal study data was collected from 17 locations in Site monitoring wells and staff gauges in Willow Creek. Hydraulic conductivity pumping tests including step tests, short-duration tests and one long term test were conducted in ten Site monitoring wells. Soil investigation included the advancement of 17 soil borings in the vicinity of DB-2, monitoring well MW-510, and Willow Creek. This included the installation of nine piezometers. Results of the 2011 Site investigation are summarized in the 2011 Site Investigation Completion Report (ARCADIS, 2012)

2.2 Site Geology

Five hydrostratigraphic units have been identified in the Lower Yard and are discussed in detail below:

- *2008 Fill*. The 2007-2008 Interim Action excavations were backfilled to 6 to 12 inches above the observed groundwater table in the open excavations, with poorly graded coarse gravels (⅜ to 1 inch) with little to no fines. Backfill material above the coarse gravel to ground surface was a mixture of very fine to medium sand, trace silt, and fine to medium gravel materials.

- *1929 Fill*. This unit consists of silty sands with gravel and sandy silts with gravel. During the 2007-2008 Interim Action excavations, subsurface materials encountered from ground surface to a depth of 8 to 15 feet below ground surface (bgs) were mostly fill material placed circa 1929 or later, during the creation of the Lower Yard facility.

- *Marsh Deposits*. In many areas of the Lower Yard, beneath the 1929 Fill, there is a layer approximately 6 to 12 inches thick composed of silt and sandy silt with large amounts of organic matter such as peat, wood debris, and decomposing vegetation. This layer is encountered at depths ranging from 8 to 14 feet bgs, directly below the 1929 Fill material, and is interpreted to be representative of the former marsh horizon beneath the Lower Yard.

- *Beach Deposits*. Below the 1929 Fill and Marsh Deposits, a poorly graded sand formation of very fine to medium sand with fine gravel is present, containing organic material such as driftwood, and seashells. This layer is interpreted to be representative of the former beach environment in the area prior to the creation of the Lower Yard.

- *Whidbey Formation*. This material is a poorly graded sand layer consisting of very fine to medium sand with fine gravel and is distinct from the overlying materials in the Lower Yard. It is present to the maximum explored depth of 41.8 feet bgs. This unit contains interbedded sand with silt, and interbedded silt and sandy silt are also present. The interbeds range in thickness from less than 1 inch to several feet, and appear to be laterally discontinuous. This unit is interpreted to be alluvium, and is likely part of the Whidbey Formation.

The current lithology of the Lower Yard consists primarily of 2008 Fill. All of the 2007 - 2008 excavations were extended to the depth of the Beach Deposits or Whidbey Formation materials. Remaining un-excavated areas are most likely 1929 Fill material, underlain by the hydrostratigraphic units described above.

3. Groundwater Monitoring Program

In accordance with the Agreed Order No. DE 92TC-N328, groundwater monitoring was conducted after the remedial excavation activities to:

- Determine if the remaining soil concentrations will be a source of LNAPL.
- Evaluate if the remaining soil concentrations will cause an exceedance of groundwater CULs at the POCs.
- Determine if the remaining petroleum hydrocarbon concentrations in groundwater will naturally attenuate below the CULs at the POCs.
- Calculate the restoration timeframes to meet the groundwater CULs at the POCs.

Groundwater sampling events were conducted every other month (bi-monthly) over a 1-year period, from October 2008 to October 2009 and on a quarterly basis for a 2-year period, from January 2010 to December 2011. The monitoring well network was specified in the Work Plan, referenced in the 2007 Agreed Order.

The sampling program was developed based on the Indicator Hazardous Substances (IHSs) that were determined to be present at the Site in the Work Plan. The following is a list of analysis conducted on groundwater samples collected as part of the groundwater monitoring program at the Site:

- Benzene by United States Environmental Protection Agency (USEPA) Method 8021B
- Total petroleum hydrocarbons as gasoline (TPH-G) by Ecology Methods NWTPH-Gx
- Total petroleum hydrocarbons as diesel (TPH-D) and total petroleum hydrocarbons as heavy oil (TPH-O) by Ecology Method NWTPH-Dx (after silica gel cleanup)
- Total carcinogenic polyaromatic hydrocarbons (cPAHs), plus naphthalene, by USEPA Method 8270C.

Along with the petroleum hydrocarbons noted above, the following natural attenuation geochemical indicator parameters are also monitored in groundwater samples collected during the fourth quarter sampling event, from both interior wells and POC wells:

- Sulfate by USEPA Method 300.0
- Nitrate by USEPA Method 300.0
- Alkalinity by USEPA Method 310.0
- Dissolved methane by USEPA Method RSK 175
- Dissolved manganese by USEPA Method 200.8.

Water quality and geochemical indicator parameters, including dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, conductivity, temperature, and dissolved ferrous iron measurements, are also collected at the time of purging using a water quality meter with a flow-through cell. Ferrous iron is measured using Hach® field kits.

3.1 Groundwater Cleanup Levels

Based on the Conceptual Site Model (CSM) presented in the Work Plan, groundwater beneath the Site discharges to the surface-water and sediment in Willow Creek. Groundwater CULs were established in the Work Plan and are based on the protection of surface-water. The CULs are based on Method A CULs for TPH and water quality criteria (WQC) for benzene and cPAHs. WQCs have not been established for TPH; therefore, a CUL was calculated using the raw Method A groundwater CULs (800 micrograms per liter [µg/L] for TPH-G and 500 µg/L each for TPH-D and TPH-O) and setting the combined hazard index to 1. The calculation was adjusted to account for the compositions of TPH mixtures on the eastern and western side of the Lower Yard (SLR 2007a). The demarcation between the eastern and western areas is shown on Figure 2. The groundwater CULs are as follows:

- Benzene: 51 µg/L
- Total cPAHs: 0.018 µg/L
- Total TPH (eastern side of Site): 506 µg/L
- Total TPH (western side of Site): 706 µg/L

Site-specific groundwater CULs are included in Table 1.

3.2 Monitoring Well Network

POCs were established at the point where groundwater discharges to surface-water within the monitoring well network, located along the downgradient perimeter of the Site. Seventeen POC wells were established in the Work Plan. Following implementation of the remedial excavations, subsequent discussions with Ecology and stakeholders, 21 POC wells were ultimately accepted by Ecology. The following monitoring wells are considered POC wells:

LM-2	MW-8R	MW-20R	MW-101	MW-104	MW-108
MW-109	MW-129R	MW-135	MW-136	MW-139R	MW-147
MW-149R	MW-150	MW-500	MW-501	MW-510	MW-518
MW-522	MW-523	MW-524			

The remaining 19 wells are considered interior monitoring wells and are used for monitoring natural attenuation and plume migration. Based on historical groundwater flow directions, three groundwater flow paths were designated in the Work Plan to monitor the natural attenuation of the dissolved-phase concentrations in groundwater. Each flow path consists of seven monitoring wells (an upgradient, three source area wells, and three downgradient wells). Each flow path is wider at the downgradient end to account for up to 30 percent variability in the flow direction due to tidal influence. The downgradient wells in each flow path are placed at least 50 feet from Willow Creek in an attempt to minimize any surface water influence on the sample analytical results. The groundwater monitoring found that changes in Site hydrogeology caused by excavation cleanup actions caused the flow path approach to no longer be suitable.

The interior monitoring wells are listed below:

MW-143	MW-502	MW-503	MW-504	MW-505	MW-506
MW-507	MW-508	MW-509	MW-511	MW-512	MW-513
MW-514	MW-515	MW-516	MW-517	MW-519	MW-520
MW-521					

Groundwater monitoring well locations are shown on Figure 3.

3.3 Groundwater Monitoring Program Modifications

On October 13, 2009, ARCADIS met with Ecology, the Washington State Department of Transportation (WSDOT), and the Edmonds Citizens Awareness Committee (ECAC) to discuss project progress, as well as modifications to the groundwater monitoring program. As outlined in the Work Plan, groundwater flow paths were established within the interior of the Site and each flow path consisted of seven monitoring wells (an upgradient well, three source area wells, and three downgradient wells). The groundwater flow paths and frequency of groundwater sampling events were created to provide data for use in Tool Package A.

The locations of the wells inside the three groundwater flow paths were based on the known extent of LNAPL on groundwater prior to the creation of the Work Plan. Prior to the 2007/2008 Interim Action remedial excavations, the groundwater flow paths fit the

established model of upgradient, source area, and downgradient wells. However, during the 2007/2008 Interim Action, it was apparent that LNAPL was more widespread than initially thought, and following the 2007/2008 Interim Action remedial excavations, the flow paths, as defined, no longer contained monitoring wells that would provide water quality data upgradient and downgradient of the source areas. Therefore, the flow paths were no longer applicable for a spatial evaluation of natural attenuation away from the source, as required for use with Tool Package A (Ecology 2005).

After analyzing groundwater data from the first year of bi-monthly sampling, a Request to Modify the Groundwater Sampling Program was submitted by ARCADIS and approved by Ecology in December 2009 (ARCADIS 2009b). Because the Site layout and surrounding areas did not allow for redistribution of groundwater monitoring wells to accommodate upgradient and downgradient locations, modifications were proposed to the groundwater monitoring program. These proposed changes were not intended to address spatial discrepancies in the groundwater monitoring well network, but were intended to help reduce the quantity of non-essential groundwater analytical data. The proposed modifications addressed two major components of the groundwater monitoring program: monitoring schedule and laboratory analysis of groundwater samples. These two components are discussed in greater detail below.

3.3.1 Scheduling Program Changes

The groundwater sampling schedule was changed from events conducted every other month to quarterly events. The October 2009 sampling event constituted the final bi-monthly event, with the quarterly schedule beginning in January 2010. At the completion of the 2010 sampling period, ARCADIS proposed to continue the quarterly sampling program through 2011 as written in the Final 2010 Annual Groundwater Monitoring Report (ARCADIS 2010b). The 2011 sampling program was accepted by Ecology in February 2011. Therefore, the 2011 sampling events occurred in March, June, September, and December 2011.

3.3.2 Analytical Sampling Changes

During the eleven sampling events from October 2008 to October 2010, benzene was detected at a concentration greater than applicable Site CULs in only one sample from monitoring well MW-20R during a single sampling event. Therefore, benzene was discontinued from the groundwater analytical program for all Site wells except well MW-20R during the first, second, and third quarter 2011 monitoring events. Benzene was analyzed in groundwater samples from all Site wells during the fourth quarter 2011 sampling event.

During the eleven sampling events from October 2008 to October 2010, only seven samples (collected from five wells) contained cPAH concentrations exceeding the cPAH CUL. These did not contain detectable concentrations of cPAHs, but had elevated reporting limits that were greater than the CULs. Subsequent samples collected from the four wells with past cPAH exceedances were analyzed with reporting limits less than the cPAH CULs and did not contain detectable cPAH concentrations. Therefore, cPAH analysis was discontinued from the groundwater analytical program during the first, second, and third quarter 2011 monitoring events. cPAHs were analyzed in groundwater samples from all Site wells during the fourth quarter 2011 sampling event.

With the exception of purge parameters (such as DO and ORP) collected in the field at the time of sampling, additional laboratory samples analyzed for natural attenuation parameters demonstrate little value in determining whether or not natural attenuation is occurring on a quarterly basis. Sufficient data were collected throughout the first year of monitoring to evaluate natural attenuation processes at the Site. Therefore, natural attenuation parameters were discontinued from the groundwater analytical program during the first, second, and third quarter monitoring events. Natural attenuation parameters were analyzed in groundwater samples from all Site wells during the fourth quarter 2011 sampling event.

The following analytes and parameters were collected during the March and September 2011 events at POC wells only and during the June and December 2011 events at POC and interior monitoring wells:

- TPH-G by Ecology Methods NWTPH-Gx
- TPH-D and TPH-O by Ecology Method NWTPH-Dx (after silica gel cleanup)
- Benzene by USEPA Method 8021B for MW-20R only
- Water quality including DO, ORP, pH, conductivity, and temperature

During the December 2011 monitoring event, the wells that did not contain LNAPL were sampled for the full suite of analytes (including benzene, cPAHs, and natural attenuation parameters) as outlined in the Agreed Order, No. DE 92TC-N328.

The table below illustrates the groundwater monitoring program for 2011.

	March 2011	June 2011	September 2011	December 2011
POC Wells	TPH-G, TPH-D, TPH-O, benzene (MW-20R only), water quality parameters	TPH-G, TPH-D, TPH-O, benzene (MW-20R only), water quality parameters	TPH-G, TPH-D, TPH-O, benzene (MW-20R only), water quality parameters	TPH-G, TPH-D, TPH-O, benzene (all wells), cPAH, water quality parameters, natural attenuation parameters
Interior Monitoring Wells	No interior wells sampled	TPH-G, TPH-D, TPH-O, benzene (MW-20R only), water quality parameters	No interior wells sampled	TPH-G, TPH-D, TPH-O, benzene (all wells), cPAH, water quality parameters, natural attenuation parameters

4. Groundwater Conditions 2011

The first quarter 2011 groundwater monitoring event was conducted from March 21 to March 24, 2011. Groundwater gauging activities were conducted on March 21, 2011 and groundwater samples were collected from March 22 to March 24, 2011. The second quarter monitoring event was conducted from June 14 to June 20, 2011. Groundwater gauging activities were conducted on June 14 and groundwater samples were collected from June 15 to June 17 and on June 20. The third quarter sampling event was conducted from September 26 to September 28, 2011. Groundwater gauging activities were conducted on September 26 and groundwater samples were collected from September 27 to September 28. The fourth quarter groundwater monitoring event was conducted from December 12 to December 19, 2011. Groundwater gauging activities were conducted on December 12 and groundwater samples were collected from December 13 to December 16 and on December 19.

4.1 Groundwater Monitoring Procedures

During groundwater monitoring events conducted in March and June 2011, 48 onsite wells, one offsite well (MW-301), and eight piezometers were gauged. Eight additional piezometers were installed from September 22 to September 25, 2011 as part of additional soil investigation activities near DB-2. During groundwater monitoring events conducted in September and December 2011, 48 onsite wells, one offsite well (MW-301), and sixteen piezometers were gauged. During groundwater monitoring events, wells were gauged with a decontaminated oil/water interface probe to determine depth to groundwater and to check for the presence of LNAPL. If LNAPL or an LNAPL film was detected, a bailer was lowered into the well to visually confirm its presence.

Prior to gauging, well caps were removed to allow groundwater levels to equilibrate for at least 1 hour. Gauging activities were initiated as close to the time of low tide as possible. Six staff gauges in Willow Creek and one staff gauge in DB-1 were measured prior to gauging the onsite wells and after gauging the Site wells. Two sets of data were provided for each staff gauge for each event, with the exception of staff gauge TB for the March 2011 gauging event due to limited access because of a malfunctioning fence gate.

In April 2011, the staff gauge in DB-1 (D-6) was replaced by staff gauge D-6R. Staff gauge D-6R was surveyed for horizontal and vertical coordinates and was measured during the June, September, and December 2011 events. The data collected from staff gauge located in DB-1 (D-6/D-6R), is not included on groundwater contour maps as the water level in DB-1 is manually controlled by pumping. Tide tables for each gauging event are included in Appendix A. Monitoring well gauging times are included in Table

2; gauging times can be correlated with the tide tables to determine the tidal stage during gauging activities.

After gauging, the wells were purged via low-flow methods using peristaltic pumps with disposable polyethylene tubing. Water quality and geochemical parameters, including DO, ORP, pH, conductivity, and temperature, were collected at the time of purging using a properly calibrated In-Situ 9500 Troll® groundwater quality meter with low-flow cells. Dissolved ferrous iron measurements were collected in the field using a Hach® ferrous iron measuring kit. Groundwater was purged until the geochemical parameters stabilized to within 10 percent of their value or until three well casing volumes were purged. Low-flow field sheets with groundwater parameters, as well as laboratory analytical result reports collected during the 2011 sampling events, are provided in Appendices B through E.

After stabilization parameters were reached, samples were collected into new, laboratory-supplied containers with proper preservatives and kept in iced coolers. Samples for laboratory analysis were packed in iced coolers and shipped to Lancaster Laboratories in Lancaster, Pennsylvania for analysis.

As part of the Quality Assurance Project Plan, as described in the Sampling and Analysis Plan (SAP) of the Work Plan, quality assurance procedures were followed during each sampling event. This includes duplicate samples collected at a frequency of 10 percent of the total number of samples, which equates to four duplicate samples collected per sampling event. Duplicates were submitted blindly to the laboratory. Documentation of parent and duplicate samples was kept in the field notes and sampling sheets by ARCADIS field personnel.

In addition to duplicate samples, matrix spike and matrix spike duplicate (MS/MSD) samples were collected at a frequency of 5 percent of the total number of samples, or two per sampling event. One equipment rinsate sample was collected per sampling event. Equipment blank samples were collected by rinsing decontaminated field equipment with distilled water. Duplicate samples, MS/MSD samples, and equipment rinsate samples were collected and analyzed for hydrocarbon analysis only (NWTPH-Gx, NWTPH-Dx, cPAHs by 8270, and benzene by 8021B) per the SAP.

4.2 Groundwater Flow Direction

The groundwater flow direction is to the north-northwest in the central portion of the Site and to the northwest in the western portion of the Site, consistent with historical observations. Due to 2008 Fill material, groundwater across the central and southwestern portions of the Site has a very low gradient. This flattening of the

groundwater gradient across areas of excavation does not appear to have an effect on the overall Site groundwater gradient, with the exception of the southeast Lower Yard.

The majority of the southeast Lower Yard is also composed of 2008 Fill material. Groundwater flow in the southeast Lower Yard is dominated by a mounding effect. Groundwater elevations in monitoring wells MW-500 and MW-501 are generally several feet higher than nearby wells. These wells are partially installed in an excavation, but the screen interval also brackets 1929 Fill material.

In an effort to understand the mounding, six piezometers (including the two completed deeper as part of the nested pairs) were installed in 1929 Fill material. Groundwater gauging data generally indicate that the groundwater surfaces measured in P-3 and P-5, the two shallow piezometers completed in 2008 Fill material, have elevations similar to those measured in wells MW-500 and MW-501, which are also partially completed in 2008 Fill material. The water levels measured in P-3 and P-5 are generally several feet higher than the water levels in the deeper piezometer of each nested pair, which are installed with screens beneath the 2008 Fill material. Groundwater levels measured in piezometers with deeper well screens (P-2, P-4, P-7, and P-8) show groundwater elevations consistent with Site-wide groundwater flow.

The two shallow piezometers (P-1 and P-6) that were installed in 1929 Fill material, outside the footprints of the excavation, show higher groundwater elevations than their deeper counterparts. There appears to be lateral outward migration of shallow groundwater from the groundwater mound in the excavation backfill into the surrounding 1929 Fill material as the mound decays. The silty, shallow, 1929 Fill material in the southeast Lower Yard (from 0 to 13 feet bgs) appears to have created a distinct zone in which shallow groundwater responds to recharge independently of the lower-permeability 1929 Fill material below. The heterogeneous nature of the1929 Fill material found in the southeast Lower Yard has created localized pockets of lower and higher permeability that affect shallow groundwater elevations locally.

4.2.1 First Quarter, March 2011

As part of first quarter monitoring activities, water levels were recorded during low tide on March 21, 2011. ARCADIS field personnel gauged 49 monitoring wells, eight piezometers, six staff gauges in Willow Creek, and one staff gauge in DB-1. Depths to water ranged from 1.19 feet below the top of casing (btoc; 13.65 feet above mean sea level [amsl]) in piezometer P-3 to 25.65 feet btoc (9.48 feet amsl) in well MW-134X. Groundwater elevations ranged from 5.79 feet amsl in well MW-301 to 14.44 feet amsl in well MW-500. Water levels in Willow Creek prior to Site gauging ranged from 6.09 feet amsl at staff gauge D-3 to 6.56 feet amsl at staff gauge D-4. Water elevations in Willow Creek after Site gauging ranged from 5.89 feet amsl at staff gauge D-3 to 6.49

feet amsl at staff gauge D-4. First quarter depths to water, groundwater elevations, and times of gauging are presented in Table 2. First quarter 2011 groundwater elevations and contours are shown on Figure 4.

LNAPL was present in monitoring well MW-510 during the first quarter sampling event. LNAPL was measured at a thickness of 0.01 foot from 5.80 to 5.81 feet btoc (6.72 to 6.74 feet amsl). This measurement was confirmed using a bailer.

4.2.2 Second Quarter, June 2011

As part of second quarter monitoring activities, water levels were recorded during low tide on June 14, 2011. ARCADIS field personnel gauged 49 monitoring wells, eight piezometers, six staff gauges in Willow Creek, and one staff gauge in DB-1. Depths to water ranged from 2.54 feet btoc (5.60 feet amsl) in well LM-2 to 26.20 feet btoc (8.93 feet amsl) in well MW-134X. Groundwater elevations ranged from 3.67 feet amsl in well MW-151 to 12.62 feet amsl in piezometer P-6. Water levels in Willow Creek prior to Site gauging ranged from 6.03 feet amsl at staff gauge D-2 to 7.04 feet amsl at staff gauge D-4. Water elevations in Willow Creek after Site gauging ranged from 5.90 feet amsl at staff gauge D-5 to 6.65 feet amsl at staff gauge TB.

LNAPL was not present at a measurable thickness in any of the wells during the second quarter sampling event. The absence of LNAPL in monitoring well MW-510 was confirmed with a bailer. Second quarter depths to water, groundwater elevations, and times of gauging are presented in Table 2. Second quarter 2011 groundwater elevations and contours are shown on Figure 5.

4.2.3 Third Quarter, September 2011

As part of third quarter monitoring activities, water levels were recorded during low tide on September 26, 2011. ARCADIS field personnel gauged 49 monitoring wells, 16 piezometers, six staff gauges in Willow Creek, and one staff gauge in DB-1. Depths to water ranged from 2.79 feet btoc (5.35 feet amsl) in well LM-2 to 26.34 feet btoc (8.79 feet amsl) in well MW-134X. Groundwater elevations ranged from 2.24 feet amsl in well MW-147 to 11.27 feet amsl in piezometer P-6. Water levels in Willow Creek prior to Site gauging ranged from 6.20 feet amsl at staff gauges D-3 to 6.57 feet amsl at staff gauge D-4. Water elevations in Willow Creek after Site gauging ranged from 6.10 feet amsl at staff gauge D-5 to 6.44 feet amsl at staff gauge TB.

LNAPL was present in monitoring well MW-510 and piezometers P-12 and P-13 during the third quarter sampling event at thicknesses of 0.02, 0.01, and 0.03 foot, respectively. These measurements were confirmed using a bailer. Groundwater elevations in MW-510, P-12, and P-13 were 5.59, 5.88, and 6.09 feet amsl,

respectively. Piezometer P-12 is located within 45 feet of MW-510 and P-13 is located within 23 feet of MW-510.

Third quarter depths to water, groundwater elevations, and times of gauging are presented in Table 2. Third quarter 2011 groundwater elevations and contours are shown on Figure 6.

4.2.4 Fourth Quarter, December 2011

As part of fourth quarter monitoring activities, water levels were recorded during low tide on December 12, 2011. ARCADIS field personnel gauged 49 monitoring wells, 16 piezometers, six staff gauges in Willow Creek, and one staff gauge in DB-1. Depths to water ranged from 2.33 feet btoc (11.20 feet amsl) in well MW-109 to 26.21 feet btoc (8.92 feet amsl) in well MW-134X. Groundwater elevations ranged from 5.17 feet amsl in well MW-101 to 12.60 feet amsl in piezometers P-1 and P-6. Water levels in Willow Creek prior to Site gauging ranged from 5.23 feet amsl at staff gauge D-3 to 6.60 feet amsl at staff gauge D-5. Water elevations in Willow Creek after Site gauging ranged from 4.92 feet amsl at staff gauge D-3 to 7.21 feet amsl at staff gauge D-4.

LNAPL was present in piezometer P-13 during the fourth quarter sampling event. LNAPL was measured at a thickness of 0.23 foot from an elevation of 6.74 to 6.97 feet amsl. LNAPL was not present in monitoring well MW-510 or piezometer P-12 during this event. Bailers were used to confirm the presence or absence of LNAPL in wells MW-510, P-12 and P-13. Fourth quarter depths to water, groundwater elevations, and times of gauging are presented in Table 2. Fourth quarter 2011 groundwater elevations and contours are shown on Figure 7.

4.3 Analytical Results

Groundwater CULs for the Site, as outlined in the Work Plan, are presented in Table 1. There are two values for total TPH CULs distinguished between the east and west side of the Site, as demarcated on Figures 2 through 11. Total TPH concentrations were calculated by summing the concentrations of TPH-G, TPH-D, and TPH-O, and are collectively referred to as “TPH.” If one or more of the constituents did not exceed the laboratory detection limit, one-half of the detection limit for each constituent was added to the detectable concentrations. To calculate total cPAHs, the seven cPAH congener concentrations were adjusted for toxicity according to the method outlined in Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors (California Environmental Protection Agency 2005). Analytical reports for monitoring events are presented in Appendices B through E**.**

4.3.1 First Quarter, March 2011

From March 21 to March 24, groundwater samples were collected from 20 POC wells during the first quarter sampling event. Well MW-510 was not sampled due to the presence of 0.01 foot of LNAPL. The presence of LNAPL is considered an exceedance of the Site CULs.

Groundwater samples collected from six Site wells contained TPH concentrations less than laboratory detection limits, all of which were collected from POC wells. Eight groundwater samples collected from seven Site wells (including a duplicate sample) contained TPH concentrations exceeding applicable Site CULs, with concentrations ranging from 643 µg/L in the sample collected from monitoring well MW-136 to 2,375 µg/L in the duplicate sample collected from monitoring well MW-129R. The eight samples containing TPH concentrations greater than applicable CULs were collected from POC wells. Benzene was detected in the groundwater sample collected from monitoring well MW-20R at a concentration of 5.3 µg/L, which is less than the applicable Site CUL.

First quarter analytical results are presented in Table 3 and TPH data are presented on Figure 8. First quarter laboratory analytical reports and low-flow sampling field sheets are included in Appendix B**.**

4.3.2 Second Quarter, June 2011

From June 15 to June 17 and on June 20, groundwater samples were collected from 40 POC and interior monitoring wells during the second quarter sampling event. LNAPL was not present in any Site wells during this event.

Groundwater samples collected from one monitoring well (MW-509) contained TPH concentrations less than laboratory detection limits. Ten groundwater samples collected from nine Site wells (including one duplicate sample) contained TPH concentrations exceeding applicable Site CULs, with concentrations ranging from 645 µg/L in the sample collected from monitoring well MW-136 to 15,300 µg/L in the duplicate sample collected from monitoring well MW-510. Eight of the ten samples were collected from POC wells. Benzene was detected in the groundwater sample collected from monitoring well MW-20R at a concentration of 3.9 µg/L, which is less than the applicable Site CUL.

During the second quarter sampling event, the sample collected from monitoring well MW-139R was reported to contain a total TPH concentration of 951 µg/L, with an TPH-O concentration of 870 µg/L. TPH-O has not been detected in well MW-139R at concentrations greater than laboratory detection limits during any other sampling event

of the monitoring program. This sample was collected as part of a MS/MSD and the anomalous TPH-O detection was re-analyzed. The sample extract was re-injected and confirmed the reported results. The sample was then re-extracted and the results were less than laboratory detection limits for both TPH-D and TPH-O. However, the re-extraction was past the method hold time. Because the hold time had expired prior to the re-extraction, all reported data is taken from the original extraction.

Second quarter analytical results are presented in Table 3 and TPH data are presented on Figure 9. Second quarter laboratory analytical reports and low-flow sampling field sheets are included in Appendix C.

4.3.3 Third Quarter, September 2011

From September 27 to September 28, groundwater samples were collected from 20 POC wells during the third quarter sampling event. Well MW-510 was not sampled due to the presence of 0.02 foot of LNAPL. The presence of LNAPL is considered an exceedance of the Site CULs.

Groundwater samples collected from 15 POC wells contained TPH concentrations less than laboratory detection limits. The groundwater sample collected from well MW-129R contained a TPH concentration of 2,955 µg/L, which exceeds applicable Site CULs. Benzene was detected in the groundwater sample collected from monitoring well MW-20R at a concentration of 0.9 µg/L, which is less than the applicable Site CUL.

Third quarter analytical results are presented in Table 3 and TPH data are presented on Figure 10. Third quarter laboratory analytical reports and low-flow sampling field sheets are included in Appendix D.

4.3.4 Fourth Quarter, December 2011

From December 13 to December 19, groundwater samples were collected from 39 POC and interior monitoring wells during the fourth quarter sampling event. Well MW-510 was not sampled due to the presence of trace amounts of LNAPL. The presence of LNAPL is considered an exceedance of the Site CULs.

Groundwater samples collected from thirteen POC wells contained TPH concentrations less than laboratory detection limits. The groundwater sample collected from monitoring well MW-104 exceeded applicable Site CULs for TPH with a concentration of 771µg/L. Benzene was detected in samples collected from six wells with concentrations ranging from 0.2 µg/L in wells MW-129R, MW-500, and MW-139 to 20 µg/L in MW-20R. All detected benzene concentrations were less than the Site CUL of 51 µg/L.

Samples collected from interior monitoring well MW-515 contained a concentration of cPAHs greater than laboratory detection limits, but less than Site CULs, with a concentration of 0.008 µg/L. No other Site wells contained concentrations of cPAHs greater than laboratory detection limits. The sample collected from POC well MW-104 did not contain detectable concentrations of cPAHs, but exceeded the Site CUL due to elevated reporting limits. Monitored natural attenuation parameters were collected from all POC and interior monitoring wells during this event.

Fourth quarter analytical results are presented in Table 3 and TPH data are presented on Figure 11. Natural attenuation parameters are presented in Table 4. Fourth quarter laboratory analytical reports and low-flow sampling field sheets are included in Appendix E.

4.4 Monitoring Well MW-510, Piezometers P-12 and P-13

Monitoring well MW-510 has had measurable amounts of LNAPL present since October 2009, with the exception of the June 2011 and December 2011 sampling events. Piezometer P-12 had LNAPL present during the September 2011 sampling event and piezometer P-13 had LNAPL present during both the September 2011 and December 2011 sampling events. Monitoring well MW-510 and piezometers P-12 and P-13 are located within 15 feet of one another. LNAPL in monitoring well MW-510, piezometer P-12, and piezometer P-13 is black in color, has a high viscosity, and is difficult to recover with a bailer. During each monitoring event, an oil/water interface probe is used to measure depth to LNAPL and depth to water. Bailers were used to confirm the presence of LNAPL after each groundwater measurement in monitoring well MW-510 and piezometers P-12 and P-13.

During 2011, LNAPL thicknesses in monitoring well MW-510 ranged from not measurable during the second and fourth quarter monitoring events to 0.02 foot during the third quarter monitoring event. Monitoring well MW-510 had amounts of LNAPL in the fourth quarter event that were not measurable; small amounts of LNAPL were present on the IF probe tip at the time of gauging, but LNAPL was not present in a measurable thickness (<0.01 foot). The highest groundwater elevation measured in well MW-510 during 2011 corresponded with the second thickest measurement of LNAPL (0.01 foot) during the first quarter event. The lowest groundwater elevation measured in well MW-510 in 2011 corresponded with the thickest measurement of LNAPL (0.02 foot) during the third quarter monitoring event. LNAPL versus depth to water hydrographs are included in Appendix F.

As approved in the 2010 Annual Groundwater Monitoring Report, passive recovery of LNAPL in monitoring well MW-510 has been performed in 2011 using an oil absorbent sock. SoakEase absorbent socks have been installed in MW-510 beginning on March

24, 2011, after the first quarter gauging event. The absorbent sock was then removed and replaced during the second quarter gauging event. The sock was then removed 10 days prior to the third quarter gauging event, on September 16, 2011. The sock was replaced upon completion of gauging MW-510. The sock was then removed four days prior to the fourth quarter gauging event, on December 8, 2011, and was replaced upon completion of the gauging event.

During the third quarter 2011 groundwater gauging event, LNAPL was measured in piezometer P-12 at a thickness of 0.01 foot, which corresponds with the lowest groundwater elevation measured in P-12 during 2011.

During 2011 groundwater gauging events, LNAPL thicknesses in piezometer P-13 ranged from 0.03 to 0.23 foot during the third and fourth quarter monitoring events, respectively. The highest groundwater elevation and the thickest measurement of LNAPL (0.23 foot) were measured in piezometer P-13 during the fourth quarter monitoring event. The lowest groundwater elevation and the second thinnest measurement of LNAPL (0.03 foot) were measured during the third quarter monitoring event. LNAPL versus depth to water hydrographs are included in Appendix F.

LNAPL and/or sheen has never been observed in Willow Creek. Between the tidal basin and the furthest upstream staff gauge (D-4), the creek was observed daily for signs of LNAPL and/or sheen during groundwater gauging and sampling events as well as during monthly Site visits. LNAPL was also not observed in Willow Creek during the 2007-2008 Interim Action Phase II excavation activities.

5. Overall Groundwater Conditions

When compared to groundwater conditions prior to Interim Action work in the Lower Yard (2001), groundwater has displayed a marked decrease in areas of LNAPL and a marked decrease in dissolved phase TPH across the Site. Geochemical parameters monitored across the Site indicate that an environment that is conducive to anaerobic biodegradation of petroleum hydrocarbons is present and that biodegradation is likely ongoing at the Site. Upgradient wells generally do not have concentrations of IHS' in excess of the groundwater CULs. Hydrographs representing TPH compared to depth to water for Site wells included in the monitoring program are presented in Appendix G.

In 2011, samples collected from 30 monitoring wells did not contain TPH concentrations greater than their applicable CUL. Twelve of the wells were POC wells and 18 wells were interior monitoring wells. During the first and second quarter groundwater sampling events, samples from 13 of 20 POC wells and 31 of 40 Site wells, respectively, did not contain TPH concentrations exceeding Site CULs. Maximum concentrations during the first and second quarter events ranged from 643 µg/L in well MW-136 to 15,300 µg/L in well MW-510. The greatest TPH concentration in a groundwater sample collected from a Site monitoring well other than MW-510 during the first and second quarter events was 2,955 µg/L from well MW-129R.

During the third and fourth quarter 2011 monitoring events, samples from 19 of 20 POC wells and 38 of 39 Site wells, respectively, did not contain TPH concentrations greater than CULs. During the third quarter event, samples collected from well MW-129R contained a TPH concentration of 2,955 µg/L and during the fourth quarter event samples collected from well MW-104 contained a concentration of 771 µg/L. MW-510 was not sampled during the third or fourth quarter events.

6. Proposed Interim Light Nonaqueous Phase Liquid Recovery

ARCADIS intends to continue implementing interim LNAPL recovery activities at monitoring well MW-510. This includes passive LNAPL recovery through the use of the SoakEase ™ absorbent sock recovery system. A product data sheet is presented in Appendix H. Spent absorbent socks are stored in a Department of Transportation-approved 55-gallon drum and will be properly disposed of at an Ecology-approved solid waste landfill.

7. Proposed Monitoring Program 2012

ARCADIS proposes to continue the current groundwater monitoring program in 2012. The following analytes and parameters will be collected during the first and third quarter 2012 events at POC wells only and during the second quarter 2012 event at POC and interior monitoring wells:

- TPH-G by Ecology Methods NWTPH-Gx
- TPH-D and TPH-O by Ecology Method NWTPH-Dx (after silica gel cleanup)
- Benzene by USEPA Method 8021B for MW-20R only
- Water quality including DO, ORP, pH, conductivity, and temperature.

During the fourth quarter 2012 monitoring event, the Site wells in the program that do not contain LNAPL will be sampled for the full suite of analytes (including benzene, cPAHs, and natural attenuation parameters) as outlined in the Agreed Order, No. DE 92TC-N328. ARCADIS will evaluate the monitoring program annually and propose changes to Ecology at the end of each year.

The table below illustrates the proposed groundwater monitoring schedule for 2012.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
POC Wells	TPH-G, TPH-D, TPH-O, benzene (MW-20R only), water quality parameters	TPH-G, TPH-D, TPH-O, benzene (MW-20R only), water quality parameters	TPH-G, TPH-D, TPH-O, benzene (MW-20R only), water quality parameters	TPH-G, TPH-D, TPH-O, benzene (all wells), cPAH, MNA parameters, water quality parameters
Interior Monitoring Wells	No interior wells sampled	TPH-G, TPH-D, TPH-O, benzene (MW-20R only), water quality parameters	No interior wells sampled	TPH-G, TPH-D, TPH-O, benzene (all wells), cPAH, MNA parameters, water quality parameters

8. Conclusions

In 2011, a total of 30 Site wells (12 POC wells and 18 interior monitoring wells) did not contain IHS concentrations greater than Site CULs. During the first and second quarter sampling events, samples from 13 of 20 POC wells and 31 of 40 Site wells, respectively, contained IHS concentrations that did not exceed Site CULs. During the third and fourth quarter sampling events, samples from 19 of 20 POC wells and 38 of 39 Site wells, respectively, contained IHS concentrations that did not exceed Site CULs. As of the third and fourth quarter sampling events, only two monitoring wells contained IHS concentrations greater than Site CULs. LNAPL continues to be present in monitoring well MW-510 and piezometers P-12 and P-13, all located within 15 feet of one another between the 2007/2008 excavation area and DB2.

9. References

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ARCADIS

Tables

Table 1

Surface Water and Groundwater Cleanup Levels
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Indicator Hazardous Substances	Surface Water and Groundwater Cleanup Level	
	Eastern	Western
Total TPH	506	706
Benzene	51	51
Total cPAHs	0.018	0.018

Notes :
Concentrations in micrograms per liter (µg/L)

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
LM-2	10/20/08	16:08	8.14	2.66	--	NP	5.48
	12/08/08	10:51		2.89	--	NP	5.25
	02/20/09	9:55		2.64	--	NP	5.50
	04/20/09	9:48		2.46	--	NP	5.68
	06/22/09	11:35		2.84	--	NP	5.30
	08/03/09	11:18		3.10	--	NP	5.04
	08/17/09	9:27		3.09	--	NP	5.05
	10/29/09	9:46		2.56	--	NP	5.58
	01/18/10	13:47		2.59	--	NP	5.55
	04/19/10	15:14		2.20	--	NP	5.94
	07/19/10	7:24		2.41	--	NP	5.73
	10/25/10	14:02		1.63	--	NP	6.51
	03/21/11	12:32		1.60	--	NP	6.54
	06/14/11	10:54		2.54	--	NP	5.60
	09/26/11	10:59		2.79	--	NP	5.35
	12/12/11	12:42		2.46	--	NP	5.68
MW-E	10/20/08	16:20	14.42	7.95	--	NP	6.47
	12/08/08	11:35		7.78	--	NP	6.64
	02/20/09	10:27		7.58	--	NP	6.84
	04/20/09	10:11		7.48	--	NP	6.94
	06/22/09	12:14		7.94	--	NP	6.48
	08/03/09	11:32		8.10	--	NP	6.32
	08/17/09	9:39		8.19	--	NP	6.23
	10/29/09	8:53		7.02	--	NP	7.40
	01/18/10	13:45		6.89	--	NP	7.53
	04/19/10	15:39		7.10	--	NP	7.32
	07/19/10	7:41		7.65	--	NP	6.77
	10/25/10	14:14		7.30	--	NP	7.12
	03/21/11	12:44		6.58	--	NP	7.84
	06/14/11	11:15		7.57	--	NP	6.85
	09/26/11	11:06		7.93	--	NP	6.49
	12/12/11	12:41		7.45	--	NP	6.97
MW-8R	10/20/08	15:47	13.82	8.49	--	NP	5.33
	12/08/08	10:17		8.35	--	NP	5.47
	02/20/09	9:22		8.11	--	NP	5.71
	04/20/09	9:09		8.40	--	NP	5.42
	06/22/09	11:13		7.06	--	NP	6.76
	08/03/09	10:53		8.21	--	NP	5.61
	08/17/09	8:53		8.45	--	NP	5.37
	10/29/09	8:43		7.99	--	NP	5.83
	01/18/10	13:21		6.02	--	NP	7.80
	04/19/10	14:29		7.64	--	NP	6.18
	07/19/10	6:58		8.37	--	NP	5.45
	10/25/10	13:31		7.83	--	NP	5.99
	03/21/11	12:16		6.92	--	NP	6.90
	06/14/11	9:58		8.13	--	NP	5.69
	09/26/11	10:48		8.35	--	NP	5.47
	12/12/11	11:39		8.39	--	NP	5.43
MW-101	10/20/08	15:55	14.99	8.97	--	NP	6.02
	12/08/08	10:30		8.96	--	NP	6.03
	02/20/09	9:40		8.81	--	NP	6.18
	04/20/09	9:15		8.83	--	NP	6.16
	06/22/09	11:27		8.95	--	NP	6.04
	08/03/09	11:03		9.14	--	NP	5.85
	08/17/09	9:18		9.38	--	NP	5.61
	10/29/09	9:00		8.71	--	NP	6.28
	01/18/10	13:30		7.00	--	NP	7.99
	04/19/10	14:43		8.31	--	NP	6.68
	07/19/10	7:10		9.08	--	NP	5.91
	10/25/10	13:39		8.55	--	NP	6.44
	03/21/11	12:23		7.85	--	NP	7.14
	06/14/11	10:07		8.79	--	NP	6.20
	09/26/11	10:50		9.13	--	NP	5.86
	12/12/11	11:56		9.82	--	NP	5.17

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-104	10/20/08	15:53	14.08	8.21	--	NP	5.87
	12/08/08	10:28		8.20	--	NP	5.88
	02/20/09	9:34		8.09	--	NP	5.99
	04/20/09	9:13		8.32	--	NP	5.76
	06/22/09	11:24		8.41	8.40	0.01^	5.67
	08/03/09	11:02		8.51	--	NP	5.57
	08/17/09	9:17		8.80	--	NP	5.28
	10/29/09	8:59		8.12	--	NP	5.96
	01/18/10	13:29		6.24	--	NP	7.84
	04/19/10	14:40		7.77	--	NP	6.31
	07/19/10	7:08		8.47	--	NP	5.61
	10/25/10	13:37		7.74	--	NP	6.34
	03/21/11	12:21		7.11	--	NP	6.97
	06/14/11	10:04		8.26	--	NP	5.82
	09/26/11	10:47		8.50	--	NP	5.58
	12/12/11	11:48		8.15	--	NP	5.93
MW-108	10/20/08	16:11	12.40	6.31	--	NP	6.09
	12/08/08	10:59		7.80	--	NP	4.60
	02/20/09	9:58		6.54	--	NP	5.86
	04/20/09	9:51		6.48	--	NP	5.92
	06/22/09	11:38		6.68	--	NP	5.72
	08/03/09	11:20		6.75	--	NP	5.65
	08/17/09	9:29		6.80	--	NP	5.60
	10/29/09	9:43		7.45	--	NP	4.95
	01/18/10	13:49		6.42	--	NP	5.98
	04/19/10	15:16		6.07	--	NP	6.33
	07/19/10	7:27		6.42	--	NP	5.98
	10/25/10	13:58		5.66	--	NP	6.74
	03/21/11	12:34		5.81	--	NP	6.59
	06/14/11	10:49		6.38	--	NP	6.02
	09/26/11	9:27		6.56	--	NP	5.84
	12/12/11	12.:47		6.37	--	NP	6.03
MW-109	10/20/08	16:15	13.53	6.98	--	NP	6.55
	12/08/08	11:02		7.38	--	NP	6.15
	02/20/09	10:00		7.36	--	NP	6.17
	04/20/09	9:53		7.30	--	NP	6.23
	06/22/09	11:41		7.15	--	NP	6.38
	08/03/09	11:22		7.56	--	NP	5.97
	08/17/09	9:32		7.60	--	NP	5.93
	10/29/09	9:41		7.39	--	NP	6.14
	01/18/10	13:51		6.46	--	NP	7.07
	04/19/10	15:20		6.87	--	NP	6.66
	07/19/10	7:33		7.40	--	NP	6.13
	10/25/10	13:58		6.40	--	NP	7.13
	03/21/11	12:32		6.74	--	NP	6.79
	06/14/11	10:44		6.95	--	NP	6.58
	09/26/11	9:49		7.15	--	NP	6.38
	12/12/11	12:50		2.33	--	NP	11.20
MW-122	10/20/08	16:32	15.54	8.05	--	NP	7.49
	12/08/08	11:40		7.87	--	NP	7.67
	02/20/09	10:27		7.85	--	NP	7.69
	04/20/09	10:13		7.92	--	NP	7.62
	06/22/09	11:54		8.21	--	NP	7.33
	08/03/09	10:30		8.31	--	NP	7.23
	08/17/09	9:42		8.41	--	NP	7.13
	10/29/09	9:35		7.78	--	NP	7.76
	01/18/10	14:10		7.35	--	NP	8.19
	04/19/10	15:43		7.61	--	NP	7.93
	07/19/10	7:49		8.00	--	NP	7.54
	10/25/10	14:15		7.52	--	NP	8.02
	03/21/11	12:46		7.23	--	NP	8.31
	06/14/11	11:11		7.90	--	NP	7.64
	09/26/11	11:17		8.10	--	NP	7.44
	12/12/11	12:44		7.76	--	NP	7.78

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-126	10/20/08	17:05	12.40	4.51	--	NP	7.89
	12/08/08	10:00		4.17	--	NP	8.23
	02/20/09	9:33		4.32	--	NP	8.08
	04/20/09	8:59		4.13	--	NP	8.27
	06/22/09	11:03		4.54	--	NP	7.86
	08/03/09	10:58		4.85	--	NP	7.55
	08/17/09	8:44		4.65	--	NP	7.75
	10/29/09	9:47		4.00	--	NP	8.40
	01/18/10	13:02		3.55	--	NP	8.85
	04/19/10	14:10		3.97	--	NP	8.43
	07/19/10	6:44		4.72	--	NP	7.68
	10/25/10	13:13		4.35	--	NP	8.05
	03/21/11	12:08		3.74	--	NP	8.66
	06/14/11	11:30		4.49	--	NP	7.91
	09/26/11	10:35		4.91	--	NP	7.49
	12/12/11	11:51		4.20	--	NP	8.20
MW-129R	10/20/08	16:33	12.92	6.54	--	NP	6.38
	12/08/08	11:38		6.78	--	NP	6.14
	02/20/09	10:30		6.35	6.34	0.01	6.58**
	04/20/09	10:15		6.35	--	NP	6.57
	06/22/09	11:56		6.71	--	NP	6.21
	08/03/09	10:25		6.90	--	NP	6.02
	08/17/09	9:44		6.98	--	<0.01	5.94
	10/29/09	9:34		6.27	--	NP	6.65
	01/18/10	14:08		6.22	--	NP	6.70
	04/19/10	15:44		5.88	--	NP	7.04
	07/19/10	7:45		6.30	--	NP	6.62
	10/25/10	14:17		5.79	--	NP	7.13
	03/21/11	12:49		5.31	--	NP	7.61
	06/14/11	11:07		6.36	--	NP	6.56
	09/26/11	11:10		6.66	--	<0.01	6.26
	12/12/11	13:53		6.31	--	NP	6.61
MW-13U	10/20/08	16:46	25.60	17.52	--	NP	8.08
	12/08/08	12:03		17.32	--	NP	8.28
	02/20/09	10:52		17.29	--	NP	8.31
	04/20/09	10:35		17.10	--	NP	8.50
	06/22/09	11:40		17.40	--	NP	8.20
	08/03/09	10:39		17.53	--	NP	8.07
	08/17/09	9:55		17.63	--	NP	7.97
	10/29/09	9:32		17.26	--	NP	8.34
	01/18/10	14:02		16.21	--	NP	9.39
	04/19/10	16:06		16.52	--	NP	9.08
	07/19/10	8:10		17.21	--	NP	8.39
	10/25/10	14:48		17.25	--	NP	8.35
	03/21/11	13:03		16.33	--	NP	9.27
	06/14/11	11:30		16.88	--	NP	8.72
	09/26/11	11:15		17.34	--	NP	8.26
	12/12/11	13:24		16.96	--	NP	8.64
MW-131	10/20/08	16:17	12.53	6.37	--	NP	6.16
	12/08/08	11:31		6.10	--	NP	6.43
	02/20/09	10:58		5.91	--	NP	6.62
	04/20/09	8:42		5.75	--	NP	6.78
	06/22/09	11:46		6.27	--	NP	6.26
	08/03/09	11:31		6.45	--	NP	6.08
	08/17/09	9:32		6.46	--	NP	6.07
	10/29/09	9:30		5.70	--	NP	6.83
	01/18/10	13:46		4.81	--	NP	7.72
	04/19/10	15:32		5.49	--	NP	7.04
	07/19/10	8:36		6.11	--	NP	6.42
	10/25/10	14:12		5.83	--	NP	6.70
	03/21/11	12:42		4.83	--	NP	7.70
	06/14/11	10:53		5.95	--	NP	6.58
	09/26/11	11:04		6.40	--	NP	6.13
	12/12/11	12:11		5.84	--	NP	6.69

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-134X	10/20/08	16:40	35.13	26.58	--	NP	8.55
	12/08/08	11:57		26.55	--	NP	8.58
	02/20/09	10:55		26.62	--	NP	8.51
	04/20/09	10:30		26.43	--	NP	8.70
	06/22/09	11:35		26.69	--	NP	8.44
	08/03/09	10:36		26.70	--	NP	8.43
	08/17/09	9:50		26.79	--	NP	8.34
	10/29/09	9:25		26.34	--	NP	8.79
	01/18/10	13:57		25.51	--	NP	9.62
	04/19/10	16:01		25.64	--	NP	9.49
	07/19/10	8:06		26.41	--	NP	8.72
	10/25/10	14:43		26.40	--	NP	8.73
	03/21/11	13:00		25.65	--	NP	9.48
	06/14/11	11:22		26.20	--	NP	8.93
	09/26/11	11:11		26.34	--	NP	8.79
	12/12/11	13:16		26.21	--	NP	8.92
MW-135	10/20/08	16:35	18.13	10.06	--	NP	8.07
	12/08/08	11:47		11.43	--	NP	6.70
	02/20/09	10:47		10.14	--	NP	7.99
	04/20/09	10:22		11.17	--	NP	6.96
	06/22/09	11:23		10.84	--	NP	7.29
	08/03/09	10:13		11.04	--	NP	7.09
	08/17/09	9:55		11.16	--	NP	6.97
	10/29/09	10:15		11.00	--	NP	7.13
	01/18/10	13:05		10.20	--	NP	7.93
	04/19/10	15:54		10.78	--	NP	7.35
	07/19/10	7:52		10.97	--	NP	7.16
	10/25/10	14:26		10.75	--	NP	7.38
	03/21/11	12:56		10.53	--	NP	7.60
	06/14/11	11:26		10.05	--	NP	8.08
	09/26/11	11:05		11.25	--	NP	6.88
	12/12/11	13:08		11.01	--	NP	7.12
MW-136	10/27/08	13:35	15.99	8.13	--	NP	7.86
	12/08/08	11:49		8.06	--	NP	7.93
	02/20/09	10:50		7.80	--	NP	8.19
	04/20/09	10:25		7.73	--	NP	8.26
	06/22/09	11:25		8.00	--	NP	7.99
	08/03/09	10:14		8.74	--	NP	7.25
	08/17/09	9:57		9.78	--	NP	6.21
	10/29/09	10:20		7.84	--	NP	8.15
	01/18/10	13:02		7.08	--	NP	8.91
	04/19/10	15:55		7.63	--	NP	8.36
	07/19/10	7:55		8.06	--	NP	7.93
	10/25/10	14:23		7.91	--	NP	8.08
	03/21/11	12:56		6.22	--	NP	9.77
	06/14/11	11:23		7.77	--	NP	8.22
	09/26/11	11:23		8.70	--	NP	7.29
	12/12/11	13:10		7.69	--	NP	8.30
MW-139R	10/20/08	15:59	13.84	7.57	--	NP	6.27
	12/08/08	10:46		7.17	--	NP	6.67
	02/20/09	9:48		6.96	--	NP	6.88
	04/20/09	9:38		6.77	--	NP	7.07
	06/22/09	11:27		7.34	--	NP	6.50
	08/03/09	11:12		7.54	--	NP	6.30
	08/17/09	9:21		7.62	--	NP	6.22
	10/29/09	9:23		6.93	--	NP	6.91
	01/18/10	13:45		5.43	--	NP	8.41
	04/19/10	14:58		6.51	--	NP	7.33
	07/19/10	7:15		7.36	--	NP	6.48
	10/25/10	13:48		7.08	--	NP	6.76
	03/21/11	12:27		5.89	--	NP	7.95
	06/14/11	10:39		7.01	--	NP	6.83
	09/26/11	10:53		7.62	--	NP	6.22
	12/12/11	12:07		6.95	--	NP	6.89

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-143	10/22/08	12:25	11.94	4.55	--	NP	7.39
	12/16/08	10:16		4.08	--	NP	7.86
	02/20/09	10:18		4.02	--	NP	7.92
	04/20/09	9:31		3.79	--	NP	8.15
	06/22/09	11:05		4.45	--	NP	7.49
	08/03/09	10:57		4.70	--	NP	7.24
	08/17/09	8:45		4.69	--	NP	7.25
	10/29/09	9:50		4.07	--	NP	7.87
	01/18/10	13:07		2.81	--	NP	9.13
	04/19/10	14:12		3.46	--	NP	8.48
	07/19/10	6:44		4.47	--	NP	7.47
	10/25/10	13:18		3.17	--	NP	8.77
	03/21/11	12:06		3.80	--	NP	8.14
	06/14/11	11:31		4.14	--	NP	7.80
	09/26/11	10:36		2.90	--	NP	9.04
	12/12/11	11:50		3.84	--	NP	8.10
MW-147	10/20/08	15:45	11.02	5.69	--	NP	5.33
	12/08/08	10:13		5.51	--	NP	5.51
	02/20/09	9:13		5.35	--	NP	5.67
	04/20/09	9:13		5.76	--	NP	5.26
	06/22/09	11:08		5.67	--	NP	5.35
	08/03/09	10:50		5.72	--	NP	5.30
	08/17/09	8:51		5.99	--	NP	5.03
	10/29/09	8:48		5.01	--	NP	6.01
	01/18/10	13:18		2.86	--	NP	8.16
	04/19/10	14:25		5.12	--	NP	5.90
	07/19/10	6:58		5.93	--	NP	5.09
	10/25/10	13:28		4.74	--	NP	6.28
	03/21/11	12:15		4.07	--	NP	6.95
	06/14/11	9:56		5.70	--	NP	5.32
	09/26/11	10:39		8.78	--	NP	2.24
	12/12/11	11:34		5.58	--	NP	5.44
MW-149R	10/20/08	15:42	12.18	6.76	--	NP	5.42
	12/08/08	10:07		6.70	--	NP	5.48
	02/20/09	9:10		6.57	--	NP	5.61
	04/20/09	9:06		7.09	--	NP	5.09
	06/22/09	11:10		7.22	--	NP	4.96
	08/03/09	10:46		7.33	--	NP	4.85
	08/17/09	8:48		7.69	--	NP	4.49
	10/29/09	8:50		6.77	--	NP	5.41
	01/18/10	13:15		3.90	--	NP	8.28
	04/19/10	14:20		6.76	--	NP	5.42
	07/19/10	6:50		7.56	--	NP	4.62
	10/25/10	13:23		6.13	--	NP	6.05
	03/21/11	12:13		5.39	--	NP	6.79
	06/14/11	9:44		7.27	--	NP	4.91
	09/26/11	10:44		7.19	--	NP	4.99
	12/12/11	11:29		6.74	--	NP	5.44
MW-150	10/20/08	15:41	12.36	7.21	--	NP	5.15
	12/08/08	10:05		6.90	--	NP	5.46
	02/20/09	9:07		6.76	--	NP	5.60
	04/20/09	9:04		6.89	--	NP	5.47
	06/22/09	11:12		6.81	--	NP	5.55
	08/03/09	10:44		6.95	--	NP	5.41
	08/17/09	8:46		7.15	--	NP	5.21
	10/29/09	8:48		6.44	--	NP	5.92
	01/18/10	13:14		4.20	--	NP	8.16
	04/19/10	14:18		6.34	--	NP	6.02
	07/19/10	6:47		7.07	--	NP	5.29
	10/25/10	13:25		6.55	--	NP	5.81
	03/21/11	12:11		4.93	--	NP	7.43
	06/14/11	9:40		6.75	--	NP	5.61
	09/26/11	10:43		7.15	--	NP	5.21
	12/12/11	11:30		6.89	--	NP	5.47

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-151	10/20/08	15:39	11.05	5.76	--	NP	5.29
	12/08/08	10:02		5.41	--	NP	5.64
	02/20/09	9:16		5.28	--	NP	5.77
	04/20/09	9:10		5.24	--	NP	5.81
	06/22/09	11:07		5.52	--	NP	5.53
	08/03/09	10:48		5.64	--	NP	5.41
	08/17/09	8:51		5.82	--	NP	5.23
	10/29/09	8:42		4.44	--	NP	6.61
	01/18/10	13:10		1.26	--	NP	9.79
	04/19/10	14:15		4.77	--	NP	6.28
	07/19/10	6:53		7.80	--	NP	3.25
	10/25/10	13:21		4.63	--	NP	6.42
	03/21/11	12:10		2.71	--	NP	8.34
	06/14/11	9:51		7.38	--	NP	3.67
	09/26/11	10:38		5.75	--	NP	5.30
	12/12/11	11:35		5.29	--	NP	5.76
MW-20R	10/20/08	15:51	12.17	6.53	--	NP	5.64
	12/08/08	10:27		6.50	--	NP	5.67
	02/20/09	9:27		6.37	--	NP	5.80
	04/20/09	9:11		6.80	--	NP	5.37
	06/22/09	11:21		6.83	--	NP	5.34
	08/03/09	11:00		6.90	--	NP	5.27
	08/17/09	9:15		7.18	--	NP	4.99
	10/29/09	8:58		6.55	--	NP	5.62
	01/18/10	13:27		4.60	--	NP	7.57
	04/19/10	14:38		6.30	--	NP	5.87
	07/19/10	7:06		6.94	--	NP	5.23
	10/25/10	13:34		5.96	--	NP	6.21
	03/21/11	12:19		5.73	--	NP	6.44
	06/14/11	10:02		6.76	--	NP	5.41
	09/26/11	10:47		6.83	--	NP	5.34
	12/12/11	11:44		6.56	--	NP	5.61
MW-203	10/20/08	16:43	31.15	22.83	--	NP	8.32
	12/08/08	12:00		22.69	--	NP	8.46
	02/20/09	11:00		22.71	--	NP	8.44
	04/20/09	10:33		22.55	--	NP	8.60
	06/22/09	11:38		22.81	--	NP	8.34
	08/03/09	10:38		22.90	--	NP	8.25
	08/17/09	10:22		23.02	--	NP	8.13
	10/29/09	9:30		22.11	--	NP	9.04
	01/18/10	13:59		21.67	--	NP	9.48
	04/19/10	16:04		21.86	--	NP	9.29
	07/19/10	8:05		22.57	--	NP	8.58
	10/25/10	14:45		22.62	--	NP	8.53
	03/21/11	13:00		21.76	--	NP	9.39
	06/14/11	11:27		22.26	--	NP	8.89
	09/26/11	11:13		22.63	--	NP	8.52
	12/12/11	13:20		22.35	--	NP	8.80
MW-301	10/20/08	17:30	12.15	6.73	--	NP	5.42
	12/08/08	--		--	--	--	--
	02/20/09	11:22		6.53	--	NP	5.62
	04/20/09	10:55		7.44	--	NP	4.71
	06/22/09	10:36		7.25	--	NP	4.90
	08/03/09	11:44		7.42	--	NP	4.73
	08/17/09	10:28		7.92	--	NP	4.23
	10/29/09	10:00		7.26	--	NP	4.89
	01/18/10	14:11		4.95	--	NP	7.20
	04/19/10	16:25		7.05	--	NP	5.10
	07/19/10	8:34		7.62	--	NP	4.53
	10/25/10	15:07		6.05	--	NP	6.10
	03/21/11	13:26		6.36	--	NP	5.79
	06/14/11	11:50		7.57	--	NP	4.58
	09/26/11	11:50		7.27	--	NP	4.88
	12/12/11	14:15		6.78	--	NP	5.37

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-500	10/20/08	16:32	16.64	8.71	--	NP	7.93
	12/08/08	11:45		5.16	--	NP	11.48
	02/20/09	10:46		4.51	--	NP	12.13
	04/20/09	10:19		3.54	--	NP	13.10
	06/22/09	11:28		5.18	--	NP	11.46
	08/03/09	10:20		6.15	--	NP	10.49
	08/17/09	9:48		6.51	--	NP	10.13
	10/29/09	9:05		4.94	--	NP	11.70
	01/18/10	13:16		1.69	--	NP	14.95
	04/19/10	15:50		3.77	--	NP	12.87
	07/19/10	7:45		5.39	--	NP	11.25
	10/25/10	14:35		5.51	--	NP	11.13
	03/21/11	12:54		2.20	--	NP	14.44
	06/14/11	11:17		4.71	--	NP	11.93
	09/26/11	11:00		6.94	--	NP	9.70
	12/12/11	13:00		4.39	--	NP	12.25
MW-501	10/20/08	16:30	15.24	7.27	--	NP	7.97
	12/08/08	11:43		5.20	--	NP	10.04
	02/20/09	10:44		3.43	--	NP	11.81
	04/20/09	10:17		2.50	--	NP	12.74
	06/22/09	11:31		3.98	--	NP	11.26
	08/03/09	10:22		4.95	--	NP	10.29
	08/17/09	9:46		5.51	--	NP	9.73
	10/29/09	9:02		3.01	--	NP	12.23
	01/18/10	13:23		0.56	--	NP	14.68
	04/19/10	15:48		2.54	--	NP	12.70
	07/19/10	7:44		4.36	--	NP	10.88
	10/25/10	14:35		4.57	--	NP	10.67
	03/21/11	12:48		1.31	--	NP	13.93
	06/14/11	11:12		3.51	--	NP	11.73
	09/26/11	11:12		6.01	--	NP	9.23
	12/12/11	12:56		3.28	--	NP	11.96
MW-502	10/20/08	16:25	13.00	5.41	--	NP	7.59
	12/08/08	11:20		5.16	--	NP	7.84
	02/20/09	10:24		5.03	--	NP	7.97
	04/20/09	10:40		4.98	--	NP	8.02
	06/22/09	11:49		5.35	--	NP	7.65
	08/03/09	11:34		5.53	--	NP	7.47
	08/17/09	9:39		5.56	--	NP	7.44
	10/29/09	9:40		5.03	--	NP	7.97
	01/18/10	13:55		3.78	--	NP	9.22
	04/19/10	15:42		4.47	--	NP	8.53
	07/19/10	7:24		5.25	--	NP	7.75
	10/25/10	14:15		5.20	--	NP	7.80
	03/21/11	12:43		4.05	--	NP	8.95
	06/14/11	11:05		4.90	--	NP	8.10
	09/26/11	11:10		5.46	--	NP	7.54
	12/12/11	13:26		4.91	--	NP	8.09
MW-503	10/20/08	16:23	12.22	5.75	--	NP	6.47
	12/08/08	11:23		5.42	--	NP	6.80
	02/20/09	10:21		5.25	--	NP	6.97
	04/20/09	10:42		5.00	--	NP	7.22
	06/22/09	11:48		5.56	--	NP	6.66
	08/03/09	11:33		5.75	--	NP	6.47
	08/17/09	9:37		5.76	--	NP	6.46
	10/29/09	9:39		5.00	--	NP	7.22
	01/18/10	13:54		3.66	--	NP	8.56
	04/19/10	15:40		4.69	--	NP	7.53
	07/19/10	7:26		5.45	--	NP	6.77
	10/25/10	14:12		5.19	--	NP	7.03
	03/21/11	12:42		4.10	--	NP	8.12
	06/14/11	11:01		5.10	--	NP	7.12
	09/26/11	11:07		5.55	--	NP	6.67
	12/12/11	13:30		5.07	--	NP	7.15

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-504	10/20/08	16:14	13.32	7.01	--	NP	6.31
	12/08/08	11:26		6.63	--	NP	6.69
	02/20/09	10:16		6.46	--	NP	6.86
	04/20/09	10:03		6.25	--	NP	7.07
	06/22/09	11:42		6.81	--	NP	6.51
	08/03/09	11:29		7.00	--	NP	6.32
	08/17/09	9:35		7.05	--	NP	6.27
	10/29/09	9:26		6.28	--	NP	7.04
	01/18/10	13:53		4.90	--	NP	8.42
	04/19/10	15:37		5.99	--	NP	7.33
	07/19/10	7:28		6.80	--	NP	6.52
	10/25/10	14:10		6.66	--	NP	6.66
	03/21/11	12:40		5.48	--	NP	7.84
	06/14/11	10:57		6.48	--	NP	6.84
	09/26/11	11:05		7.09	--	NP	6.23
	12/12/11	12:07		6.42	--	NP	6.90
MW-505	10/20/08	16:11	11.42	5.10	--	NP	6.32
	12/08/08	11:13		4.72	--	NP	6.70
	02/20/09	10:18		4.53	--	NP	6.89
	04/20/09	10:02		4.32	--	NP	7.10
	06/22/09	11:39		4.90	--	NP	6.52
	08/03/09	11:28		5.11	--	NP	6.31
	08/17/09	9:33		5.13	--	NP	6.29
	10/29/09	9:25		4.37	--	NP	7.05
	01/18/10	13:52		2.99	--	NP	8.43
	04/19/10	15:35		4.08	--	NP	7.34
	07/19/10	7:31		5.89	--	NP	5.53
	10/25/10	14:08		4.73	--	NP	6.69
	03/21/11	12:39		3.45	--	NP	7.97
	06/14/11	10:58		4.58	--	NP	6.84
	09/26/11	10:54		5.14	--	NP	6.28
	12/12/11	12:09		4.50	--	NP	6.92
MW-506	10/20/08	16:16	13.44	7.13	--	NP	6.31
	12/08/08	11:29		6.75	--	NP	6.69
	02/20/09	10:13		6.60	--	NP	6.84
	04/20/09	10:08		6.37	--	NP	7.07
	06/22/09	11:44		6.93	--	NP	6.51
	08/03/09	11:30		7.13	--	NP	6.31
	08/17/09	9:31		7.17	--	NP	6.27
	10/29/09	9:28		6.39	--	NP	7.05
	01/18/10	13:47		5.02	--	NP	8.42
	04/19/10	15:30		6.10	--	NP	7.34
	07/19/10	7:37		6.91	--	NP	6.53
	10/25/10	14:10		6.75	--	NP	6.69
	03/21/11	12:40		5.50	--	NP	7.94
	06/14/11	10:48		6.59	--	NP	6.85
	09/26/11	11:00		7.13	--	NP	6.31
	12/12/11	12:14		6.56	--	NP	6.88
MW-507	10/20/08	16:09	13.60	7.38	--	NP	6.22
	12/08/08	11:11		7.09	--	NP	6.51
	02/20/09	10:11		6.91	--	NP	6.69
	04/20/09	10:00		6.70	--	NP	6.90
	06/22/09	11:37		7.23	--	NP	6.37
	08/03/09	11:27		7.41	--	NP	6.19
	08/17/09	9:29		7.45	--	NP	6.15
	10/29/09	9:23		6.70	--	NP	6.90
	01/18/10	13:48		5.49	--	NP	8.11
	04/19/10	15:29		6.40	--	NP	7.20
	07/19/10	7:36		7.14	--	NP	6.46
	10/25/10	14:09		6.90	--	NP	6.70
	03/21/11	12:38		5.86	--	NP	7.74
	06/14/11	10:44		6.95	--	NP	6.65
	09/26/11	11:01		7.40	--	NP	6.20
	12/12/11	12:17		6.81	--	NP	6.79

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-508	10/20/08	16:07	13.31	7.16	--	NP	6.15
	12/08/08	11:09		6.33	--	NP	6.98
	02/20/09	10:08		6.70	--	NP	6.61
	04/20/09	9:59		6.40	--	NP	6.91
	06/22/09	11:35		6.94	--	NP	6.37
	08/03/09	11:26		7.15	--	NP	6.16
	08/17/09	9:28		7.20	--	NP	6.11
	10/29/09	9:22		6.55	--	NP	6.76
	01/18/10	13:49		5.13	--	NP	8.18
	04/19/10	15:27		6.11	--	NP	7.20
	07/19/10	7:33		6.88	--	NP	6.43
	10/25/10	14:07		6.58	--	NP	6.73
	03/21/11	12:36		5.51	--	NP	7.80
	06/14/11	10:40		6.70	--	NP	6.61
	09/26/11	10:57		7.18	--	NP	6.13
	12/12/11	12:21		6.55	--	NP	6.76
MW-509	10/20/08	16:05	10.28	3.97	--	NP	6.31
	12/08/08	11:07		3.59	--	NP	6.69
	02/20/09	10:06		3.39	--	NP	6.89
	04/20/09	9:36		3.18	--	NP	7.10
	06/22/09	11:33		3.75	--	NP	6.53
	08/03/09	11:11		3.95	--	NP	6.33
	08/17/09	9:27		6.97	--	NP	3.31
	10/29/09	9:10		3.23	--	NP	7.05
	01/18/10	13:50		1.85	--	NP	8.43
	04/19/10	15:26		2.93	--	NP	7.35
	07/19/10	7:18		3.77	--	NP	6.51
	10/25/10	14:49		4.59	--	NP	5.69
	03/21/11	12:30		2.34	--	NP	7.94
	06/14/11	10:17		3.43	--	NP	6.85
	09/26/11	10:55		4.20	--	NP	6.08
	12/12/11	12:27		3.36	--	NP	6.92
MW-510	10/20/08	16:03	12.53	6.47	--	NP	6.06
	12/08/08	10:49		6.45	--	NP	6.08
	02/20/09	9:51		6.35	--	NP	6.18
	04/20/09	9:46		6.72	--	NP	5.81
	06/22/09	11:31		7.05	--	NP	5.48
	08/03/09	11:15		7.08	--	<0.01	5.45
	08/17/09	9:24		7.29	--	<0.01	5.24
	10/29/09	9:31		6.72	6.71	0.01	5.82**
	01/18/10	13:31		4.98	4.85	0.13	7.65**
	04/19/10	15:04		6.40	6.38	0.02	6.15**
	07/19/10	7:40		7.04	7.00	0.04	5.52**
	10/25/10	14:49		6.04	6.02	0.02	6.51**
	03/21/11	13:25		5.81	5.80	0.01	6.73**
	06/14/11	12:11		7.08	--	NP	5.45
	09/26/11	12:47		6.96	6.94	0.02	5.59**
	12/12/11	12:26		6.41	--	NP	6.12
MW-511	10/20/08	16:49	15.20	7.75	--	NP	7.45
	12/08/08	12:05		7.45	--	NP	7.75
	02/20/09	10:13		7.34	--	NP	7.86
	04/20/09	10:44		7.09	--	NP	8.11
	06/22/09	11:16		7.66	--	NP	7.54
	08/03/09	10:40		7.89	--	NP	7.31
	08/17/09	9:17		7.87	--	NP	7.33
	10/29/09	9:10		7.30	--	NP	7.90
	01/18/10	13:36		6.06	--	NP	9.14
	04/19/10	16:10		6.83	--	NP	8.37
	07/19/10	7:18		7.59	--	NP	7.61
	10/25/10	14:50		7.51	--	NP	7.69
	03/21/11	13:06		6.37	--	NP	8.83
	06/14/11	11:38		7.29	--	NP	7.91
	09/26/11	11:08		7.88	--	NP	7.32
	12/12/11	13:27		7.20	--	NP	8.00

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-512	10/20/08	16:04	13.19	6.90	--	NP	6.29
	12/08/08	10:37		6.51	--	NP	6.68
	02/20/09	10:10		6.30	--	NP	6.89
	04/20/09	9:28		6.12	--	NP	7.07
	06/22/09	11:18		7.68	--	NP	5.51
	08/03/09	11:09		6.86	--	NP	6.33
	08/17/09	9:18		6.91	--	NP	6.28
	10/29/09	9:07		6.15	--	NP	7.04
	01/18/10	13:34		4.78	--	NP	8.41
	04/19/10	14:48		5.85	--	NP	7.34
	07/19/10	7:16		6.67	--	NP	6.52
	10/25/10	13:48		6.51	--	NP	6.68
	03/21/11	12:22		5.26	--	NP	7.93
	06/14/11	10:16		6.35	--	NP	6.84
	09/26/11	11:53		6.95	--	NP	6.24
	12/12/11	11:59		6.29	--	NP	6.90
MW-513	10/20/08	16:01	11.09	4.78	--	NP	6.31
	12/08/08	10:41		4.40	--	NP	6.69
	02/20/09	10:07		4.19	--	NP	6.90
	04/20/09	9:30		4.00	--	NP	7.09
	06/22/09	11:21		4.58	--	NP	6.51
	08/03/09	11:08		4.78	--	NP	6.31
	08/17/09	9:21		4.80	--	NP	6.29
	10/29/09	9:13		4.04	--	NP	7.05
	01/18/10	13:37		2.67	--	NP	8.42
	04/19/10	14:51		3.75	--	NP	7.34
	07/19/10	7:12		4.57	--	NP	6.52
	10/25/10	13:44		4.42	--	NP	6.67
	03/21/11	12:25		3.18	--	NP	7.91
	06/14/11	10:12		4.25	--	NP	6.84
	09/26/11	10:54		4.83	--	NP	6.26
	12/12/11	11:57		4.19	--	NP	6.90
MW-514	10/20/08	16:02	11.39	5.09	--	NP	6.30
	12/08/08	10:35		4.70	--	NP	6.69
	02/20/09	10:08		4.19	--	NP	7.20
	04/20/09	9:28		4.31	--	NP	7.08
	06/22/09	11:19		4.88	--	NP	6.51
	08/03/09	11:07		5.08	--	NP	6.31
	08/17/09	9:19		5.11	--	NP	6.28
	10/29/09	9:06		4.35	--	NP	7.04
	01/18/10	13:33		2.98	--	NP	8.41
	04/19/10	14:46		4.05	--	NP	7.34
	07/19/10	7:10		4.97	--	NP	6.42
	10/25/10	13:41		4.71	--	NP	6.68
	03/21/11	12:23		3.48	--	NP	7.91
	06/14/11	10:14		4.56	--	NP	6.83
	09/26/11	10:50		5.13	--	NP	6.26
	12/12/11	11:55		4.49	--	NP	6.90
MW-515	10/20/08	16:00	11.60	5.30	--	NP	6.30
	12/08/08	10:42		4.91	--	NP	6.69
	02/20/09	9:47		5.70	--	NP	5.90
	04/20/09	9:25		4.52	--	NP	7.08
	06/22/09	11:25		5.09	--	NP	6.51
	08/03/09	11:04		5.29	--	NP	6.31
	08/17/09	9:23		5.33	--	NP	6.27
	10/29/09	9:15		4.55	--	NP	7.05
	01/18/10	13:40		3.18	--	NP	8.42
	04/19/10	14:54		4.26	--	NP	7.34
	07/19/10	7:12		5.10	--	NP	6.50
	10/25/10	13:45		4.93	--	NP	6.67
	03/21/11	12:26		3.65	--	NP	7.95
	06/14/11	10:14		4.75	--	NP	6.85
	09/26/11	10:52		5.35	--	NP	6.25
	12/12/11	12:01		4.71	--	NP	6.89

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-516	10/20/08	15:59	11.25	4.94	--	NP	6.31
	12/08/08	10:33		4.56	--	NP	6.69
	02/20/09	9:49		4.35	--	NP	6.90
	04/20/09	9:26		4.17	--	NP	7.08
	06/22/09	11:24		4.75	--	NP	6.50
	08/03/09	11:05		4.94	--	NP	6.31
	08/17/09	9:24		4.96	--	NP	6.29
	10/29/09	9:14		4.22	--	NP	7.03
	01/18/10	13:39		2.84	--	NP	8.41
	04/19/10	14:52		3.91	--	NP	7.34
	07/19/10	7:11		4.75	--	NP	6.50
	10/25/10	13:44		5.38	--	NP	5.87
	03/21/11	12:25		3.30	--	NP	7.95
	06/14/11	10:12		4.41	--	NP	6.84
	09/26/11	10:50		5.00	--	NP	6.25
	12/12/11	11:48		4.36	--	NP	6.89
MW-517	10/20/08	15:57	12.00	5.69	--	NP	6.31
	12/08/08	10:31		5.31	--	NP	6.69
	02/20/09	9:51		5.12	--	NP	6.88
	04/20/09	9:27		4.91	--	NP	7.09
	06/22/09	11:22		5.49	--	NP	6.51
	08/03/09	11:06		5.68	--	NP	6.32
	08/17/09	9:25		5.72	--	NP	6.28
	10/29/09	9:05		4.97	--	NP	7.03
	01/18/10	13:31		3.58	--	NP	8.42
	04/19/10	14:44		4.66	--	NP	7.34
	07/19/10	7:08		5.49	--	NP	6.51
	10/25/10	13:42		5.33	--	NP	6.67
	03/21/11	12:24		4.05	--	NP	7.95
	06/14/11	10:08		5.16	--	NP	6.84
	09/26/11	10:49		5.77	--	NP	6.23
	12/12/11	11:51		5.11	--	NP	6.89
MW-518	10/20/08	15:56	14.60	8.51	--	NP	6.09
	12/08/08	10:44		8.37	--	NP	6.23
	02/20/09	9:45		8.29	--	NP	6.31
	04/20/09	9:17		8.40	--	NP	6.20
	06/22/09	11:29		8.68	--	NP	5.92
	08/03/09	11:04		8.79	--	NP	5.81
	08/17/09	9:20		9.00	--	NP	5.60
	10/29/09	9:19		8.42	--	NP	6.18
	01/18/10	13:43		6.65	--	NP	7.95
	04/19/10	14:56		8.01	--	NP	6.59
	07/19/10	7:14		8.73	--	NP	5.87
	10/25/10	13:47		8.05	--	NP	6.55
	03/21/11	12:27		7.45	--	NP	7.15
	06/14/11	10:09		8.45	--	NP	6.15
	09/26/11	10:52		8.73	--	NP	5.87
	12/12/11	12:03		7.30	--	NP	7.30
MW-519	10/20/08	15:35	12.60	7.25	--	NP	5.35
	12/08/08	10:25		7.12	--	NP	5.48
	02/20/09	10:21		6.89	--	NP	5.71
	04/20/09	9:02		7.17	--	NP	5.43
	06/22/09	11:04		6.83	--	NP	5.77
	08/03/09	10:57		6.96	--	NP	5.64
	08/17/09	8:47		7.21	--	NP	5.39
	10/29/09	8:56		6.75	--	NP	5.85
	01/18/10	13:25		4.80	--	NP	7.80
	04/19/10	14:37		6.41	--	NP	6.19
	07/19/10	7:05		7.15	--	NP	5.45
	10/25/10	13:36		6.60	--	NP	6.00
	03/21/11	12:19		5.71	--	NP	6.89
	06/14/11	10:03		6.88	--	NP	5.72
	09/26/11	10:37		7.11	--	NP	5.49
	12/12/11	11:42		7.14	--	NP	5.46

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-520	10/20/08	15:50	13.31	7.95	--	NP	5.36
	12/08/08	10:23		7.83	--	NP	5.48
	02/20/09	9:23		7.61	--	NP	5.70
	04/20/09	9:05		7.88	--	NP	5.43
	06/22/09	11:19		7.55	--	NP	5.76
	08/03/09	10:56		7.69	--	NP	5.62
	08/17/09	8:49		7.92	--	NP	5.39
	10/29/09	8:55		7.46	--	NP	5.85
	01/18/10	13:26		5.51	--	NP	7.80
	04/19/10	14:35		7.12	--	NP	6.19
	07/19/10	7:03		7.85	--	NP	5.46
	10/25/10	13:33		7.30	--	NP	6.01
	03/21/11	12:18		5.38	--	NP	7.93
	06/14/11	10:01		7.59	--	NP	5.72
	09/26/11	10:43		7.82	--	NP	5.49
	12/12/11	11:40		7.85	--	NP	5.46
MW-521	10/20/08	15:48	12.18	6.82	--	NP	5.36
	12/08/08	10:21		6.71	--	NP	5.47
	02/20/09	9:21		6.49	--	NP	5.69
	04/20/09	9:04		6.75	--	NP	5.43
	06/22/09	11:06		6.41	--	NP	5.77
	08/03/09	10:55		6.57	--	NP	5.61
	08/17/09	8:48		6.80	--	NP	5.38
	10/29/09	8:56		6.33	--	NP	5.85
	01/18/10	13:24		4.39	--	NP	7.79
	04/19/10	14:33		6.01	--	NP	6.17
	07/19/10	7:01		6.74	--	NP	5.44
	10/25/10	13:30		6.40	--	NP	5.78
	03/21/11	12:16		5.29	--	NP	6.89
	06/14/11	10:04		7.45	--	NP	4.73
	09/26/11	10:40		6.70	--	NP	5.48
	12/12/11	11:38		6.73	--	NP	5.45
MW-522	10/20/08	15:50	13.82	8.49	--	NP	5.33
	12/08/08	10:19		8.35	--	NP	5.47
	02/20/09	9:23		8.10	--	NP	5.72
	04/20/09	9:07		8.41	--	NP	5.41
	06/22/09	11:15		8.11	--	NP	5.71
	08/03/09	10:53		8.25	--	NP	5.57
	08/17/09	8:54		8.51	--	NP	5.31
	10/29/09	8:56		7.99	--	NP	5.83
	01/18/10	13:22		6.03	--	NP	7.79
	04/19/10	14:31		7.65	--	NP	6.17
	07/19/10	7:02		8.43	--	NP	5.39
	10/25/10	13:33		7.80	--	NP	6.02
	03/21/11	12:18		6.97	--	NP	6.85
	06/14/11	9:59		8.13	--	NP	5.69
	09/26/11	10:46		8.40	--	NP	5.42
	12/12/11	11:42		8.38	--	NP	5.44
MW-523	10/20/08	15:47	13.53	8.17	--	NP	5.36
	12/08/08	10:15		8.05	--	NP	5.48
	02/20/09	9:21		7.81	--	NP	5.72
	04/20/09	9:10		8.10	--	NP	5.43
	06/22/09	11:11		7.78	--	NP	5.75
	08/03/09	10:52		7.91	--	NP	5.62
	08/17/09	8:52		8.17	--	NP	5.36
	10/29/09	8:54		7.69	--	NP	5.84
	01/18/10	13:20		5.73	--	NP	7.80
	04/19/10	14:27		7.35	--	NP	6.18
	07/19/10	6:54		8.09	--	NP	5.44
	10/25/10	13:30		7.52	--	NP	6.01
	03/21/11	12:15		6.64	--	NP	6.89
	06/14/11	9:58		7.85	--	NP	5.68
	09/26/11	10:44		8.02	--	NP	5.51
	12/12/11	11:37		8.09	--	NP	5.44

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
MW-524	10/20/08	15:44	13.16	8.95	--	NP	4.21
	12/08/08	10:09		7.71	--	NP	5.45
	02/20/09	9:13		7.60	--	NP	5.56
	04/20/09	9:08		7.81	--	NP	5.35
	06/22/09	11:19		7.69	--	NP	5.47
	08/03/09	10:47		7.79	--	NP	5.37
	08/17/09	7:33		8.03	--	NP	5.13
	10/29/09	8:50		6.75	--	NP	6.41
	01/18/10	13:17		4.26	--	NP	8.90
	04/19/10	14:23		7.17	--	NP	5.99
	07/19/10	6:51		7.99	--	NP	5.17
	10/25/10	13:27		6.97	--	NP	6.19
	03/21/11	12:12		5.78	--	NP	7.38
	06/14/11	9:48		7.67	--	NP	5.49
	09/26/11	10:41		7.90	--	NP	5.26
	12/12/11	11:33		7.74	--	NP	5.42
Piezometers							
P-1 [S]	08/03/09	10:23	16.47	7.80	--	NP	8.67
	08/17/09	9:43		6.60	--	NP	9.87
	10/29/09	9:32		4.37	--	NP	12.10
	01/18/10	13:31		1.26	--	NP	15.21
	04/19/10	15:46		3.21	--	NP	13.26
	07/19/10	8:02		4.65	--	NP	11.82
	10/25/10	14:26		4.61	--	NP	11.86
	03/21/11	12:46		2.16	--	NP	14.31
	06/14/11	11:08		3.98	--	NP	12.49
	09/26/11	11:27		6.76	--	NP	9.71
	12/12/11	12:49		3.87	--	NP	12.60
P-2 [D]	08/03/09	10:21	15.00	7.39	--	NP	7.61
	08/17/09	9:46		7.46	--	NP	7.54
	10/29/09	8:57		6.38	--	NP	8.62
	01/18/10	13:28		6.30	--	NP	8.70
	04/19/10	15:47		6.68	--	NP	8.32
	07/19/10	7:46		7.02	--	NP	7.98
	10/25/10	14:29		6.65	--	NP	8.35
	03/21/11	12:49		6.26	--	NP	8.74
	06/14/11	11:10		7.01	--	NP	7.99
	09/26/11	11:15		7.01	--	NP	7.99
	12/12/11	12:52		6.79	--	NP	8.21
P-3 [S]	08/03/09	10:21	14.84	4.47	--	NP	10.37
	08/17/09	9:48		4.77	--	NP	10.07
	10/29/09	8:59		3.35	--	NP	11.49
	01/18/10	13:25		0.81	--	NP	14.03
	04/19/10	15:48		2.36	--	NP	12.48
	07/19/10	7:48		3.72	--	NP	11.12
	10/25/10	14:31		4.04	--	NP	10.80
	03/21/11	12:49		1.19	--	NP	13.65
	06/14/11	11:11		3.05	--	NP	11.79
	09/26/11	11:17		5.18	--	NP	9.66
	12/12/11	12:54		2.95	--	NP	11.89
P-4 [D]	08/03/09	10:19	16.38	8.64	--	NP	7.74
	08/17/09	9:49		8.75	--	NP	7.63
	10/29/09	9:08		7.64	--	NP	8.74
	01/18/10	13:21		7.56	--	NP	8.82
	04/19/10	15:49		7.92	--	NP	8.46
	07/19/10	7:50		8.28	--	NP	8.10
	10/25/10	14:34		7.93	--	NP	8.45
	03/21/11	12:52		7.51	--	NP	8.87
	06/14/11	11:14		8.23	--	NP	8.15
	09/26/11	11:20		8.41	--	NP	7.97
	12/12/11	13:01		8.00	--	NP	8.38

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
P-5 [S]	08/03/09	10:19	16.85	6.47	--	NP	10.38
	08/17/09	9:50		6.78	--	NP	10.07
	10/29/09	9:10		5.85	--	NP	11.00
	01/18/10	13:18		2.76	--	NP	14.09
	04/19/10	15:50		4.31	--	NP	12.54
	07/19/10	7:54		5.71	--	NP	11.14
	10/25/10	14:33		6.03	--	NP	10.82
	03/21/11	12:53		3.17	--	NP	13.68
	06/14/11	11:15		5.00	--	NP	11.85
	09/26/11	11:21		7.13	--	NP	9.72
	12/12/11	13:02		4.93	--	NP	11.92
P-6 [S]	08/03/09	10:16	17.67	9.90	--	NP	7.77
	08/17/09	9:53		6.31	--	NP	11.36
	10/29/09	9:12		4.92	--	NP	12.75
	01/18/10	13:10		3.09	--	NP	14.58
	04/19/10	15:52		4.63	--	NP	13.04
	07/19/10	7:59		5.21	--	NP	12.46
	10/25/10	14:29		4.81	--	NP	12.86
	03/21/11	12:54		3.41	--	NP	14.26
	06/14/11	11:20		5.05	--	NP	12.62
	09/26/11	11:25		6.40	--	NP	11.27
	12/12/11	13:05		5.07	--	NP	12.60
P-7 [D]	08/03/09	10:17	17.63	9.72	--	NP	7.91
	08/17/09	9:52		9.80	--	NP	7.83
	10/29/09	8:55		6.15	--	NP	11.48
	01/18/10	13:14		8.56	--	NP	9.07
	04/19/10	15:51		8.94	--	NP	8.69
	07/19/10	8:00		7.36	--	NP	10.27
	10/25/10	14:31		8.97	--	NP	8.66
	03/21/11	12:52		8.62	--	NP	9.01
	06/14/11	11:18		9.24	--	NP	8.39
	09/26/11	11:23		9.55	--	NP	8.08
	12/12/11	13:04		9.04	--	NP	8.59
P-8 [D]	08/03/09	10:24	16.07	8.52	--	NP	7.55
	08/17/09	9:41		8.92	--	NP	7.15
	10/29/09	8:53		8.03	--	NP	8.04
	01/18/10	13:33		7.47	--	NP	8.60
	04/19/10	15:45		7.80	--	NP	8.27
	07/19/10	8:03		8.12	--	NP	7.95
	10/25/10	14:24		7.80	--	NP	8.27
	03/21/11	12:45		7.49	--	NP	8.58
	06/14/11	11:05		8.16	--	NP	7.91
	09/26/11	11:20		8.34	--	NP	7.73
	12/12/11	12:48		7.94	--	NP	8.13
P-9	08/25/11	12:51	13.86	7.57	--	NP	6.29
	09/02/11	10:04		7.58	--	NP	6.28
	09/09/11	7:58		7.61	--	NP	6.25
	09/16/11	14:42		7.64	--	NP	6.22
	09/26/11	11:03		8.62	--	NP	5.24
	10/28/11	9:52		7.59	--	NP	6.27
	11/18/11	8:55		7.45	--	NP	6.41
	12/12/11	13:55		7.00	--	NP	6.86
P-10	08/25/11	12:49	11.07	4.98	--	NP	6.09
	09/02/11	10:08		4.97	--	NP	6.10
	09/09/11	8:02		5.00	--	NP	6.07
	09/16/11	14:35		5.00	--	NP	6.07
	09/26/11	10:59		4.96	--	NP	6.11
	10/28/11	9:56		4.80	--	NP	6.27
	11/18/11	9:00		4.81	--	NP	6.26
	12/12/11	12:18		4.36	--	NP	6.71

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
P-11	08/25/11	12:45	13.63	7.49	--	NP	6.14
	09/02/11	10:10		7.49	--	NP	6.14
	09/09/11	8:05		7.50	--	NP	6.13
	09/16/11	14:30		7.53	--	NP	6.10
	09/26/11	12:15		7.50	--	NP	6.13
	10/28/11	9:59		7.36	--	NP	6.27
	11/18/11	9:03		7.31	--	NP	6.32
	12/12/11	13:58		6.75	--	NP	6.88
P-12	08/25/11	12:42	13.03	7.26	--	NP	5.77
	09/02/11	10:14		7.10	--	NP	5.93
	09/09/11	8:08		7.11	--	NP	5.92
	09/16/11	14:10		7.18	--	<0.01	5.85
	09/26/11	12:37		7.16	7.15	0.01	5.88**
	10/28/11	10:03		6.91	--	NP	6.12
	11/18/11	9:13		6.98	--	NP	6.05
	12/12/11	13:59		6.61	--	NP	6.42
P-13	08/25/11	12:40	13.02	6.90	--	NP	6.12
	09/02/11	10:17		6.84	--	NP	6.18
	09/09/11	8:11		6.89	--	NP	6.13
	09/16/11	14:17		6.91	--	<0.01	6.11
	09/26/11	12:23		6.93	6.90	0.03	6.09**
	10/28/11	10:20		6.75	6.74	0.01	6.35**
	11/18/11	9:19		-- [+]	6.66	-- [+]	-- [+]
	12/12/11	12:11		6.46	6.23	0.23	6.74**
P-14	08/25/11	12:38	12.14	6.79	--	NP	5.35
	09/02/11	10:21		6.37	--	NP	5.77
	09/09/11	8:14		6.50	--	NP	5.64
	09/16/11	14:23		6.51	--	NP	5.63
	09/26/11	12:19		6.60	--	NP	5.54
	10/28/11	10:16		6.13	--	NP	6.01
	11/18/11	9:16		6.24	--	NP	5.90
	12/12/11	14:03		5.98	--	NP	6.16
P-15	08/25/11	12:30	12.54	7.48	--	NP	5.06
	09/02/11	10:23		6.97	--	NP	5.57
	09/09/11	8:17		7.22	--	NP	5.32
	09/16/11	14:48		7.10	--	NP	5.44
	09/26/11	10:56		7.15	--	NP	5.39
	10/28/11	10:11		6.68	--	NP	5.86
	11/18/11	9:09		6.83	--	NP	5.71
	12/12/11	12:55		6.65	--	NP	5.89
P-16	08/25/11	12:25	9.04	3.60	--	NP	5.44
	09/02/11	10:25		3.41	--	NP	5.63
	09/09/11	8:19		3.42	--	NP	5.62
	09/16/11	14:52		3.39	--	NP	5.65
	09/26/11	11:00		3.38	--	NP	5.66
	10/28/11	10:07		3.14	--	NP	5.90
	11/18/11	9:07		3.22	--	NP	5.82
	12/12/11	12:38		2.93	--	NP	6.11
Staff Gauges							
D-1[1]	06/22/09	10:43	8.84 [3]	2.58	--	NP	6.26
	06/22/09	12:31		2.81	--	NP	6.03
	08/03/09	9:34		2.85	--	NP	5.99
	08/03/09	12:02		2.82	--	NP	6.02
	08/17/09	7:48		2.79	--	NP	6.05
	08/17/09	10:59		2.87	--	NP	5.97
	10/29/09	7:48		2.68	--	NP	6.16
	10/29/09	10:08		2.54	--	NP	6.30
	01/18/10	12:34		1.48	--	NP	7.36
	01/18/10	14:39		1.83	--	NP	7.01
	04/19/10	14:09		2.62	--	NP	6.22
	04/19/10	16:13		2.78	--	NP	6.06
	07/19/10	5:35		2.50	--	NP	6.34
	07/19/10	9:08		3.86	--	NP	4.98

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
D-1 (continued)	10/25/10	12:18		1.30	--	NP	7.54
	10/25/10	15:33		1.85	--	NP	6.99
	03/21/11	11:17		2.50	--	NP	6.34
	03/21/11	13:56		2.80	--	NP	6.04
	06/14/11	8:54		2.40	--	NP	6.44
	06/14/11	12:49		2.92	--	NP	5.92
	09/26/11	8:56		2.43	--	NP	6.41
	09/26/11	--		2.69	--	NP	6.15
	12/12/11	10:15		2.27	--	NP	6.57
	12/12/11	14:40		2.70	--	NP	6.14
D-2	10/20/08	17:15	5.60	1.20	--	NP	6.80
	12/08/08	11:05		1.24	--	NP	6.84
	02/20/09	9:55		0.60	--	NP	6.20
	04/20/09	9:49		0.20	--	NP	5.80
	06/22/09	10:50	8.67 [3]	2.30	--	NP	6.37
	06/22/09	12:35		2.44	--	NP	6.23
	08/03/09	9:40		2.43	--	NP	6.24
	08/03/09	12:05		2.45	--	NP	6.22
	08/17/09	7:53		2.50	--	NP	6.17
	08/17/09	11:03		2.50	--	NP	6.17
	10/29/09	7:52		2.35	--	NP	6.32
	10/29/09	10:14		2.25	--	NP	6.42
	01/18/10	12:38		1.38	--	NP	7.29
	01/18/10	14:43		1.76	--	NP	6.91
	04/19/10	14:14		2.32	--	NP	6.35
	04/19/10	16:16		2.44	--	NP	6.23
	07/19/10	5:46		2.26	--	NP	6.41
	07/19/10	9:13		2.45	--	NP	6.22
	10/25/10	12:23		1.00	--	NP	7.67
	10/25/10	15:40		1.60	--	NP	7.07
	03/21/11	11:21		2.27	--	NP	6.40
	03/21/11	14:06		2.45	--	NP	6.22
	06/14/11	9:23		2.64	--	NP	6.03
	06/14/11	12:54		2.45	--	NP	6.22
	09/26/11	9:25		2.30	--	NP	6.37
	09/26/11	--		2.39	--	NP	6.28
	12/12/11	10:21		2.09	--	NP	6.58
	12/12/11	14:47		2.50	--	NP	6.17

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
D-3	10/20/08	17:18	5.20	1.90	--	NP	7.10
	12/08/08	11:09		1.78	--	NP	6.98
	02/20/09	9:59		1.20	--	NP	6.40
	04/20/09	9:53		1.20	--	NP	6.40
	06/22/09	11:02	8.39 [3]	2.19	--	NP	6.20
	06/22/09	12:40		2.24	--	NP	6.15
	08/03/09	9:49		2.30	--	NP	6.09
	08/03/09	12:10		2.23	--	NP	6.16
	08/17/09	7:57		2.19	--	NP	6.20
	08/17/09	11:08		2.40	--	NP	5.99
	10/29/09	7:55		2.07	--	NP	6.32
	10/29/09	10:13		2.04	--	NP	6.35
	01/18/10	12:23		1.22	--	NP	7.17
	01/18/10	14:46		1.52	--	NP	6.87
	04/19/10	14:18		2.12	--	NP	6.27
	04/19/10	16:22		2.29	--	NP	6.10
	07/19/10	5:55		2.10	--	NP	6.29
	07/19/10	9:17		2.28	--	NP	6.11
	10/25/10	12:29		0.80	--	NP	7.59
	10/25/10	15:42		1.45	--	NP	6.94
	03/21/11	11:25		2.30	--	NP	6.09
	03/21/11	14:05		2.50	--	NP	5.89
	06/14/11	9:06		2.05	--	NP	6.34
	06/14/11	12:59		2.35	--	NP	6.04
	09/26/11	9:45		2.19	--	NP	6.20
	09/26/11	--		2.08	--	NP	6.31
	12/12/11	10:27		3.16	--	NP	5.23
	12/12/11	14:55		3.47	--	NP	4.92
D-4[2]	06/22/09	10:19	9.39 [3]	2.96	--	NP	6.43
	06/22/09	12:54		2.81	--	NP	6.58
	08/03/09	10:09		2.93	--	NP	6.46
	08/03/09	12:25		2.95	--	NP	6.44
	08/17/09	8:10		2.92	--	NP	6.47
	08/17/09	11:19		2.94	--	NP	6.45
	10/29/09	8:19		2.74	--	NP	6.65
	10/29/09	10:34		2.59	--	NP	6.80
	01/18/10	12:55		2.06	--	NP	7.33
	01/18/10	15:00		2.35	--	NP	7.04
	04/19/10	14:33		2.87	--	NP	6.52
	04/19/10	16:39		2.95	--	NP	6.44
	07/19/10	6:19		2.90	--	NP	6.49
	07/19/10	9:34		3.00	--	NP	6.39
	10/25/10	12:45		1.70	--	NP	7.69
	10/25/10	15:36		2.40	--	NP	6.99
	03/21/11	11:48		2.83	--	NP	6.56
	03/21/11	14:15		2.90	--	NP	6.49
	06/14/11	9:00		2.35	--	NP	7.04
	06/14/11	13:12		2.93	--	NP	6.46
	09/26/11	10:00		2.82	--	NP	6.57
	09/26/11	--		3.03	--	NP	6.36
	12/12/11	10:48		2.86	--	NP	6.53
	12/12/11	15:05		2.18	--	NP	7.21

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
D-5	10/20/08	--	--	--	--	--	--
	12/08/08	11:18	5.60	1.25	--	NP	6.85
	02/20/09	9:45		0.30	--	NP	5.90*
	04/20/09	9:22		0.10	--	NP	5.70
	06/22/09	10:39	9.09 [3]	2.88	--	NP	6.21
	06/22/09	12:28		3.10	--	NP	5.99
	08/03/09	9:32		3.10	--	NP	5.99
	08/03/09	11:59		3.12	--	NP	5.97
	08/17/09	7:46		3.12	--	NP	5.97
	08/17/09	10:56		3.17	--	NP	5.92
	10/29/09	7:45		2.99	--	NP	6.10
	10/29/09	10:04		2.88	--	NP	6.21
	01/18/10	12:29		1.76	--	NP	7.33
	01/18/10	14:35		2.10	--	NP	6.99
	04/19/10	14:05		2.87	--	NP	6.22
	04/19/10	16:10		Dry	--	NP	Dry
	07/19/10	5:32		2.78	--	NP	6.31
	07/19/10	9:04		Dry	--	NP	Dry
	10/25/10	12:15		1.50	--	NP	7.59
	10/25/10	15:33		2.11	--	NP	6.98
	03/21/11	11:13		2.80	--	NP	6.29
	03/21/11	13:54		3.10	--	NP	5.99
	06/14/11	8:50		2.65	--	NP	6.44
	06/14/11	12:46		3.19	--	NP	5.90
	09/26/11	8:50		2.69	--	NP	6.40
	09/26/11	--		2.99	--	NP	6.10
	12/12/11	10:09		2.49	--	NP	6.60
	12/12/11	14:35		2.99	--	NP	6.10
D-6	10/20/08	--	--	--	--	--	--
	12/08/08	11:22	2.80	3.00	--	NP	5.80
	02/20/09	10:16		4.40	--	NP	7.20
	04/20/09	9:40		4.30	--	NP	7.10
	06/22/09	11:10	8.11 [3]	3.12	--	NP	4.99
	06/22/09	12:46		3.12	--	NP	4.99
	08/03/09	9:59		3.30	--	NP	4.81
	08/03/09	12:16		3.29	--	NP	4.82
	08/17/09	8:02		3.30	--	NP	4.81
	08/17/09	11:14		3.29	--	NP	4.82
	10/29/09	8:09		2.76	--	NP	5.35
	10/29/09	10:34		2.71	--	NP	5.40
	01/18/10	12:46		3.77	--	NP	4.34
	01/18/10	14:52		3.80	--	NP	4.31
	04/19/10	14:25		2.20	--	NP	5.91
	04/19/10	16:30		2.30	--	NP	5.81
	07/19/10	6:08		2.35	--	NP	5.76
	07/19/10	9:26		2.35	--	NP	5.76
	10/25/10	12:36		1.65	--	NP	6.46
	10/25/10	15:48		1.61	--	NP	6.50
	03/21/11	11:35		1.64	--	NP	6.47
	03/21/11	14:08		1.65	--	NP	6.46
D-6R	06/14/11	8:57	9.11	3.72	--	NP	5.39
	06/14/11	12:50		3.72	--	NP	5.39
	09/26/11	9:00		3.95	--	NP	5.16
	09/26/11	--		3.90	--	NP	5.21
	12/12/11	10:17		3.69	--	NP	5.42
	12/12/11	14:42		3.69	--	NP	5.42
D-7	10/20/08	17:23	7.60	Dry	--	NP	Dry
	12/08/08	11:31		Dry	--	NP	Dry
	02/20/09	10:48		Dry	--	NP	Dry
	04/20/09	10:23		Dry	--	NP	Dry

Table 2

Groundwater Elevation Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)
TB	10/20/08	17:05	4.70	2.30	--	NP	7.00
	12/08/08	11:16		2.50	--	NP	7.20
	02/20/09	9:37		1.10	--	NP	5.80
	04/20/09	9:20		1.33	--	NP	6.03
	06/22/09	10:35		1.63	--	NP	6.33
	06/22/09	12:25		1.85	--	NP	6.55
	08/03/09	9:27		1.83	--	NP	6.53
	08/03/09	11:56		1.83	--	NP	6.53
	08/17/09	7:41		1.83	--	NP	6.53
	08/17/09	10:52		1.88	--	NP	6.58
	10/29/09	7:41		1.69	--	NP	6.39
	10/29/09	10:01		1.64	--	NP	6.34
	01/18/10	12:18		0.45	--	NP	5.15
	01/18/10	14:24		0.90	--	NP	5.60
	04/19/10	14:00		1.74	--	NP	6.44
	04/19/10	16:07		1.94	--	NP	6.64
	07/19/10	5:28		1.59	--	NP	6.29
	07/19/10	9:01		1.97	--	NP	6.67
	10/25/10	12:11		4.20	--	NP	8.90
	10/25/10	15:30		0.86	--	NP	5.56
	06/14/11	8:47		1.49	--	NP	6.19
	06/14/11	12:42		1.95	--	NP	6.65
	09/26/11	8:47		1.51	--	NP	6.21
	09/26/11	--		1.74	--	NP	6.44
	12/12/11	10:05		1.19	--	NP	5.89
	12/12/11	14:30		1.70	--	NP	6.40

Notes:

amsl= Above Mean Sea Level

LNAPL = Light non-aqueous phase liquid

"--" = Not measured.

NP = Not present

[1] Staff gauge D-1 re-established prior to June 2009 sampling event.

[2] Staff gauge D-4 was established prior to June 2009 sampling event to replace staff guage D-7 which is not within the Willow Creek channel.

[3] Staff guages were resurveyed by OTAK Incorporated June 1, 2009. Staff guages were surveyed from top of gauge and water levels are now measured from top down to water.

* = Potentially anomalous reading that will be confirmed with subsequent gauging data.

** = Groundwater elevation adjusted for the presence of LNAPL.

+ = LNAPL thickness could not be accurately measured due to LNAPL coating oil/water interface probe tip.

^ = Measurement error. LNAPL measurement was not confirmed with a bailer at the time the measurement was collected. The measurement was re-collected on 06/23/09 and there was no indication of LNAPL or LNAPL film. A bailer was used to confirm the measurement on 06/23/09 and there were no signs of LNAPL, sheen or odor present in MW-104.

[S] = Shallow piezometer (installed between 12 and 13 feet below ground surface).

[D] = Deep piezometer (installed between 22 and 25 feet below ground surface).

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L) B		T		E		X		Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
West Side of Lower Yard																			
MW-101*	10/22/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	250	U	50	U	500	U	400	UU
	12/10/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	245	U	50	U	490	U	393	UU
	02/24/09	0.5	U	NA		NA		NA		0.00755	UU	160		83		72	U	279	
	04/22/09	0.5	U	NA		NA		NA		0.00755	UU	160		50	U	79	U	225	
	06/25/09	0.5	U	NA		NA		NA		0.0073311	UU	36		50	U	69	U	96	
	08/20/09	0.5	U	NA		NA		NA		0.012499	UU	82		50	U	74	U	144	
	10/27/09	0.5	U	NA		NA		NA		0.01255	UU	310		50	U	74	U	372	
	01/19/10	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	04/21/10	NA		NA		NA		NA		NA		75		75		78	U	189	
	07/21/10	NA		NA		NA		NA		NA		98 [100]		50 [50]	U	74 [73]	U	160 [162]	
	10/27/10	0.5	U	NA		NA		NA		0.0119225	UU	130		120		67	U	284	
	03/23/11	NA		NA		NA		NA		NA		34		50	U	67	U	93	
	06/15/11	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		70 [68]		50 [50]	U	67 [70]	U	129 [163]	
	09/27/11	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	12/14/11	0.2	U	NA		NA		NA		0.00717	UU	32	U	50	U	75	U	79	UU
MW-104*	10/22/08	3.89		0.554		11.8		1.00	U	0.00755	UU	253	U	728		505	U	1,107	
	12/10/08	3.41		0.50	U	23.5		1.15		0.0074	UU	245	U	859		490	U	1,227	
	02/24/09	1.4		NA		NA		NA		0.00733105	UU	130		460		68	U	624	
	04/23/09	5.0 [5.0]	U	NA [NA]		NA [NA]		NA [NA]		0.00763 [0.00838]	UU	180 [210]		1,700 [1,800]		70 [72]	U	1,915 [2,046]	
	06/24/09	2.9		NA		NA		NA		0.0073105	UU	140		740		72	U	916	
	08/19/09	2.0		NA		NA		NA		0.0119225	UU	120		310		68	U	464	
	10/27/09	2.0		NA		NA		NA		0.0125245	UU	130		510		73	U	677	
	01/19/10	NA		NA		NA		NA		NA		270		2,800		69	U	3,105	
	04/21/10	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		100 [100]		400 [510]		83 [67]	U	542 [644]	
	07/20/10	NA		NA		NA		NA		NA		200		450		72	U	686	
	10/27/10	1.7		NA		NA		NA		0.04719	UU	81		220		67	U	335	
	03/23/11	NA		NA		NA		NA		NA		290		890		68	U	1,214	
	06/15/11	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		340 [350]		1,900 [1,900]		67 [67]	U	2,274 [2,374]	
	09/27/11	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	12/13/11	3.0	U	NA		NA		NA		0.0717	UU	38		700		66	U	771	
MW-143	10/22/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	250	U	50	U	500	U	400	UU
	12/16/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	240	U	50	U	481	U	386	UU
	02/25/09	0.5	U	NA		NA		NA		0.007399	UU	1,400		50	U	580		2,005	
	04/21/09	0.5	U	NA		NA		NA		0.00747	UU	710		50	U	69	U	770	
	06/24/09	0.5	U	NA		NA		NA		0.00733105	UU	940		50	U	210		1,175	
	08/19/09	0.5	U	NA		NA		NA		0.0125245	UU	360		50	U	71	U	421	
	10/27/09	0.5	U	NA		NA		NA		0.0125245	UU	200		50	U	66	U	258	
	01/21/10	NA		NA		NA		NA		NA		620		50	U	330		975	
	04/20/10	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		1,200 [1,400]		50 [50]	U	340 [450]		1,565 [1,875]	
	07/20/10	NA		NA		NA		NA		NA		1,300		50	U	260		1,585	
	10/27/10	0.5	U	NA		NA		NA		0.0119225	UU	110		50	U	67	U	169	
	06/15/11	NA		NA		NA		NA		NA		1,500		50	U	220		1,745	
	12/14/11	0.2	U	NA		NA		NA		0.0072	UU	31		50	U	67	U	90	

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)				Total cPAHs Adjusted for Toxicity[2] (µg/L)	Diesel[3] (µg/L)	Gasoline[4] (µg/L)	Heavy Oil[3] (µg/L)	Total TPH[5] (µg/L)
		B	T	E	X					
		CUL=51				CUL=0.018				CUL=706 (West Side) 506 (East Side)
MW-147*	10/21/08	0.50 U	0.50 U	0.50 U	1.00 U	0.00733 UU	240 U	91.2	481 U	452
	12/09/08	0.50 U	0.562	1.38	3.49	0.00755 UU	243 U	604	485 U	968
	02/23/09	0.5 [0.5] U	NA [NA]	NA [NA]	NA [NA]	0.007263 [0.0077399] UU	1,100 [1,000]	760 [790]	380 [420]	2,240 [2,210]
	04/21/09	1.7	NA	NA	NA	0.00838 UU	730	630	99	1,459
	06/23/09	0.5 U	NA	NA	NA	0.0071876 UU	750	260	290	1,300
	08/18/09	0.5 U	NA	NA	NA	0.0119735 UU	240	76	70 U	351
	10/26/09	0.5 U	NA	NA	NA	0.0119735 UU	1,700	690	330	2,720
	01/19/10	NA	NA	NA	NA	NA	360	750	66 U	1,143
	04/20/10	NA	NA	NA	NA	NA	320	730	78	1,128
	07/20/10	NA	NA	NA	NA	NA	500	70	100	670
	10/26/10	0.5 U	NA	NA	NA	0.0125245 UU	1,200	330	200	1,730
	3/22/11	NA	NA	NA	NA	NA	750	740	68 U	1,524
	6/15/11	NA	NA	NA	NA	NA	370	250	67 U	654
	9/27/11	NA	NA	NA	NA	NA	29 U	50 U	67 U	73 UU
	12/13/11	0.2 [0.2] U	NA [NA]	NA [NA]	NA [NA]	0.0072 [0.0072] UU	28 [28] U	50 [50] U	66 [66] U	72 [72] UU
MW-149R*	10/21/08	0.50 U	0.50 U	0.50 U	1.00 U	0.00733 UU	245 U	50 U	490 U	393 UU
	12/09/08	0.50 U	0.50 U	0.50 U	1.00 U	0.0074 UU	243 U	50 U	485 U	389 UU
	02/23/09	0.5 U	NA	NA	NA	0.00755 UU	110	50 U	78 U	174
	04/21/09	0.5 U	NA	NA	NA	0.00755 UU	100	50 U	76 U	163
	06/23/09	0.5 U	NA	NA	NA	0.0071876 UU	190	50 U	66 U	248
	08/18/09	0.5 U	NA	NA	NA	0.0119225 UU	160	50 U	66 U	218
	10/26/09	0.5 U	NA	NA	NA	0.011948 UU	430	50 U	320	775
	01/19/10	NA	NA	NA	NA	NA	28 U	50 U	66 U	72 UU
	04/20/10	NA [NA]	NA [NA]	NA [NA]	NA [NA]	NA [NA]	29 [28] U	50 [50] U	68 [66] U	74 [72] UU
	07/20/10	NA	NA	NA	NA	NA	210	50 U	89	324
	10/26/10	0.5 U	NA	NA	NA	0.011948 UU	410	50 U	210	645
	03/22/11	NA	NA	NA	NA	NA	61	50 U	66 U	119
	06/17/11	NA	NA	NA	NA	NA	82	50 U	66 U	140
	09/27/11	NA	NA	NA	NA	NA	30 U	50 U	67 U	78 UU
	12/13/11	0.2 U	NA	NA	NA	0.0072 UU	29 U	50 U	68 U	74 UU
MW-150*	10/21/08	0.50 U	0.50 U	0.50 U	1.00 U	0.0074 UU	240 U	50 U	481 UJ	386 UU
	12/09/08	0.50 U	0.50 U	0.50 U	1.00 U	0.00719 UU	248 U	50 U	495 U	397 UU
	02/23/09	0.5 U	NA	NA	NA	0.00712 UU	82	50 U	69 U	142
	04/21/09	0.5 U	NA	NA	NA	0.0074 UU	240	50 U	69 U	300
	06/23/09	0.5 U	NA	NA	NA	0.00755 UU	160	50 U	69 U	220
	08/18/09	0.5 U	NA	NA	NA	0.0125245 UU	110	50 U	72 U	171
	10/26/09	0.5 U	NA	NA	NA	0.011948 UU	420	50 U	270	715
	01/19/10	NA	NA	NA	NA	NA	31	50 U	69 U	91
	04/20/10	NA	NA	NA	NA	NA	48	50 U	77 U	112
	07/20/10	NA	NA	NA	NA	NA	200	50 U	68 U	259
	10/26/10	0.5 U	NA	NA	NA	0.011897 UU	59	50 U	65 U	117
	03/22/11	NA	NA	NA	NA	NA	29 U	50 U	67 U	73 UU
	06/17/11	NA	NA	NA	NA	NA	190	50 U	68 U	249
	09/27/11	NA	NA	NA	NA	NA	30 U	50 U	68 U	74 UU
	12/13/11	0.2 [0.2] U	NA [NA]	NA [NA]	NA [NA]	0.0073235 [0.00732] UU	29 [28] U	50 [50] U	68 [66] U	74 [72] UU

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)				Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		B	T	E	X										
		CUL=51				CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-20R*	10/22/08	2.95	0.50 U	3.31	1.00 U	0.00755	UU	250	U	222		500	U	597	
	12/10/08	22.2	0.50 U	2.06	1.14	0.00712	UU	248	U	325		495	U	697	
	02/24/09	55	NA	NA	NA	0.00711965	UU	580		420		87		1,087	
	04/22/09	47	NA	NA	NA	0.00838	UU	510		270		86		866	
	06/24/09	0.5 U	NA	NA	NA	0.00733105	UU	160		50	U	69	U	220	
	08/19/09	8.4	NA	NA	NA	0.0119225	UU	220		50	U	68	U	279	
	10/27/09	4.9	NA	NA	NA	0.01255	UU	170		50	U	72	U	231	
	01/19/10	50	0.5 U	1.1	1.5 U	NA		260		66		66	U	359	
	04/21/10	0.9	NA	NA	NA	NA		350		50	U	100		475	
	07/20/10	0.5 [0.5] U	0.5 [0.5] U	0.5 [0.5] U	0.5 [0.5]	1.5 [1.5]		130 [130]		50 [50]	U	66 [66]	U	188 [188]	
	10/27/10	0.5 U	NA	NA	NA	0.011897	UU	47		50	U	75	U	110	
	03/23/11	5.3	NA	NA	NA	NA		390		50	U	190		605	
	06/15/11	3.9	NA	NA	NA	NA		320		71		72		463	
	09/27/11	0.9	NA	NA	NA	NA		29	U	50	U	68	U	74	UU
	12/14/11	20	NA	NA	NA	0.0072	UU	29	U	65		67	U	113	
MW-516	10/22/08	0.779	0.711	0.50 U	3.96	0.00712	UU	248	U	429	JZ	495	U	801	J
	12/10/08	0.50 U	0.50 U	0.50 U	1.00 U	0.00747	UU	243	U	114		485	U	478	
	02/24/09	0.5 U	NA	NA	NA	0.00755	UU	30	U	50	U	70	U	75	UU
	04/22/09	0.5 U	NA	NA	NA	0.00793	UU	31	U	50	U	73	U	77	UU
	06/24/09	0.5 U	NA	NA	NA	0.0071876	UU	210		50	U	69	U	270	
	08/20/09	0.5 U	NA	NA	NA	0.0125245	UU	260		50	U	75	U	323	
	10/27/09	0.5 U	NA	NA	NA	0.011897	UU	140		50	U	67	U	199	
	01/20/10	NA	NA	NA	NA	NA		29	U	50	U	67	U	73	UU
	04/21/10	NA	NA	NA	NA	NA		30	U	50	U	70	U	75	UU
	07/21/10	NA	NA	NA	NA	NA		150		50	U	67	U	209	
	10/27/10	0.5 [0.5] U	NA [NA]	NA [NA]	NA [NA]	0.0119225 [0.0119225]	UU	49 [40]		50 [50]	U	67 [66]	U	108 [98]	
	06/16/11	NA	NA	NA	NA	NA		170		50	U	67	U	229	
	12/14/11	0.2 U	NA	NA	NA	0.0072	UU	29	U	50	U	69	U	74	UU
MW-517	10/22/08	1.24	0.50 U	0.884	1.56	0.00755	UU	248	U	275	JZ	495	U	647	J
	12/10/08	0.50 U	0.50 U	0.50 U	1.00 U	0.00726	UU	240	U	130		481	U	491	
	02/24/09	0.5 U	NA	NA	NA	0.00755	UU	50		50	U	72	U	111	
	04/22/09	0.5 U	NA	NA	NA	0.00815	UU	100		50	U	71	U	161	
	06/24/09	0.5 U	NA	NA	NA	0.0071876	UU	460		50	U	86		571	
	08/20/09	0.5 U	NA	NA	NA	0.012499	UU	230		120		69	U	385	
	10/27/09	0.5 U	NA	NA	NA	0.012499	UU	160		54		73	U	251	
	01/20/10	NA	NA	NA	NA	NA		40		50	U	69	U	100	
	04/21/10	NA [NA]	NA [NA]	NA [NA]	NA [NA]	NA [NA]		75 [94]		50 [50]	U	67 [70]	U	134 [154]	
	07/20/10	NA	NA	NA	NA	NA		200		50	U	66	U	258	
	10/27/10	0.5 U	NA	NA	NA	0.012499	UU	77		50	U	72	U	138	
	06/16/11	NA	NA	NA	NA	NA		89		50	U	67	U	148	
	12/14/11	0.2 U	NA	NA	NA	0.00717	UU	28	U	50	U	66	U	72	UU

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)				Total cPAHs Adjusted for Toxicity[2] (µg/L)	Diesel[3] (µg/L)	Gasoline[4] (µg/L)	Heavy Oil[3] (µg/L)	Total TPH[5] (µg/L)
		B	T	E	X					
		CUL=51				CUL=0.018				CUL=706 (West Side) 506 (East Side)
MW-518*	10/22/08	0.503	0.50 U	0.50 U	1.92	0.00755 UU	248 U	770 JZ	495 U	1,142 J
	12/10/08	0.50 U	0.50 U	0.50 U	2.12	0.0074 UU	245 U	796 JZ	490 U	1,164 J
	02/25/09	0.5 U	NA	NA	NA	0.00711965 UU	450	880	73	1,403
	04/22/09	0.5 U	NA	NA	NA	0.0074 UU	480	650	72	1,202
	06/25/09	0.5 U	NA	NA	NA	0.0071876 UU	200	440	70 U	675
	08/20/09	0.5 U	NA	NA	NA	0.0125245 UU	300	730	71 U	1,066
	10/30/09	0.5 U	NA	NA	NA	0.0125245 UU	310	660	74 U	1,007
	01/20/10	NA	NA	NA	NA	NA	230	660	67 U	924
	04/21/10	NA	NA	NA	NA	NA	240	630	75 U	908
	07/21/10	NA	NA	NA	NA	NA	310 [400]	350 [270]	73 [78] U	697 [709]
	10/28/10	0.5 U	NA	NA	NA	0.0119225 UU	290	600	67 U	924
	03/23/11	NA	NA	NA	NA	NA	390	330	68 U	754
	06/16/11	NA	NA	NA	NA	NA	200	140	67 U	374
	09/27/11	NA	NA	NA	NA	NA	66	230	68 U	330
	12/14/11	0.2 U	NA	NA	NA	0.00732 UU	40	440	67 U	514
MW-519	10/22/08	0.5 [0.5] U	0.5 [0.5] U	0.5 [0.5] U	1.00 [1.00] U	0.00755 [0.00747] UU	248 [248] U	79.9 [83.6]	495 [495] U	451 [455]
	12/09/08	0.50 U	0.50 U	0.50 U	1.00 U	0.0074 UU	250 U	64.1	500 U	439
	02/24/09	0.5 U	NA	NA	NA	0.00755 UU	83	50 U	71 U	144
	04/21/09	0.5 U	NA	NA	NA	0.00755 UU	150	50 U	74 U	212
	06/24/09	0.5 U	NA	NA	NA	0.0071876 UU	220	50 U	70 U	280
	08/18/09	0.5 [0.5] U	NA [NA]	NA [NA]	NA [NA]	0.0125245 [0.011948] UU	290 [250]	50 [50] U	75 [72] U	353 [311]
	10/27/09	0.5 U	NA	NA	NA	0.0125245 UU	58	50 U	66 U	116
	01/19/10	NA	NA	NA	NA	NA	170	50 U	67 U	229
	04/21/10	NA	NA	NA	NA	NA	82	50 U	71 U	143
	07/20/10	NA	NA	NA	NA	NA	290	50 U	67 U	349
	10/26/10	0.5 [0.5] U	NA [NA]	NA [NA]	NA [NA]	0.012499 [0.012499] UU	43 [54]	50 [50] U	73 [79] U	105 [119]
	06/15/11	NA	NA	NA	NA	NA	260	50 U	68 U	319
	12/14/11	0.2 U	NA	NA	NA	0.008 UU	29 U	50 U	67 U	73 UU
MW-520	10/21/08	1.45	0.50 U	0.50 U	1.00 U	0.00755 UU	250 U	356	500 U	731
	12/09/08	3.77	0.50 U	0.50 U	1.00 U	0.00763 UU	243 U	125	485 U	489
	02/23/09	1.6	NA	NA	NA	0.007928 UU	160	110	76 U	308
	04/22/09	7.6 [7.3]	NA [NA]	NA [NA]	NA [NA]	0.00747 [0.00740] UU	110 [110]	50 [50] U	66 [67] U	168 [169]
	06/24/09	0.5	NA	NA	NA	0.0072631 UU	180	50 U	69 U	240
	08/18/09	0.5 U	NA	NA	NA	0.0119735 UU	140	50 U	72 U	201
	10/27/09	0.5 U	NA	NA	NA	0.012499 UU	130	50 U	73 U	192
	01/19/10	NA	NA	NA	NA	NA	30 U	50 U	70 U	75 UU
	04/20/10	NA	NA	NA	NA	NA	52	50 U	68 U	111
	07/20/10	NA	NA	NA	NA	NA	320	50 U	67 U	379
	10/27/10	0.5 U	NA	NA	NA	0.011897 UU	110	50 U	66 U	168
	06/15/11	NA	NA	NA	NA	NA	120	50 U	67 U	179
	12/14/11	0.2 U	NA	NA	NA	0.0072 UU	29 U	50 U	67 U	73 UU

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		B		T		E		X											
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-521	10/21/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	245	U	57.9		490	U	425	
	12/09/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00755	UU	250	U	98.4		500	U	473	
	02/23/09	1.7		NA		NA		NA		0.008154	UU	90		50	U	78	U	154	
	04/21/09	0.5	U	NA		NA		NA		0.00755	UU	31	U	50	U	73	U	77	UU
	06/23/09	0.5	U	NA		NA		NA		0.007701	UU	47		50	U	71	U	108	
	08/19/09	0.5	U	NA		NA		NA		0.012499	UU	45		50	U	71	U	106	
	10/26/09	0.5 [0.5]	U	NA [NA]		NA [NA]		NA [NA]		0.011897 [0.011948]	UU	120 [78]		50 [50]	U	69 [74]	U	180 [140]	
	01/19/10	NA		NA		NA		NA		NA		30	U	50	U	70	U	75	UU
	04/20/10	NA		NA		NA		NA		NA		31	U	50	U	73	U	77	UU
	07/20/10	NA		NA		NA		NA		NA		70		50	U	67	U	129	
	10/27/10	0.5	U	NA		NA		NA		0.0125245	UU	77		50	U	72	U	138	
	06/15/11	NA		NA		NA		NA		NA		47		50	U	67	U	106	
	12/14/11	0.2	U	NA		NA		NA		0.00717	UU	29	U	50	U	67	U	74	UU
MW-522*	10/21/08	1.46		0.50	U	0.50	U	1.41		0.0356	UU	250	U	534	JZ	500	U	909	J
	12/09/08	0.782 [0.805]		0.5 [5.0]	U	0.5 [5.0]	U	1.00 [1.00]	U	0.00747 [0.00755]	UU	245 [245]	U	183 [186]		490 [490]	U	551 [554]	
	02/23/09	0.5	U	NA		NA		NA		0.007188	UU	490		160		71	U	686	
	04/21/09	0.5	U	NA		NA		NA		0.00755	UU	620		62		97		779	
	06/23/09	0.5	U	NA		NA		NA		0.0071876	UU	330		100		67	U	464	
	08/18/09	0.5		NA		NA		NA		0.0119225	UU	300		94		67	U	428	
	10/26/09	0.5		NA		NA		NA		0.0119735	UU	650		50	U	280		955	
	01/19/10	NA		NA		NA		NA		NA		39		50	U	66	U	97	UU
	04/20/10	NA		NA		NA		NA		NA		220		50	U	81	U	286	
	07/20/10	NA		NA		NA		NA		NA		470		50	U	76	U	533	
	10/26/10	0.5	U	NA		NA		NA		0.011897	UU	260		50	U	66	U	318	
	03/22/11	NA		NA		NA		NA		NA		150		50	U	66	U	208	
	06/15/11	NA		NA		NA		NA		NA		380		50	U	72	U	477	
	09/27/11	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		29 [42]		50 [50]	U	67 [66]	U	88 [100]	
	12/14/11	0.2	U	NA		NA		NA		0.0073	UU	29	U	50	U	67	U	73	UU
MW-523*	10/21/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	245	U	63.0		490	U	431	
	12/09/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00763	UU	248	U	50	U	495	U	397	UU
	02/23/09	0.5	U	NA		NA		NA		0.007399	UU	32		50	U	68	U	91	
	04/21/09	0.5	U	NA		NA		NA		0.0074	UU	30	U	50	U	69	U	75	UU
	06/23/09	0.5 [0.5]	U	NA		NA		NA		0.0072631 [0.00755]	UU	39 [78]		50 [50]	U	68 [68]	U	98 [137]	
	08/18/09	0.5	U	NA		NA		NA		0.0119225	UU	140		50	U	66	U	198	
	10/26/09	0.5	U	NA		NA		NA		0.0119735	UU	120		50	U	66	U	178	
	01/19/10	NA		NA		NA		NA		NA		32		50	U	69	U	92	
	04/20/10	NA		NA		NA		NA		NA		35	U	50	U	83	U	84	UU
	07/20/10	NA		NA		NA		NA		NA		61		50	U	80	U	126	
	10/26/10	0.5	U	NA		NA		NA		0.01255	UU	160		50	U	74	U	222	
	03/22/11	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	06/15/11	NA		NA		NA		NA		NA		73		50	U	67	U	132	
	09/27/11	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	12/13/11	0.2	U	NA		NA		NA		0.00717	UU	28	U	50	U	66	U	72	UU

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		B		T		E		X											
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-524*	10/21/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00726	UU	240	U	50	U	481	U	386	UU
	12/09/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	243	U	50	U	485	U	389	UU
	02/23/09	0.5	U	NA		NA		NA		0.007928	UU	32	U	50	U	74	U	78	UU
	04/21/09	0.5	U	NA		NA		NA		0.00747	UU	29	U	50	U	67	U	73	UU
	06/23/09	0.5	U	NA		NA		NA		0.0074745	UU	29	U	50	U	67	U	73	UU
	08/18/09	0.5	U	NA		NA		NA		0.0119225	UU	29	U	50	U	67	U	73	UU
	10/26/09	0.5	U	NA		NA		NA		0.011948	UU	270		50	U	150		445	
	01/19/10	NA		NA		NA		NA		NA		30	U	50	U	71	U	76	UU
	04/20/10	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	07/20/10	NA		NA		NA		NA		NA		32	U	50	U	75	U	79	UU
	10/26/10	0.5	U	NA		NA		NA		0.011897	UU	28	U	50	U	66	U	72	UU
	03/22/11	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	06/17/11	NA		NA		NA		NA		NA		36		50	U	67	U	95	
	09/27/11	NA		NA		NA		NA		NA		29	U	50	U	67.0	U	73	UU
	12/13/11	0.2	U	NA		NA		NA		0.00747	UU	29	U	50	U	68	U	74	UU
MW-8R*	10/21/08	0.505		0.50	U	0.50	U	1.00	U	0.0074	UU	243	U	145	JZ	485	U	509	J
	12/09/08	0.510		0.50	U	0.50	U	1.00	U	0.0074	UU	240	U	97.1		481	U	458	
	02/23/09	0.5	U	NA		NA		NA		0.00712	UU	68		50	U	70	U	128	
	04/21/09	0.5	U	NA		NA		NA		0.0074	UU	29		50	U	67	U	88	
	06/23/09	0.5	U	NA		NA		NA		0.0072631	UU	49		50	U	67	U	108	
	08/18/09	0.5	U	NA		NA		NA		0.0119225	UU	62		50	U	66	U	120	
	10/26/09	0.5	U	NA		NA		NA		0.0119735	UU	300		50	U	66	U	358	
	01/19/10	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		34 [32]		50 [50]	U	67 [68]	U	93 [91]	
	04/20/10	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	07/20/10	NA		NA		NA		NA		NA		79		50	U	67	U	138	
	10/26/10	0.5	U	NA		NA		NA		0.01255	UU	440		50	U	77	U	504	
	03/22/11	NA		NA		NA		NA		NA		28 U [32]		50 [50]	U	66 [67]	U	72 UU [91]	
	06/15/11	NA		NA		NA		NA		NA		44		50	U	67	U	103	
	09/27/11	NA		NA		NA		NA		NA		30	U	50	U	70	U	75	UU
	12/14/11	0.2	U	NA		NA		NA		0.00717	UU	28	U	50	U	66	U	72	UU
East Side of Lower Yard																			
LM-2*	10/23/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	243	U	50	U	485	U	389	UU
	12/11/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00772		243	U	50	U	485	U	389	UU
	02/26/09	0.5	U	NA		NA		NA		0.00755	UU	1,300		50	U	510		1,835	
	04/23/09	0.5	U	NA		NA		NA		0.00719	UU	1,100		50	U	230		1,355	
	06/25/09	0.5	U	NA		NA		NA		0.0071876	UU	520		50	U	370		915	
	08/20/09	0.5	U	NA		NA		NA		0.011948	UU	290		50	U	71		386	
	10/30/09	0.5	U	NA		NA		NA		0.01255	UU	1,500		50	U	700		2,225	
	01/20/10	NA		NA		NA		NA		NA		1,100		50	U	500		1,625	
	04/21/10	NA		NA		NA		NA		NA		1,100		50	U	460		1,585	
	07/22/10	NA		NA		NA		NA		NA		1,500		50	U	550		2,075	
	10/29/10	0.5	U	NA		NA		NA		0.0119225	UU	2,500		50	U	1,400		3,925	
	03/23/11	NA		NA		NA		NA		NA		1,600		50	U	1,000		2,625	
	06/16/11	NA		NA		NA		NA		NA		1,800		50	U	520		2,345	
	09/28/11	NA		NA		NA		NA		NA		29	U	50	U	67	U	74	UU
	12/16/11	0.2	U	NA		NA		NA		0.00732	UU	28	U	50	U	66	U	72	UU

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L) B		T		E		X		Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-108*	10/23/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00733	UU	243	U	50	U	485	U	389	UU
	12/11/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	243	U	50	U	485	U	389	UU
	02/26/09	0.5	U	NA		NA		NA		0.00712	UU	31	U	50	U	71	U	77	UU
	04/23/09	2.5	U W	NA		NA		NA		0.00712	UU	39		250	UW	66	U	197	
	06/25/09	0.5	U	NA		NA		NA		0.0071876	UU	28	U	50	U	66	U	72	UU
	08/20/09	0.5	U	NA		NA		NA		0.011897	UU	36		50	U	68	U	95	
	10/30/09	0.5	U	NA		NA		NA		0.013805	UU	40		50	U	71	U	101	
	01/20/10	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	04/21/10	NA		NA		NA		NA		NA		75		50	U	67	U	134	
	07/22/10	NA		NA		NA		NA		NA		76		50	U	76	U	139	
	10/29/10	0.5	U	NA		NA		NA		0.0119225	UU	29	U	50	U	67	U	73	UU
	03/23/11	NA		NA		NA		NA		NA		33		50	U	67	U	92	
	06/16/11	NA		NA		NA		NA		NA		140		50	U	68	U	199	
	09/28/11	NA		NA		NA		NA		NA		30	U	50	U	69	U	75	UU
	12/16/11	0.2	U	NA		NA		NA		0.00717	UU	29	U	50	U	67	U	73	UU
MW-109*	10/23/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0077	UU	253	U	50	U	505	U	404	UU
	12/12/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00733	UU	248	U	50	U	495	U	397	UU
	02/26/09	0.5	U	NA		NA		NA		0.008381	UU	32	U	50	U	75	U	79	UU
	04/23/09	0.5	U	NA		NA		NA		0.00719	UU	29	U	50	U	67	U	73	UU
	06/25/09	0.5	U	NA		NA		NA		0.0071876	UU	29	U	50	U	67	U	73	UU
	08/20/09	0.5	U	NA		NA		NA		0.011897	UU	29	U	50	U	67	U	73	UU
	10/30/09	0.5	U	NA		NA		NA		0.011897	UU	29	U	50	U	67	U	73	UU
	01/20/10	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	04/21/10	NA		NA		NA		NA		NA		55		50	U	67	U	114	
	07/22/10	NA		NA		NA		NA		NA		31	U	50	U	72	U	77	UU
	10/29/10	0.5	U	NA		NA		NA		0.011897	UU	29	U	50	U	67	U	73	UU
	03/23/11	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	06/16/11	NA		NA		NA		NA		NA		96		50	U	100		221	
	09/28/11	NA		NA		NA		NA		NA		32	U	50	U	75	U	79	UU
	12/16/11	0.2	U	NA		NA		NA		0.0072	UU	29		50	U	66	U	87	
MW-129R*	10/24/08	0.50	U	0.50	U	0.50	U	1.12		0.0074	UU	250	U	68.1		500	U	443	
	12/12/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00755	UU	245	U	50	U	490	U	393	UU
	02/27/09	0.5	U	NA		NA		NA		0.007263	UU	1,900		50	U	730		2,655	
	04/27/09	0.5	U	NA		NA		NA		0.00719	UU	1,400		50	U	250		1,675	
	06/26/09	0.5	U	NA		NA		NA		0.0074745	UU	1,700		50	U	1,000		2,725	
	08/21/09	0.5	U	NA		NA		NA		0.011948	UU	3,400		50	U	1,000		4,425	
	10/28/09	0.5	U	NA		NA		NA		0.0125245	UU	1,900		50	U	240		2,165	
	01/21/10	NA		NA		NA		NA		NA		1,800		50	U	650		2,475	
	04/22/10	NA		NA		NA		NA		NA		1,600		50	U	390		2,015	
	07/22/10	NA		NA		NA		NA		NA		1,800		50	U	400		2,225	
	11/01/10	0.5	U	NA		NA		NA		0.011897	UU	1,900		50	U	700		2,625	
	03/23/11	NA		NA		NA		NA		NA		1,700 [1,700]		50 [50]	UU	550 [650]		2,275 [2,375]	
	06/17/11	NA		NA		NA		NA		NA		1,600		50	U	310		1,935	
	09/28/11	NA		NA		NA		NA		NA		2,700		50	U	230		2,955	
	12/19/11	0.2		NA		NA		NA		0.00717	UU	45		50	U	67	U	104	

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
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11720 Unoco Road
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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		B		T		E		X											
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-135*	10/27/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	243	U	50	U	485	U	389	UU
	12/15/08	0.5	U	0.5	U	0.5	U	1.00	U	0.00712	UU	238	U	50	U	476	U	382	UU
	02/27/09	0.5	U	NA		NA		NA		0.07928	UU	800		50	U	870		1,695	
	04/24/09	0.5	U	NA		NA		NA		0.00712	UU	310		50	U	67	U	369	
	06/29/09	0.5	U	NA		NA		NA		0.007399	UU	1,600		50	U	1,000		2,625	
	08/24/09	0.5	U	NA		NA		NA		0.0119735	UU	1,900		50	U	640		2,565	
	10/29/09	0.5	U	NA		NA		NA		0.011897	UU	2,000		50	U	520		2,545	
	01/21/10	NA		NA		NA		NA		NA		460		50	U	360		845	
	04/23/10	NA		NA		NA		NA		NA		610		50	U	400		1,035	
	07/22/10	NA		NA		NA		NA		NA		1,400		50	U	200		1,625	
	11/01/10	0.5	U	NA		NA		NA		0.012499	UU	1,800		50	U	590		2,415	
	03/24/11	NA		NA		NA		NA		NA		500		50	U	170		695	
	06/17/11	NA		NA		NA		NA		NA		550		50	U	210		785	
	09/28/11	NA		NA		NA		NA		NA		29	U	50	U	69	U	75	UU
	12/16/11	0.2	U	NA		NA		NA		0.0072	UU	79		50	U	110		214	
MW-136*	10/27/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00755	UU	243	U	50	U	485	U	389	UU
	12/15/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	243	U	60.6		485	U	425	
	02/27/09	2.5		NA		NA		NA		0.00712	UU	2,400		120		490		3,010	
	04/24/09	1.9		NA		NA		NA		0.00944	UU	1,400		52		170		1,622	
	06/29/09	0.8		NA		NA		NA		0.007938	UU	2,500		50	U	1,200		3,725	
	08/24/09	0.6		NA		NA		NA		0.011897	UU	1,600		50	U	560		2,185	
	10/29/09	0.5	U	NA		NA		NA		0.0125245	UU	2,100		50	U	460		2,585	
	01/21/10	NA		NA		NA		NA		NA		980		50	U	540		1,545	
	04/23/10	NA		NA		NA		NA		NA		1,100		50	U	410		1,535	
	07/22/10	NA		NA		NA		NA		NA		1,300		50	U	250		1,575	
	11/01/10	0.5	U	NA		NA		NA		0.011897	UU	1,200		50	U	460		1,685	
	03/24/11	NA		NA		NA		NA		NA		540		50	U	78		643	
	06/17/11	NA		NA		NA		NA		NA		510		50	U	110		645	
	09/28/11	NA		NA		NA		NA		NA		40		50	U	67	U	99	
	12/16/11	0.2	U	NA		NA		NA		0.0072	UU	40		50	U	71	U	101	
MW-139R*	10/22/08	0.50	U	0.50	U	0.724		1.00	U	0.00726	UU	240	U	57	JZ	481	U	418	J
	12/10/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	248	U	50	U	495	U	397	UU
	02/25/09	0.5	U	NA		NA		NA		0.0083805	UU	42		50	U	73	U	104	
	04/23/09	0.5	U	NA		NA		NA		0.008	UU	31	U	50	U	72	U	77	UU
	06/25/09	0.5	U	NA		NA		NA		0.00733105	UU	63		50	U	69	U	123	
	08/20/09	0.5	U	NA		NA		NA		0.0119735	UU	87		50	U	66	U	145	
	10/28/09	0.5	U	NA		NA		NA		0.0119735	UU	78		50	U	70	U	138	
	01/20/10	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		31 [36]		50 [50]	U	70 [70]	U	91 [96]	
	04/21/10	NA		NA		NA		NA		NA		34	U	50	U	78	U	81	UU
	07/21/10	NA		NA		NA		NA		NA		66		50	U	80	U	131	
	10/28/10	0.5	U	NA		NA		NA		0.0119225	UU	64		50	U	66	U	122	
	03/23/11	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	06/16/11	NA		NA		NA		NA		NA		56		50	U	870	XX	951	XX
	09/27/11	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	12/15/11	0.2		NA		NA		NA		0.00717	UU	29	U	50	U	67	U	73	UU

Table 3
Summary of Groundwater Analytical Data
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Former Unocal Terminal
11720 Unoco Road
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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		B		T		E		X											
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-500*	10/27/08	0.800		0.50	U	0.93		8.29		0.00712	UU	1,180		298		472	U	1,714	
	12/15/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	245	U	50	U	490	U	393	UU
	02/27/09	0.5	U	NA		NA		NA		0.007928	UU	250		50	U	320		595	
	04/24/09	0.5 [0.5]	U	NA [NA]		NA [NA]		NA [NA]		0.00712 [0.00755]	UU	44 [35]		50 [50]	U	76 [75]	U	107 [98]	
	06/29/09	0.5	U	NA		NA		NA		0.0078021		1,400		50	U	500		1,925	
	08/21/09	0.6		NA		NA		NA		0.012499	UU	2,200		110		690		3,000	
	10/29/09	0.5	U	NA		NA		NA		0.011897	UU	1,000		50	U	500		1,525	
	01/21/10	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		36 [29]	[U]	50 [50]	U	70 [69]	[U]	131 [74]	
	04/22/10	NA		NA		NA		NA		NA		59		50	U	68	U	118	
	07/22/10	NA		NA		NA		NA		NA		490		50	U	96		611	
	11/01/10	0.5	U	NA		NA		NA		0.011897	UU	170		50	U	67	U	229	
	03/24/11	NA		NA		NA		NA		NA		32		50	U	68	U	91	
	06/17/11	NA		NA		NA		NA		NA		130		50	U	67	U	189	
	09/28/11	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		61 [45]		60 [62]		69 [68]	U	155 [141]	
	12/16/11	0.2	U	NA		NA		NA		0.008	UU	28	U	50	U	66	U	72	UU
MW-501*	10/24/08	0.50	U	1.42		1.15		1.00	U	0.00838	UU	6,690	J	1,040		597	J	8,327	J
	12/15/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	243	U	50	U	485	U	389	UU
	03/02/09	0.5 [5.0]	U	NA [NA]		NA [NA]		NA [NA]		0.00755 [0.00755]	UU	630 [550]		50 [50]	U	160 [210]		815 [785]	
	04/24/09	0.5	U	NA		NA		NA		0.00719	UU	350		50	U	67		442	
	06/26/09	0.5	U	NA		NA		NA		0.007399	UU	1,700		50	U	1,100		2,825	
	08/21/09	0.5	U	NA		NA		NA		0.01255	UU	2,600		50	U	760		3,385	
	10/29/09	0.5	U	NA		NA		NA		0.0125245	UU	75		50	U	73	U	137	
	01/21/10	NA		NA		NA		NA		NA		75		50	U	67	U	134	
	04/22/10	NA		NA		NA		NA		NA		130		50	U	69	U	190	
	07/22/10	NA		NA		NA		NA		NA		470		50	U	97		592	
	11/01/10	0.5	U	NA		NA		NA		0.0125245	UU	230		50	U	68	U	289	
	03/24/11	NA		NA		NA		NA		NA		89		50	U	67	U	148	
	06/17/11	NA		NA		NA		NA		NA		340		50	U	82		447	
	09/28/11	NA		NA		NA		NA		NA		30	U	50	U	67	U	74	UU
	12/16/11	0.2	U	NA		NA		NA		0.00717	UU	28	U	50	U	66	U	72	UU
MW-502	10/24/08	0.50	U	0.50	U	0.891		1.00	U	0.00755	UU	347		1,100	JZ	500	U	1,697	J
	12/12/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00755	UU	321	JX	874		485	U	1,438	J
	02/25/09	0.5	U	NA		NA		NA		0.00755	UU	31	U	1,500		72	U	1,552	
	04/22/09	0.5	U	NA		NA		NA		0.0712	UU	370		1,100		66	U	1,503	
	06/26/09	0.5 [0.5]	U	NA [NA]		NA [NA]		NA [NA]		0.0071876 [0.0071876]	UU	260 [220]		170 [160]		82 [66]	[U]	512 [413]	
	08/21/09	0.5	U	NA		NA		NA		0.011897	UU	140		50	U	67	U	199	
	10/28/09	0.5	U	NA		NA		NA		0.011897	UU	370		470		66	U	873	
	01/21/10	NA		NA		NA		NA		NA		300		800		130		1,230	
	04/22/10	NA		NA		NA		NA		NA		290		520		67	U	844	
	07/21/10	NA		NA		NA		NA		NA		200		50	U	68	U	259	
	10/28/10	0.5	U	NA		NA		NA		0.0125245	UU	98		50	U	75	U	161	
	06/17/11	NA		NA		NA		NA		NA		150		50	U	67	U	209	
	12/16/11	0.2	U	NA		NA		NA		0.0072	UU	30		50	U	66	U	88	

Table 3
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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		B		T		E		X											
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-503	10/27/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00712	UU	236	U	50	U	472	U	379	UU
	12/12/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00726	UU	243	U	50	U	485	U	389	UU
	02/26/09	0.5	U	NA		NA		NA		0.007928	UU	77		50	U	74	U	139	
	04/22/09	0.5	U	NA		NA		NA		0.00719	UU	130		50	U	68	U	189	
	06/26/09	0.5	U	NA		NA		NA		0.0071876	UU	210		50	U	96		331	
	08/21/09	0.5	U	NA		NA		NA		0.011897	UU	140		50	U	67	U	199	
	10/28/09	0.5	U	NA		NA		NA		0.011897	UU	160		50	U	66	U	218	
	01/21/10	NA		NA		NA		NA		NA		150		50	U	190		365	
	04/22/10	NA		NA		NA		NA		NA		30	U	50	U	70	U	75	UU
	07/21/10	NA		NA		NA		NA		NA		220		50	U	68	U	279	
	10/28/10	0.5	U	NA		NA		NA		0.01255	UU	150		50	U	79		254	
	06/17/11	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		140 [160]		50 [50]	U	67 [67]	U	199 [219]	
	12/15/11	0.2	U	NA		NA		NA		0.00717	UU	28	U	50	U	66	U	72	UU
MW-504	10/24/08	7.03		0.50	U	4.03		2.95		0.00838	UU	248	U	329		495	U	701	
	12/12/08	0.5 [5.0]	U	0.5 [5.0]	U	0.5 [5.0]	U	1.00 [1.00]	U	0.00755 [0.00747]	UU	248 [250]	U	50.0 [50.0]	U	495 [500]	U	397 [400]	UU
	02/27/09	0.5	U	NA		NA		NA		0.00728	UU	30	U	50	U	70	U	75	UU
	04/24/09	0.5	U	NA		NA		NA		0.00712	UU	46		50	U	66	U	104	
	06/26/09	0.5	U	NA		NA		NA		0.0071876	UU	220		50	U	73	U	282	
	08/21/09	0.5	U	NA		NA		NA		0.011897	UU	220		50	U	68	U	279	
	10/28/09	0.5	U	NA		NA		NA		0.0119735	UU	95		50	U	66	U	153	
	01/21/10	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	04/22/10	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	07/21/10	NA		NA		NA		NA		NA		110		50	U	75	U	173	
	10/28/10	0.5	U	NA		NA		NA		0.011897	UU	110		50	U	66	U	168	
	06/17/11	NA		NA		NA		NA		NA		60		50	U	68	U	119	
	12/16/11	0.2 [0.2]	U	NA [NA]		NA [NA]		NA [NA]		0.0072 [0.0072]	UU	28 [29]	U	50 [50]	U	66 [68]	U	72 [74]	UU
MW-505	10/24/08	0.5 [5.0]	U	0.5 [5.0]	UJ	0.50 [2.78]	U	1.01 [1.00]	[U]	0.00755 [0.00726]	UU	253 [250]	U	50.0 [50.0]	U	505 [500]	U	404 [400]	UU
	12/15/08	0.5 [5.0]	U	0.5 [5.0]	U	0.50 [0.647]	U	1.00 [1.00]	U	0.00712 [0.00712]	UU	238 [238]	U	50.0 [50.0]	U	476 [476]	U	382 [382]	UU
	02/27/09	0.5	U	NA		NA		NA		0.00755	UU	52		50	U	78	U	116	
	04/22/09	0.5	U	NA		NA		NA		0.00807		59		50	U	67	U	118	
	06/26/09	0.5	U	NA		NA		NA		0.00733105	UU	39		50	U	100		164	
	08/21/09	0.5	U	NA		NA		NA		0.0125245	UU	98		50	U	75	U	161	
	10/28/09	0.5	U	NA		NA		NA		0.011897	UU	67		50	U	69	U	127	
	01/20/10	NA		NA		NA		NA		NA		30	U	50	U	71	U	76	UU
	04/22/10	NA		NA		NA		NA		NA		30	U	50	U	69	U	75	UU
	07/21/10	NA		NA		NA		NA		NA		220		50	U	67	U	279	
	10/29/10	0.5	U	NA		NA		NA		0.01255	UU	130		50	U	74	U	192	
	06/17/11	NA		NA		NA		NA		NA		100		50	U	67	U	159	
	12/15/11	0.2	U	NA		NA		NA		0.0072	UU	29	U	50	U	67	U	73	UU

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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		B		T		E		X											
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-506	10/24/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	245	U	50	U	490	U	393	UU
	12/12/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	248	U	50	U	495	U	397	UU
	02/27/09	0.5	U	NA		NA		NA		0.007399	UU	37		50	U	70	U	97	
	04/24/09	0.5	U	NA		NA		NA		0.00755	UU	31	U	50	U	72	U	77	UU
	06/26/09	0.5	U	NA		NA		NA		0.00733105	UU	38		50	U	140		203	
	08/21/09	0.5	U	NA		NA		NA		0.01255	UU	85		50	U	75	U	148	
	10/30/09	0.5	U	NA		NA		NA		0.01556	UU	50		50	U	74	U	112	
	01/21/10	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	04/22/10	NA		NA		NA		NA		NA		36		50	U	75	U	99	
	07/21/10	NA		NA		NA		NA		NA		57		50	U	68	U	116	
	10/29/10	0.5 [0.5]	U	NA [NA]		NA [NA]		NA [NA]		0.011897 [0.012499]	UU	97 [72]		50 [50]	U	72 [71]	U	158 [133]	
	06/16/11	NA		NA		NA		NA		NA		50		50	U	67	U	109	
	12/15/11	0.2	U	NA		NA		NA		0.0072	UU	29	U	50	U	67	U	73	UU
MW-507	10/24/08	0.995		0.50	U	0.50	U	1.00	U	0.00733	UU	240	U	523		481	U	884	
	12/12/08	0.605		0.50	U	0.50	U	1.00	U	0.00747	UU	245	U	194		490	U	562	
	02/27/09	0.5 [5.0]	U	NA [NA]		NA [NA]		NA [NA]		0.007331 [0.7331]	UU	610 [560]		120 [130]		310 [120]		1,040 [810]	
	04/24/09	0.5	U	NA		NA		NA		0.00747	UU	520		59		74	U	616	
	06/26/09	0.5	U	NA		NA		NA		0.0072631	UU	640		62		440		1,142	
	08/21/09	0.5 [0.5]	U	NA [NA]		NA [NA]		NA [NA]		0.0125245 [0.012499]	UU	450 [500]		54 [50]	[U]	69 [72]	U	539 [561]	
	10/28/09	0.5	U	NA		NA		NA		0.01255	UU	900		50	U	88		1,013	
	01/21/10	NA		NA		NA		NA		NA		270		50	U	88		383	
	04/22/10	NA		NA		NA		NA		NA		290		50	U	91		406	
	07/21/10	NA		NA		NA		NA		NA		330		50	U	80		435	
	10/29/10	0.5	U	NA		NA		NA		0.0119225	UU	370		50	U	220		615	
	06/17/11	NA		NA		NA		NA		NA		200		50	U	88		313	
	12/16/11	0.2 [0.2]	U	NA [NA]		NA [NA]		NA [NA]		0.00717 [0.00717]	UU	28 [29]	U	50 [50]	U	66 [67]	U	72 [73]	UU
MW-508	10/24/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00755	UU	243	U	50	U	485	U	389	UU
	12/11/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00763	UU	243	U	50	U	485	U	389	UU
	02/26/09	0.5	U	NA		NA		NA		0.00712	UU	85		50	U	74	U	147	
	04/23/09	0.5	U	NA		NA		NA		0.00815	UU	90		50	U	70	U	150	
	06/25/09	0.5 [0.5]	U	NA [NA]		NA [NA]		NA [NA]		0.007399 [0.007399]	UU	430 [310]		50 [50]	U	290 [310]		745 [645]	
	08/21/09	0.5	U	NA		NA		NA		0.0119735	UU	200		50	U	67	U	259	
	10/28/09	0.5 [0.5]	U	NA [NA]		NA [NA]		NA [NA]		0.011948 [0.0125245]	UU	71 [68]		50 [50]	U	67 [70]	U	130 [128]	
	01/20/10	NA [NA]		NA [NA]		NA [NA]		NA [NA]		NA [NA]		29 [28]	U	50 [50]	U	67 [66]	U	73 [72]	UU
	04/22/10	NA		NA		NA		NA		NA		31	U	50	U	72	U	77	UU
	07/21/10	NA		NA		NA		NA		NA		270		50	U	76	U	333	
	10/28/10	0.5	U	NA		NA		NA		0.011897	UU	64		50	U	66	U	122	
	06/16/11	NA		NA		NA		NA		NA		150		50	U	67	U	209	
	12/15/11	0.2	U	NA		NA		NA		0.0072	UU	29	U	50	U	67	U	73	UU

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		Diesel[3] (µg/L)		Gasoline[4] (µg/L)		Heavy Oil[3] (µg/L)		Total TPH[5] (µg/L)	
		B		T		E		X											
		CUL=51								CUL=0.018								CUL=706 (West Side) 506 (East Side)	
MW-509	10/23/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00733	UU	243	U	50	U	485	U	389	UU
	12/11/08	0.50	U	0.50	U	0.50	U	1.00	U	0.0074	UU	243	U	50	U	485	U	389	UU
	02/25/09	0.5	U	NA		NA		NA		0.00755	UU	32	U	50	U	75	U	74	UU
	04/23/09	0.5	U	NA		NA		NA		0.00747	UU	31	U	50	U	71	U	76	UU
	06/25/09	0.5	U	NA		NA		NA		0.00733105	UU	29		50	U	68	U	88	
	08/21/09	0.5	U	NA		NA		NA		0.0119735	UU	46		50	U	70	U	106	
	10/28/09	0.5	U	NA		NA		NA		0.0119735	UU	48		50	U	76	U	111	
	01/20/10	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	04/21/10	NA		NA		NA		NA		NA		43		50	U	68	U	102	
	07/21/10	NA		NA		NA		NA		NA		34 [34]		50 [50]	U	75 [74]	U	97 [96]	
	10/28/10	0.5	U	NA		NA		NA		0.012499	UU	40		50	U	76	U	103	
	06/16/11	NA		NA		NA		NA		NA		29	U	50	U	67	U	73	UU
	12/15/11	0.2	U	NA		NA		NA		0.00717	UU	29	U	50	U	67	U	73	UU
MW-510*	10/23/08	6.89		0.832		0.540		4.93		0.149	UU	3,400		332	JZ	495	U	3,980	J
	12/11/08	5.44		0.50	U	0.50	U	3.98		0.0747	UU	4,920		244		485	U	5,407	
	02/26/09	9.4		NA		NA		NA		0.031786	UU	14,000		430		3900	U	16,380	
	04/27/09	14		NA		NA		NA		0.00733	UU	21,000		530		1,400		22,930	
	06/24/09	18		NA		NA		NA		0.014868		22,000		490		2,600		25,090	
	08/20/09	8.4		NA		NA		NA		0.011897	UU	16,000		430		3,300	U	18,080	
	10/28/09	Not sampled due to the presence of LNAPL																	
	01/19/10	Not sampled due to the presence of LNAPL																	
	04/20/10	Not sampled due to the presence of LNAPL																	
	07/19/10	Not sampled due to the presence of LNAPL																	
	10/25/10	Not sampled due to the presence of LNAPL																	
	03/22/11	Not sampled due to the presence of LNAPL																	
	06/20/11	NA		NA		NA		NA		NA		12,000		200		3,100		15,300	
	09/28/11	Not sampled due to the presence of LNAPL																	
	12/13/12	Not sampled due to the presence of LNAPL																	
MW-511	10/24/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00755	UU	250	U	50	U	500	U	400	UU
	12/12/08	0.50	U	0.50	U	0.50	U	1.00	U	0.00747	UU	243	U	50	U	485	U	389	UU
	02/25/09	0.5	U	NA		NA		NA		0.00711965	UU	30	U	50	U	70	U	75	UU
	04/21/09	0.5	U	NA		NA		NA		0.00712	UU	28	U	50	U	66	U	72	UU
	06/24/09	0.5 [0.5]	U	NA		NA		NA		0.0071876 [0.0071876]	UU	28 [28]	U	50 [50]	U	66 [66]	U	72 [72]	UU
	08/19/09	0.5	U	NA		NA		NA		0.0119225	UU	32		50	U	74	U	94	
	10/28/09	0.5 [0.5]	U	NA [NA]		NA [NA]		NA [NA]		0.011897 [0.0119225]	UU	33 [28]	[U]	50 [50]	U	65 [65]	U	91 [72]	[UU]
	01/20/10	NA		NA		NA		NA		NA		28	U	50	U	66	U	72	UU
	04/22/10	NA		NA		NA		NA		NA		32	U	50	U	75	U	79	UU
	07/22/10	NA		NA		NA		NA		NA		72		50	U	67	U	131	
	10/28/10	0.5	U	NA		NA		NA		0.011897	UU	36		50	U	67	U	95	
	06/17/11	NA		NA		NA		NA		NA		100		50	U	70	U	160	
	12/19/11	0.2	U	NA		NA		NA		0.00717	UU	29	U	50	U	67	U	73	UU

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)				Total cPAHs Adjusted for Toxicity[2] (µg/L)	Diesel[3] (µg/L)	Gasoline[4] (µg/L)	Heavy Oil[3] (µg/L)	Total TPH[5] (µg/L)
		B	T	E	X					
		CUL=51				CUL=0.018				CUL=706 (West Side) 506 (East Side)
MW-512	10/23/08	1.97	0.50 U	2.96	5.23	0.00763 UU	250 U	348	500 U	723
	12/11/08	2.50	0.50 U	2.17	3.58	0.0074 UU	243 U	320	485 U	684
	02/25/09	1.5	NA	NA	NA	0.00712 UU	390	280	78	748
	04/21/09	2.7 [3.7]	NA [NA]	NA [NA]	NA [NA]	0.00712 [0.00712] UU	260 [220]	240 [280]	67 [66] U	534 [533]
	06/24/09	0.8	NA	NA	NA	0.0072631 UU	180	84	78	342
	08/19/08	1.3	NA	NA	NA	0.011897 UU	220	110	66 U	363
	10/27/09	0.6	NA	NA	NA	0.011897 UU	190	92	67 U	316
	01/20/10	NA	NA	NA	NA	NA	300	200	75	575
	04/21/10	NA	NA	NA	NA	NA	420	110	140	670
	07/21/10	NA	NA	NA	NA	NA	150	82	67 U	266
	10/28/10	0.5 U	NA	NA	NA	0.011897 UU	220	93	67 U	347
	06/16/11	NA [NA]	NA [NA]	NA [NA]	NA [NA]	NA [NA]	200 [190]	74 [79]	67 [67] U	308 [303]
	12/15/11	0.40	NA	NA	NA	0.00717 UU	33	120	68 U	187
MW-513	10/23/08	0.702	0.50 U	0.50 U	3.81	0.00755 UU	245 U	564 JZ	490 U	932 J
	12/10/08	0.793	0.50 U	0.50 U	1.21	0.0074 UU	245 U	439	490 U	807
	02/25/09	0.5 [5.0] U	NA [NA]	NA [NA]	NA [NA]	0.00755 [0.00755] UU	330 [300]	470 [440]	72 [74] U	836 [777]
	04/22/09	0.5 U	NA	NA	NA	0.00747 UU	290	330	66 U	653
	06/24/09	0.5 U	NA	NA	NA	0.007399 UU	170	280	75 U	488
	08/20/09	0.5 U	NA	NA	NA	0.0125245 UU	290	280	75 U	608
	10/27/09	0.5 [5.0] U	NA [NA]	NA [NA]	NA [NA]	0.0125245 [0.012499] UU	320 [320]	180 [240]	68 [68] U	534 [594]
	01/20/10	NA	NA	NA	NA	NA	300	210	67 U	544
	04/21/10	NA	NA	NA	NA	NA	290	160	74 U	487
	07/21/10	NA	NA	NA	NA	NA	360	140	67 U	534
	10/28/10	0.5 [0.5] U	NA [NA]	NA [NA]	NA [NA]	0.01255 [0.01255] UU	270 [290]	150 [160]	74 [67] U	457 [484]
	06/16/11	NA	NA	NA	NA	NA	230	100	67 U	364
	12/15/11	0.3	NA	NA	NA	0.00717 UU	38	97	67 U	169
MW-514	10/23/08	2.98	0.640	1.54	4.69	0.00712 UU	253	1020 JZ	490 U	1,518 J
	12/10/08	3.15 [3.40]	0.836 [0.822]	1.82 [1.89]	4.98 [4.95]	0.00733 [0.00755] UU	248 [245] U	801 [831]	495 [490] U	1,173 [1,199]
	02/24/09	2.9	NA	NA	NA	0.007551 UU	710	830	75 U	1,578
	04/21/09	3.5	NA	NA	NA	0.0151 UU	370	680	69 U	1,085
	06/24/09	2.0	NA	NA	NA	0.007399 UU	280	510	70 U	825
	08/19/09	3.2 [2.7]	NA	NA	NA	0.012499 [0.01255] UU	290 [270]	520 [450]	73 [70] U	847 [755]
	10/27/09	2.2	NA	NA	NA	0.011897 UU	400	400	66 U	833
	01/20/10	NA	NA	NA	NA	NA	200	340	69 U	575
	04/21/10	NA	NA	NA	NA	NA	340	270	71 U	646
	07/21/10	NA	NA	NA	NA	NA	420	170	67 U	624
	10/27/10	1.5	NA	NA	NA	0.011948 UU	250	290	70 U	575
	06/16/11	NA	NA	NA	NA	NA	230	170	67 U	434
	12/14/11	0.5	NA	NA	NA	0.0072 UU	39	150	67 U	223

Table 3
Summary of Groundwater Analytical Data
Petroleum and Polynuclear Aromatic Hydrocarbons
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L) B	T	E	X	Total cPAHs Adjusted for Toxicity[2] (µg/L)	Diesel[3] (µg/L)	Gasoline[4] (µg/L)	Heavy Oil[3] (µg/L)	Total TPH[5] (µg/L)
		CUL=51				CUL=0.018				CUL=706 (West Side) 506 (East Side)
MW-515	10/22/08	1.86 [1.92]	1.35 [1.40]	1.00 [1.07]	4.47 [4.70]	0.00740 [0.00740] UU	248 [248] U	575 [603] JZ	495 [495] U	947 [975] J
	12/10/08	0.50 U	0.50 U	0.50 U	1.00 U	0.0074 UU	243 U	100	485 U	464
	02/24/09	0.5 U	NA	NA	NA	0.00773311 UU	71	69	68 U	174
	04/22/09	0.5 U	NA	NA	NA	0.0074 UU	77	59	69 U	171
	06/24/09	0.5 U	NA	NA	NA	0.00733105 UU	170	85	76 U	293
	08/20/09	0.5 [0.5] U	NA	NA	NA	0.012499 [0.0125245] UU	200 [340]	63 [110]	75 [75] U	301 [488]
	10/27/09	0.5 U	NA	NA	NA	0.012499 UU	79	50 U	70 U	139
	01/20/10	NA	NA	NA	NA	NA	34	50 U	69 U	94
	04/21/10	NA	NA	NA	NA	NA	32	50 U	67 U	91
	07/21/10	NA	NA	NA	NA	NA	120	50 U	66 U	178
	10/27/10	0.5 U	NA	NA	NA	0.0119225 UU	52	50 U	67 U	111
	06/16/11	NA	NA	NA	NA	NA	200	50 U	67 U	259
	12/14/11	0.2 U	NA	NA	NA	0.008	28 U	50 U	66 U	72 UU

Notes:

[1]B= benzene, T= toluene, E= ethylbenzene, X= xylenes. BTEX analyzed by EPA Method 8021B.

[2]cPAHs = Carcinogenic Polynuclear Aromatic Hydrocarbons. Analyzed by EPA Method 8270C-HVI. cPAHs adjusted for toxicity according to WAC 173-340-708(8) and *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors*. Office of Environmental Health Hazard Assessment, California EPA. May 2005. If one or more adjusted cPAH constituents were reported as Non-Detect, half of the reporting limt was used in calculations.

[3]Diesel and Heavy Oil (Lube) analyzed by method NWTPH-D Extended.

[4]Gasoline analyzed by method NWTPH-G.

[5]TPH = Total petroleum hydrocarbons. Total TPH calculated by summing the concentrations of gasoline, diesel and heavy oil. For results which did not exceed method reporting limits, half of the reporting limit was added to determine Total TPH.

(µg/L) = micrograms per liter.
CUL = Cleanup level.
EPA = Environmental Protection Agency.
* = Denotes Point of Compliance (POC) wells.
[ ] = Bracketed data indicate duplicate samples.
Highlighted cell = Exceeds site specific CUL.
Bold values indicate the most recent sampling event.
LNAPL = Light non-aqueous phase liquid.
NA = Not Analyzed.

Lab Qualifiers	Definition
D	Compound quantitated using a secondary dilution.
J	Indicates an estimated value.
JX	Results in the diesel organic range are primarily due to overlap from a gasoline range product.
JZ	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons.
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UJ	The compound was analyzed for but not detected. The associated value is the estimated compound
UU	The constituents making up the total are all non-detects.
W	Due to excessive foaming of the sample, normal reporting limits were not attained.
XX	Sample was collected as part of a matrix spike/ matrix spike duplicate (MS/MSD). Anomolous detection of HO was re-analyzed. The sample extract was re-injected and confirmed the reported results. The sample was re-extracted past the method hold time. Results from the re-extraction are N.D. (<MDL) for both DRO and HO. Since the hold time had expired prior to the re-extraction, all reported data is taken from the original extraction.

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
LM-2	10/23/08	57.54	3.51	17,373.54	0.39	222.94	5.00 U	914	1 UJ	28.1	0.349	4.0
	12/11/08	53.17	3.89	13,859.08	0.17	338.86	5.00 U	942	0.200 U	46.9	0.358	5.0
	02/26/09	49.78	3.82	12,912.70	1.62	371.08	0.460 U	915	0.250 U	59	0.367	3.2
	04/23/09	51.06	4.91	11,367.56	7.37	133.42	9.7	768	0.250 U	50	0.298	6.0
	06/25/09	55.63	5.36	17,476.72	3.18	-38.23	43.4	1,280	0.640	41	0.239	6.0
	08/20/09	60.42	6.03	23,943.90	5.43	-93.49	90.6	2,220	0.250 UW	25 P	0.277	6.0
	10/30/09	56.50	4.16	5,546.90	0.91	325.52	30.2	401	0.250 U	15	0.292	7.5
	10/29/10	59.54	5.27	12,292.11	1.08	27.03	90.4	385	5.000 U	760	0.196	5.2
	12/16/11	49.80	4.12	17,054.02	0.85	370	460 U	829	0.250 U	85	0.309	3.4
MW-8R	10/21/08	61.34	6.65	860.34	-0.02	-100.66	217	50.6	0.200 U	304	1.49	1.2
	12/09/08	54.32	6.83	494.30	0.40	-132.57	180	58.1	0.200 U	299	0.664	1.2
	02/23/09	47.03	6.75	426.42	0.42	-23.66	155	69.9	0.250 U	210	0.682	1.0
	04/21/09	49.17	6.81	309.61	0.54	-167.35	134	47.5	0.250 U	21	0.375	0.0
	06/23/09	61.01	6.69	404.48	0.22	17.20	168	45.70	0.250 U	100	0.719	2.0
	08/18/09	68.36	6.55	568.94	0.11	-5.74	208	40.6	0.250 U	240	0.945	1.0
	10/26/09	62.15	6.73	1,126.47	3.00	201.58	138	503	0.380	120	0.418	0.5
	10/26/10	60.46	6.68	1,272.61	3.23	-24.65	223	376	0.250 U	220	0.497	1.0
	12/14/11	52.84	6.57	663.65	0.75	-10.00	185	70.9	0.250 U	150	0.780	0.2
MW-20R	10/22/08	55.85	6.68	10,026.36	0.15	-63.43	306	283	0.200 U	771	2.97	6.0
	12/10/08	54.77	6.63	7,040.07	0.00	-88.61	263	238	0.200 U	886	1.63	4.0
	02/24/09	49.87	6.89	2,668.49	0.11	-94.36	271	77.7	0.250 U	3,300	0.404	2.0
	04/22/09	48.29	6.77	1,613.57	0.53	-71.76	250	33.6	0.250 U	2,800	0.293	5.5
	06/24/09	54.32	6.73	6,859.37	0.44	-54.70	234	287	0.390	160	1.24	3.5
	08/19/09	58.26	6.72	12,573.84	0.18	-122.78	229	592	0.250 U	900	2.49	6.0
	10/27/09	57.49	6.43	11,374.52	0.61	-95.09	153	520	2.80	340	1.41	2.0
	10/27/10	57.29	6.80	30,822.78	0.07	-143.50	128	1,710	1.2	51	0.839	2.6
	12/14/11	53.47	6.56	10,515.91	-0.01	-39.92	220	566	0.250 U	1,400	0.488	2.6
MW-101	10/22/08	59.63	6.13	2,773.56	0.19	64.36	42	96.2	0.210	170	1.33	3.6
	12/10/08	55.79	5.99	1,807.60	0.41	132.69	50	41.0	0.450	708	3.32	2.2
	02/24/09	43.38	6.32	870.43	0.78	49.88	110	70.6	0.390	3,000	2.38	2.4
	04/22/09	49.80	6.19	452.57	3.79	24.22	83	83.3	0.980	300	0.977	1.0
	06/25/09	57.14	6.10	901.96	1.65	129.31	56	135.0	0.250 U	71	1.55	0.5
	08/20/09	64.03	6.15	1,864.72	0.66	48.55	75.8	110	0.250 UW	250 P	2.98	6.0
	10/27/09	59.81	6.11	877.98	1.56	141.54	101	37.5	1.20	1.7	0.185	0.5
	10/27/10	59.43	6.12	3,096.41	2.12	-48.48	108	107	0.250 U	200	1.33	5.0
	12/14/11	54.44	6.54	1,095.90	0.95	100	130	35.3	0.910	320	0.0501	0.0

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-104	10/22/08	58.72	6.26	2,428.46	-0.01	-13.09	35.6	66.6	0.200 U	594	1.02	4.0
	12/10/08	55.07	6.24	982.41	0.22	30.53	53.8	23.1	0.200 U	1,160	1.13	3.0
	02/24/09	49.93	6.08	967.89	0.21	-26.14	58.8	17.0	0.250 U	2,200	1.19	3.2
	04/23/09	48.22	6.23	566.34	1.01	-121.29	59.2	60.2	0.730	1,800	0.959	4.0
	06/24/09	58.33	6.34	506.78	0.21	-62.91	63.90	39.20	0.250 U	1,200	0.714	6.0
	08/19/09	62.87	6.32	1,353.13	0.29	-61.28	75.6	45.0	0.250 U	950	0.901	6.0
	10/27/09	60.10	6.12	2,590.00	0.43	-27.46	110	92.4	0.300	3,200	1.4	4.5
	10/27/10	58.17	6.16	1,640.32	0.04	-86.19	95.1	31.2	0.250 U	1,300	1.3	2.1
	12/13/11	53.28	6.19	863.19	0.14	-10.00	112	52.8	0.530 U	1,700	0.765	3.0
MW-108	10/23/08	53.88	6.26	14,851.80	0.20	-83.53	509	373	1 UJ	2,390 D	0.208	1.4
	12/11/08	50.51	6.29	14,241.04	0.01	-184.14	557	288	0.200 U	1,410 D	0.242	1.2
	02/26/09	50.02	6.28	15,209.47	0.19	-268.28	549	456	0.250 U	3,000	0.263	3.0
	04/23/09	49.14	6.36	14,218.55	0.02	-270.38	517	315	0.250 U	2,400	0.278	3.0
	06/25/09	54.05	6.30	15,829.18	0.72	-132.71	486	507	0.520	2,100	0.284	4.5
	08/20/09	56.41	6.31	16,788.72	0.07	-158.78	525	401	0.250 UW	3,500	0.254	2.0
	10/30/09	55.36	6.31	18,050.49	0.12	-88.09	495	566	0.250 U	2,100	0.267	5.0
	10/29/10	54.88	6.31	23,517.97	0.02	-260.17	475	508	5.0 U	1,600	0.191	1.2
	12/16/11	51.90	6.27	20,084.25	0.07	-110.00	356	426	0.250 U	1,100	0.318	2.0
MW-109	10/23/08	54.91	6.22	16,332.14	1.34	-194.55	342	693	1 UJ	785	1.59	0.6
	12/12/08	51.03	6.29	12,565.11	0.80	-193.01	291	640	0.200 U	560	0.528	0.2
	02/26/09	47.82	6.38	13,623.75	3.97	-179.39	300	993	0.250 U	820	1.21	0.4
	04/23/09	47.97	6.03	8,713.56	1.84	-192.93	316	546	0.250 U	350	1.58	1.0
	06/25/09	54.17	6.21	22,124.79	0.52	-138.25	202	1,660	1.40	570	1.09	3.0
	08/20/09	55.99	6.37	23,873.46	2.33	-155.34	331	1,540	0.250 UW	320 P	1,650	1.0
	10/30/09	55.51	6.00	14,892.73	0.76	-41.77	332	1,200	0.250 U	400	1.38	1.0
	10/29/10	54.34	6.54	23,528.21	3.14	-262.04	348	824	0.250 U	420	1.93	0.1
	12/16/11	50.80	6.35	13,573.50	1.60	-120.00	259	597	0.250 U	310	1.58	1.6
MW-129R	10/24/08	54.76	6.45	839.57	-0.02	-33.84	502	23.8	0.200 U	1,930	5.74	5.8
	12/12/08	51.10	6.62	867.09	0.12	-76.86	469	91.6	0.200 U	1,600 D	10.3	5.4
	02/27/09	47.80	6.50	836.19	0.18	-70.26	505	47.1	0.250 U	6,000	8.56	5.8
	04/27/09	49.18	6.56	822.66	0.17	-116.70	485	60.4	0.250 U	10,000	8.21	10.0
	06/26/09	54.44	6.54	1,301.40	0.07	-79.11	493	64.40	0.250 U	9,100	7.81	9.0
	08/21/09	57.58	6.58	1,013.56	0.06	-286.98	597	51.3	0.250 U	5,400	7.88	9.0
	10/28/09	55.23	6.75	1,919.06	0.05	-161.96	1,150	1.7	0.250 U	15,000	5.22	8.0
	11/01/10	55.53	6.58	1,397.48	0.10	-155.22	742	75.3	0.250 U	5,500	8.92	2.8
	12/19/11	52.20	6.52	1,679.97	0.01	-110.00	1,000	25.2	0.250 U	11,000	7.00	5.0

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-135	10/27/08	54.94	6.51	1,848.03	-0.03	-60.48	959	4.12	0.200 U	10,800 D	2.68	4.0
	12/15/08	49.73	6.59	1,954.54	-0.09	-81.98	1,070	1.43	0.200 U	7,170 D	2.69	2.2
	02/27/09	52.61	6.38	760.32	0.27	22.19	402	79.1	0.250 U	1,100	1.31	3.4
	04/24/09	50.76	6.48	649.63	0.13	-134.17	382	67.2	0.250 U	620	0.743	2.0
	06/29/09	51.44	6.47	1,319.24	1.09	-31.25	752	33.0	0.430	2,600	1.66	6.0
	08/24/09	53.02	6.56	2,049.88	0.29	-60.39	1,140	6.00	0.250 U	11,000	1.67	7.0
	10/29/09	52.90	6.54	2,162.52	0.14	-87.07	1,220	2.4	0.250 U	12,000	1.75	8.0
	11/01/10	54.37	6.46	2,818.70	0.06	-74.99	1,160	1.5 U	0.250 U	12,000	1.24	5.6
	12/16/11	51.80	6.57	1,200.88	0.04	-20.00	425	101	0.250 U	250	0.370	7.0
MW-136	10/27/08	53.88	6.34	2,330.80	0.06	-57.07	851	0.420	0.200 U	16,800 D	3.19	4.2
	12/15/08	46.47	6.31	1,092.68	0.17	-99.68	629	32.5	0.200 U	9,050 D	4.31	2.8
	02/27/09	47.97	6.34	990.82	0.43	-56.64	474	72.1	0.250 U	8,900	4.05	5.6
	04/24/09	49.91	6.41	925.24	0.07	-193.85	405	91.1	0.250 U	13,000	4.62	8.0
	06/29/09	51.53	6.43	975.31	0.37	-75.06	492	72.1	0.250 U	16,000	4.86	7.0
	08/24/09	54.28	6.43	1,020.67	0.14	-92.53	544	36.3	0.250 U	21,000	4.82	10.0
	10/29/09	53.78	6.35	981.76	0.25	-113.64	574	1.50 U	0.250 U	19,000	4.63	7.0
	11/01/10	54.50	6.44	1,147.64	0.05	-140.56	576	1.5 U	0.250 U	17,000	6.13	1.8
	12/16/11	51.90	6.43	2,964,572.75	-0.01	-94.97	523	2.80	0.250 U	20,000	12.6	2.0
MW-139R	10/22/08	63.60	6.87	664.62	0.01	-22.31	243	64.8	0.200 U	864	2.48	1.0
	12/10/08	54.36	6.96	708.71	0.78	15.38	167	76.1	0.200	12.5	0.902	0.5
	02/25/09	43.11	7.06	334.12	3.34	136.11	105	53	0.400	5.0 U	0.115	0.4
	04/23/09	47.34	7.08	180.00	1.66	-104.66	81.4	32.3	0.250 U	10 U	0.0102	0.4
	06/25/09	62.38	7.14	365.34	0.50	-96.96	134	51.5	0.250 U	34	0.523	2.0
	08/20/09	69.85	7.10	439.97	0.22	-108.16	156	49.7	0.250 UW	77 P	0.512	1.0
	10/28/09	60.58	6.95	277.93	1.41	71.75	110	37.5	0.250 U	5.2	0.0215	0.5
	10/28/10	61.92	6.86	447.33	2.11	-69.41	185	60.4	0.250 U	52	0.189	1.0
	12/15/11	51.33	6.99	258.44	2.69	70.00	114	35.2	0.250 U	5.0 U	0.027	0.0
MW-143	10/22/08	59.41	6.49	383.51	0.01	-49.00	142	34.4	0.200 U	2,210 D	1.26	5.4
	12/16/08	50.76	6.39	367.82	0.06	-73.14	194	12.9	0.200 U	7,630 D	3.82	3.2
	02/25/09	49.77	6.32	391.78	0.23	-61.12	229	1.5 U	0.250 U	18,000	4.47	4.2
	04/21/09	51.98	6.44	395.08	0.12	-167.60	220	1.80	0.250 U	17,000	4.28	5.8
	06/24/09	59.07	6.39	418.65	0.37	-130.39	210	1.5 U	0.250 U	15,000	3.67	6.0
	08/19/09	61.70	6.42	379.94	0.06	-84.88	182	9.1	0.250 U	4,100	1.86	2.0
	10/27/09	60.32	6.35	356.97	0.17	-144.82	154	14.5	0.360	4,900	0.868	6.5
	10/27/10	59.34	6.56	268.76	0.51	-174.12	68.5	55.7	0.250 U	620	0.214	3.0
	12/14/11	52.72	6.36	392.01	0.08	-81.55	229	1.50 U	0.250 U	19,000	4.01	5.5

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-147	10/21/08	58.43	6.24	516.46	-0.02	-18.40	131	67.2	0.200 U	330	2.38	5.2
	12/09/08	52.49	6.42	692.37	0.18	-104.13	301	141	0.200 U	895	4.16	6.4
	02/23/09	49.80	6.42	776.76	0.12	-93.21	407	111	0.250 U	1,000	4.86	5.4
	04/21/09	50.50	6.50	629.49	0.09	634.02	334	86.9	0.250 U	1,500	4.08	6.0
	06/23/09	55.54	6.50	696.30	0.04	-108.35	393	49.60	0.250 U	340	3.92	7.0
	08/18/09	60.57	6.46	605.85	0.06	-45.34	272	74.2	0.250 U	610	3.01	7.0
	10/26/09	58.00	6.35	518.53	0.10	-41.83	205	84.6	0.250 U	890	3.26	8.0
	10/26/10	56.07	6.34	426.81	0.20	-74.33	162	83.6	0.250 U	340	2.96	5.2
	12/13/11	52.52	5.99	440.75	0.12	-13.48	181	134	0.640	15	2.61	1.6
MW-149R	10/21/08	58.41	6.56	521.83	0.09	-34.31	225	52.5	0.200 U	1,610 D	0.963	1.6
	12/09/08	52.55	6.22	466.01	0.17	101.87	117	165	0.200 U	224	1.06	0.6
	02/23/09	48.40	6.43	441.39	0.09	82.90	161	133	0.250 U	420	0.507	0.6
	04/21/09	48.99	6.37	329.88	1.25	589.02	115	117	0.710	60	0.216	0.2
	06/23/09	56.35	6.56	556.71	0.01	15.84	217	118	0.250 U	860	0.338	3.0
	08/18/09	62.17	6.56	643.81	0.15	-22.07	256	121	0.250 U	1,100	0.480	3.0
	10/26/09	58.37	6.21	404.24	3.57	203.93	76.4	160	1.600	7.9	0.0113	1.0
	10/26/10	57.49	6.36	501.89	0.55	50.72	150	135	0.770	28	0.140	0.5
	12/13/11	50.53	6.39	277.74	0.67	210.00	79.1	122	1.6	5.0 U	0.0163	0.0
MW-150	10/21/08	58.35	6.52	748.62	-0.05	25.37	444	68.7	0.200 U	622	1.52	1.4
	12/09/08	52.71	6.54	761.44	0.20	32.64	440	134	0.200 U	389	1.52	1.8
	02/23/09	48.38	6.56	586.85	0.14	71.82	371	101	0.250 U	180	1.24	1.0
	04/21/09	48.86	6.69	570.05	0.15	-80.49	341	86.5	0.250 U	50	1.14	1.0
	06/23/09	57.16	6.77	569.79	0.27	31.03	347	60.80	0.250 U	220	0.945	1.0
	08/18/09	62.67	6.61	708.96	0.06	-5.64	403	69.3	0.250 U	350	1.24	1.8
	10/26/09	58.83	6.64	587.23	0.96	70.66	316	73	0.380	51	0.295	1.0
	10/26/10	58.28	6.34	2,521,506.50	0.60	33.14	347	63.6	1.1	110	0.812	1.8
	12/13/11	51.57	6.54	619.48	0.06	3.17	390	89.4	0.380	150	1.37	2.0
MW-500	10/27/08	60.04	6.44	4,499.73	0.05	-10.17	977	172	0.200 U	8,590 D	0.97	4.2
	12/15/08	48.50	6.73	641.64	0.50	76.79	362	134	0.230	1,940 D	0.511	0.0
	02/27/09	44.74	6.77	475.25	0.29	111.07	334	37.7	0.250 U	6,400	0.2	1.2
	04/24/09	50.90	6.73	339.34	0.44	-143.85	263	18.6	0.250 U	39	0.0808	0.4
	06/29/09	59.99	6.38	1,001.85	-0.08	-44.59	464	17,900	0.250 U	16,000	1,340	3.0
	08/21/09	67.41	6.38	1,341.80	0.10	-233.97	647	2.20	0.250 U	15,000	1.82	2.5
	10/29/09	59.42	6.42	734.24	0.16	-104.24	362	131	0.350	13,000	1.97	1.5
	11/01/10	58.82	6.16	735.00	0.07	-145.52	451	22.4	0.250 U	12,000	1.8	5.5
	12/16/11	52.50	6.26	1,101,366.63	0.13	-103.35	175	4.3	0.250 U	9,400	0.344	5.2

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-501	10/24/08	60.21	6.53	3,805.79	-0.02	-27.98	1,700	59.2	0.200 U	10,500 DJ	3.49	5.0
	12/15/08	51.44	6.66	475.85	4.55	91.22	269	55.4	1.73	91.9	0.0552	0.0
	03/02/09	49.42	6.49	434.37	2.35	216.95	317	34.7	1.2	56.0	0.670	0.8
	04/24/09	51.05	6.53	374.33	1.03	-42.42	248	29.7	0.250 U	140	0.694	1.0
	06/26/09	59.01	6.40	1,025.69	0.04	37.36	NA	12.6	0.250 U	16,000	2.8	0.0
	08/21/09	67.17	6.44	1,361.38	0.19	-47.09	752	2.7	0.250 U	13,000	5.0	7.0
	10/29/09	58.23	6.43	366.98	0.24	-105.85	242	26.1	0.250 U	380	4.9	5.0
	11/01/10	59.18	6.26	844.99	0.10	-102.31	509	1.5 U	0.250 U	14,000	4.95	7.2
	12/16/11	52.30	6.31	1,364,320.50	0.02	-162.31	219	5.8	0.250 U	1,400	1.65	4.2
MW-502	10/24/08	59.77	6.31	558.51	0.05	-36.88	98.0	70.2	0.200 U	98.8 D	1.10	6.4
	12/12/08	53.20	6.36	482.08	0.04	-33.02	87.2	63.4	0.200 U	67.0	0.739	3.0
	02/25/09	48.02	6.37	343.38	0.11	-24.32	67.9	56.8	0.250 U	53	0.681	6.4
	04/22/09	50.96	6.36	314.18	0.03	226.34	67.7	48	0.250 U	40	0.635	7.0
	06/26/09	61.26	6.37	379.61	0.14	-57.95	95.0	52.80	0.250 U	33	0.627	6.5
	08/21/09	64.60	6.17	364.92	0.10	-38.59	107	27.6	0.250 U	20 P	0.585	6.0
	10/28/09	60.10	6.34	413.99	0.14	-65.94	153	41.4	0.250 U	45	0.568	6.0
	10/28/10	59.88	6.09	377.99	0.11	31.93	100	30.2	0.250 U	5.2	0.407	4.8
	12/16/11	53.40	6.12	280.64	0.05	127.40	84.3	31.4	0.250 U	5.7	0.244	0.8
MW-503	10/27/08	58.09	6.21	359.03	0.00	-44.22	189	8.44	0.200 U	478	0.139	3.0
	12/12/08	54.35	6.36	302.27	0.07	-38.20	169	9.51	0.200 U	306	0.188	4.6
	02/26/09	50.47	6.29	280.63	0.12	-14.44	155	11.8	0.250 U	210	0.196	2.0
	04/22/09	51.85	6.36	273.33	0.02	259.93	152	12.3	0.250 U	150	0.245	7.0
	06/26/09	55.34	6.36	281.37	0.05	-56.57	156	16.3	0.250 U	190	0.225	6.5
	08/21/09	60.08	6.34	311.25	0.02	-37.47	158	11.7	0.250 U	180 P	0.238	7.0
	10/28/09	58.50	6.31	314.43	0.04	-44.90	159	12.1	0.250 U	190	0.241	10.0
	10/28/10	58.32	6.18	512.56	0.10	-23.74	145	14.9	0.250 U	180	0.318	5.6
	12/15/11	54.30	6.26	443.34	0.00	-17.75	137	24.2	0.250 U	130	0.478	5.2
MW-504	10/24/08	58.92	6.73	1,157.92	0.08	5.06	435	64.2	0.200 U	1,970 D	3.24	0.8
	12/12/08	49.76	6.98	958.10	0.24	36.78	261	188	0.710	269	1.14	0.2
	02/27/09	46.92	7.04	572.72	0.28	473.30	251	119	0.400	120	0.376	0.2
	04/24/09	49.13	7.08	566.26	0.92	-47.37	227	129	0.710	56	0.228	0.2
	06/26/09	59.97	7.08	595.29	0.14	33.80	274	106	0.250 U	170	0.419	0.0
	08/21/09	66.52	6.88	797.96	0.04	28.06	338	84.7	0.250 U	840	1.190	0.0
	10/28/09	60.48	6.81	637.65	0.41	52.25	311	86.7	0.650	380	0.676	1.5
	10/28/10	60.75	6.76	786.39	0.73	-63.57	301	47.8	0.250 U	180	0.804	0.5
	12/16/11	54.30	6.83	412.10	0.96	153.17	225	66.3	0.250 U	170	0.400	0.0

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-505	10/24/08	56.61	6.77	1,292.49	0.42	23.88	289	119	0.540	961	2.41	0.6
	12/15/08	51.14	6.89	823.56	2.25	68.13	216	144	0.630	219	1.42	0.0
	02/27/09	46.85	6.85	659.23	2.72	182.77	181	167	0.390	130	1.16	0.0
	04/22/09	49.75	7.04	586.48	1.48	-144.75	184	134	0.430	100	1.10	0.0
	06/26/09	62.11	7.01	637.54	1.42	-17.29	190	133	0.340	190	9.11	0.5
	08/21/09	64.00	6.88	719.54	0.60	-15.81	185	72.9	0.250 U	190 P	0.997	1.0
	10/28/09	57.61	6.87	620.60	1.83	26.22	187	136	0.380	230	1.10	0.5
	10/29/10	59.58	6.75	613.95	0.05	-59.16	219	58.6	0.250 U	1,000	1.17	1.8
	12/15/11	53.63	6.77	530.14	0.65	0.00	245	92.3	0.25 U	390	1.41	1.2
MW-506	10/24/08	58.38	6.90	851.73	-0.03	-3.02	238	147	0.200 U	2,820 D	1.42	0.8
	12/12/08	49.85	6.88	863.65	0.35	52.81	186	90.7	0.210	1,770 D	1.61	0.4
	02/27/09	47.32	7.10	363.65	0.50	76.54	121	59.9	0.560	140	0.105	0.0
	04/24/09	48.74	7.12	272.22	0.56	-138.25	115	53.6	1.0	36	0.0139	0.0
	06/26/09	57.74	7.11	601.49	0.11	85.41	183	74.30	320	1,800	0.135	0.0
	08/21/09	62.46	7.06	329.13	0.07	46.69	141	28.1	0.250 U	2,200	0.434	0.5
	10/30/09	59.70	6.89	363.42	0.37	4.84	132	71.7	0.250 U	1,600	0.729	0.5
	10/29/10	58.82	6.83	518.80	0.09	-28.40	207	29.8	0.250 U	5,200	1.97	0.6
	12/15/11	52.57	7.04	283.39	0.15	38.13	183	36.1	0.850	140	0.273	0.0
MW-507	10/24/08	58.31	6.54	642.48	0.01	-93.26	214	80.7	0.200 U	1,110 D	5.10	6.0
	12/12/08	52.21	6.61	795.60	0.07	-46.04	297	151	0.200 U	850	3.31	3.8
	02/27/09	48.70	6.51	909.55	0.26	37.35	290	279	0.250 U	1,600	3.97	3.2
	04/24/09	51.10	6.53	992.50	0.14	-38.69	293	364	0.250 U	1,600	3.40	3.0
	06/26/09	56.60	6.52	1,350.93	0.03	-29.33	252	282	0.250 U	1,100	4.27	7.0
	08/21/09	61.75	6.48	964.71	0.20	-46.15	279	297	0.250 U	2,300	6.04	7.0
	10/28/09	59.50	6.59	1,034.93	0.38	-20.79	350	302	0.250 U	280	3.39	2.0
	10/29/10	59.85	6.62	1,097.89	0.36	-66.97	347	243	0.250 U	59	1.67	1.5
	12/16/11	54.20	6.65	843.34	0.21	113.30	307	314	0.250 U	150	1.4	0.8
MW-508	10/24/08	58.26	6.80	1,614.86	0.09	-18.99	430	141	0.200 U	1,630 D	0.248	0.4
	12/11/08	53.93	6.52	750.26	0.12	79.75	209	205	0.660	641	1.38	0.2
	02/26/09	48.90	6.40	786.61	0.22	-210.79	212	243	0.560	1,300	0.963	0.0
	04/23/09	49.87	6.29	882.52	0.22	-116.34	177	267	0.780	350	0.942	0.4
	06/26/09	57.68	6.54	949.43	0.18	-79.16	216	274	0.250 U	6,100	1,010	0.0
	08/21/09	61.65	6.39	1,031.70	0.21	-269.40	304	364	0.640	5,900	0.467	0.0
	10/28/09	59.81	6.13	704.28	0.49	159.01	216	224	0.750	3,500	0.767	0.0
	10/28/10	60.58	6.25	740.35	1.00	-106.68	223	176	0.250 U	6,600	0.735	2.0
	12/15/11	54.52	6.41	723.53	0.01	-17.85	270	268	0.250 U	8,200	0.570	5.0

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-509	10/23/08	59.60	6.62	489.68	0.23	44.82	185	66.0	0.260	514	0.926	0.4
	12/11/08	50.47	6.83	445.56	1.34	113.25	90.0	66.2	1.92	52.5	0.450	0.4
	02/25/09	44.22	6.98	256.98	6.04	391.88	80.8	44.4	0.250 U	5.0 U	0.0127	0.2
	04/23/09	51.31	7.07	192.88	4.78	-52.52	74.8	40.6	0.250 U	10 U	0.0063	0.0
	06/25/09	64.34	6.98	321.70	0.12	-14.93	117	55.9	0.250 U	9.0	0.0996	0.5
	08/21/09	67.68	6.90	365.42	0.21	-268.87	129	38.9	0.250 U	120	0.365	0.5
	10/28/09	57.40	6.80	219.09	2.56	99.13	95.8	29.5	0.250 U	29	0.131	0.0
	10/28/10	59.45	6.71	387.07	0.40	68.41	128	43.5	0.250 U	20	0.113	0.4
	12/15/11	49.65	6.86	236.46	1.05	90	108	43.5	0.250 U	5.0 U	0.0413	0.0
MW-510	10/23/08	57.02	6.60	942.28	0.16	-1.59	512	9.78	0.200 U	7,480 D	0.221	1.2
	12/11/08	52.98	6.60	795.47	0.28	-81.60	468	12.0	0.200 U	3,990 D	0.483	1.4
	02/26/09	47.88	6.42	873.63	0.10	-55.76	468	17.0	0.250 U	9,700	2.32	1.6
	04/27/09	50.18	6.44	851.95	0.17	-181.81	437	21.2	0.250 U	11,000	2.46	7.0
	06/24/09	58.28	6.64	918.04	0.14	-123.30	475	10.1	0.250 U	14,000	1.11	6.0
	08/20/09	62.64	6.60	937.57	0.06	-301.39	446	1.5 U	0.250 UW	15,000	0.698	6.0
	10/28/09	Not sampled due to the presence of LNAPL										
	10/25/10	Not sampled due to the presence of LNAPL										
	12/13/19	Not sampled due to the presence of LNAPL										
MW-511	10/24/08	55.73	6.59	248.56	0.41	25.86	122	23.1	0.350	1.63	0.289	0.2
	12/12/08	51.90	6.44	235.10	1.84	122.09	110	25.2	0.940	1.20 U	0.446	0.2
	02/25/09	48.43	6.12	350.22	3.73	140.09	77.9	23.3	1.1	5.0 U	0.169	0.0
	04/21/09	49.64	6.23	240.99	4.34	143.96	77.3	30.4	0.930	5.0 U	0.0887	0.0
	06/24/09	54.46	6.27	213.52	2.87	178.32	87.1	27.2	0.940	6.4	0.0855	NA
	08/19/09	58.96	6.30	211.69	3.17	145.06	86.1	22.3	0.940	5.4	0.0573	0.5
	10/28/09	54.96	6.20	211.44	3.68	91.82	94.4	23.2	1.4	5.0 U	0.0439	0.0
	10/28/10	55.71	6.26	263.83	3.75	26.79	88.4	24.2	830	5.0 U	0.0046	0.1
	12/19/11	50.80	6.30	255.22	5.16	196.26	95.2	31.9	0.720	10 U	0.0015	0.0
MW-512	10/23/08	60.03	6.54	396.67	-0.04	14.55	150	30.8	0.200 U	1,200 D	1.56	1.2
	12/11/08	53.48	6.58	480.74	0.01	-48.08	199	31.4	0.200 U	765	2.30	2.0
	02/25/09	47.91	6.59	441.66	0.64	-3.83	205	34.3	0.250 U	1,200	1.15	2.6
	04/21/09	51.96	7.05	460.06	0.37	-144.28	179	52.3	0.280	2,100	0.775	2.0
	06/24/09	61.82	6.65	368.86	0.38	-40.13	152	37.0	0.250 U	720	0.367	2.0
	08/19/09	66.20	6.55	346.88	0.23	-23.55	127	33.6	0.250 U	1,200	0.324	2.0
	10/27/09	59.92	6.66	369.90	2.04	-47.20	157	37.5	0.450	1,600	0.351	1.0
	10/28/10	59.67	6.72	444.53	0.88	-131.58	164	23.4	0.250 U	930	0.414	2.0
	12/15/11	51.70	6.90	306.64	0.02	-92.48	174	23.7	0.250 U	1,400	0.556	3.2

Table 4

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Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-513	10/23/08	58.08	6.78	405.45	-0.06	-63.03	182	19.3	0.200 U	523	2.09	2.0
	12/10/08	55.20	6.73	491.21	-0.06	-103.79	197	23.9	0.200 U	465	2.18	2.8
	02/25/09	49.12	6.76	342.53	0.10	-45.95	210	14.8	0.250 U	490	1.90	2.4
	04/22/09	50.10	6.81	342.40	0.12	-225.74	182	26.6	0.250 U	650	1.89	3.5
	06/24/09	59.64	6.82	321.78	0.09	-89.07	167	13.1	0.280	300	1.38	3.0
	08/20/09	62.58	6.73	343.96	0.11	-81.20	168	15.5	0.250 UW	320 P	1.38	2.8
	10/27/09	59.76	6.73	374.84	0.08	-96.67	178	24.3	0.250 U	550	1.80	4.0
	10/28/10	58.03	6.63	395.68	0.10	-103.39	164	11.2	0.250 U	690	1.36	3.8
	12/15/11	52.17	6.69	289.77	0.05	-60	156	16.7	0.250 U	370	1.28	3.1
MW-514	10/23/08	59.15	6.81	368.79	-0.05	-69.84	182	17.4	0.230	200	1.62	2.2
	12/10/08	55.53	6.74	410.41	0.01	-105.01	191	29.2	0.200 U	428	2.89	2.8
	02/24/09	50.68	6.74	330.80	0.15	-84.41	189	21.5	0.250 U	680	2.07	2.2
	04/21/09	51.33	6.83	345.19	0.43	-150.08	176	28.5	0.250 U	710	1.93	4.0
	06/24/09	60.09	6.89	340.42	0.21	-133.74	167	17.8	0.310	400	1.54	3.0
	08/19/09	64.22	6.77	362.34	0.10	-88.48	153	12.7	0.250 U	580	1.47	4.0
	10/27/09	60.17	6.72	342.77	0.18	-90.96	169	13.8	0.250 U	690	1.67	4.0
	10/27/10	58.93	6.62	403.73	0.07	-128.19	160	19.2	0.250 U	210	1.94	4.2
	12/14/11	51.76	6.53	389.84	0.10	-0.09	152	19.3	0.250 U	340	1.69	3.0
MW-515	10/22/08	62.15	6.60	451.90	0.00	23.35	174	36.2	0.200 U	395	2.46	1.1
	12/10/08	53.51	6.66	444.71	0.03	73.86	131	78.2	0.560	12.7	1.32	0.0
	02/24/09	49.14	6.63	382.79	1.00	76.95	125	61.6	0.250 U	99	0.541	0.0
	04/22/09	49.78	6.86	288.96	1.29	-156.87	112	54.1	0.250 U	45	0.569	0.0
	06/24/09	62.81	6.64	514.96	0.11	29.36	185	55.6	0.250 U	510	1.430	0.5
	08/20/09	67.66	6.65	526.87	0.29	14.84	194	33.0	0.250 UW	410	1.560	0.2
	10/27/09	60.81	6.76	319.95	1.41	40.71	137	33.0	0.250 U	270	0.970	0.5
	10/27/10	61.29	6.76	334.75	1.35	-91.25	150	30.2	0.250 U	240	0.645	1.0
	12/14/11	50.52	6.90	278.52	0.05	40	145	50.0	0.250 U	86	0.419	0.0
MW-516	10/22/08	60.37	6.75	410.68	0.21	22.93	175	43.2	0.200 U	439	2.23	0.4
	12/10/08	53.18	6.64	391.95	0.03	54.04	149	57.6	0.330	22.0	1.58	0.0
	02/24/09	45.41	6.85	296.90	2.83	109.91	111	55.6	0.750	5.7	0.260	0.0
	04/22/09	49.82	6.86	290.47	3.59	-7.72	110	54.1	0.500	10 U	0.0591	1.0
	06/24/09	65.26	6.67	525.02	0.61	24.67	182	48.8	0.250 U	450	0.592	0.0
	08/20/09	68.95	6.68	474.28	0.83	42.34	184	25.7	0.250 UW	300 P	1.02	0.0
	10/27/09	60.04	6.69	339.91	1.48	38.92	149	34.4	0.250 U	25	0.831	0.0
	10/27/10	60.44	6.59	373.46	1.74	-27.12	142	31.4	0.250 U	26	0.386	0.1
	12/14/11	50.40	6.67	399.03	2.39	110	0.460 U	21.4	0.250 U	150	0.402	0.0

Table 4

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Natural Attenuation Parameters
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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-517	10/22/08	59.72	6.52	361.40	0.10	15.95	156	39.3	0.200 U	1,080 D	3.17	0.6
	12/10/08	52.71	6.51	374.55	-0.04	63.88	161	47.4	0.200 U	394	1.81	0.0
	02/24/09	46.38	6.71	355.26	1.97	101.76	127	65.8	1.2	11	0.892	0.4
	04/22/09	50.90	6.70	348.44	1.21	-81.24	128	66.7	0.250 U	43	0.584	1.0
	06/24/09	64.49	6.72	463.93	0.61	-52.18	184	50.5	0.250 U	1,700	1.14	1.0
	08/20/09	67.06	6.60	437.32	0.33	7.39	184	20.6	0.250 UW	4,400	1.36	0.5
	10/27/09	60.36	6.66	355.06	0.41	15.34	148	41.9	0.250 U	99	1.09	1.5
	10/27/10	59.99	6.68	381.89	0.56	-12.51	145	35.3	0.250 U	270	0.641	0.5
	12/14/11	50.41	6.76	292.70	0.07	43.46	165	26	0.250 U	75	0.788	0.6
MW-518	10/22/08	61.89	6.46	2,403.10	0.10	6.25	194	93.4	0.200 U	2,380 D	1.60	3.0
	12/10/08	56.07	6.64	590.16	0.08	22.59	247	32.5	0.200 U	1,920 D	2.22	1.6
	02/25/09	47.59	6.55	482.43	0.15	-9.02	209	61.1	0.250 U	2,900	1.99	2.2
	04/22/09	48.17	6.52	519.99	0.27	-182.35	163	63.6	0.600	3,100	1.48	2.0
	06/25/09	58.02	6.48	1,501.29	0.24	6.00	117	97.6	0.500	1,500	1.67	2.0
	08/20/09	65.80	6.49	2,674.51	0.12	-247.61	176	119	0.250 UW	4,500	1.5	3.0
	10/30/09	62.35	6.50	1,278.14	0.45	-46.31	224	51.6	0.250 U	4,000	1.57	4.0
	10/28/10	60.96	6.57	1,587.58	0.04	-116.69	200	70.4	0.250 U	3,500	1.38	8.0
	12/14/11	54.16	6.57	645.67	0.56	0.00	213	85.6	0.530	1,500	0.807	4.0
MW-519	10/22/08	58.05	6.55	535.69	-0.02	-34.53	217	29.8	0.200 U	6,780 D	1.31	3.6
	12/09/08	53.23	6.64	610.07	0.11	-70.36	250	30.0	0.200 U	9,760 D	1.34	3.2
	02/24/09	46.76	6.65	405.26	0.10	-41.65	186	43.1	0.460	8,800	0.847	2.7
	04/21/09	51.87	6.63	478.38	0.13	638.95	255	21.5	0.250 U	14,000	1.22	2.7
	06/24/09	60.02	6.58	618.06	0.06	-67.35	290	9.7	0.250 U	13,000	1.15	5.0
	08/18/09	66.09	6.61	691.65	0.14	-57.02	258	36.7	0.250 U	14,000	1.16	2.5
	10/27/09	59.84	6.59	364.97	0.31	-72.83	124	49.6	0.250 U	6,400	0.610	2.0
	10/26/10	59.52	6.53	469.46	0.18	-61.26	170	71.6	0.250 U	3,900	0.473	4.2
	12/14/11	51.03	6.69	402.43	-0.01	-40	266	38.8	0.370	11,000	0.822	0.0
MW-520	10/21/08	59.76	6.79	944.21	0.02	-14.62	212	32.0	0.200 U	2,230 D	1.58	1.4
	12/09/08	53.17	6.81	584.24	0.12	-89.46	189	28.7	0.200 U	2,240 D	1.48	1.4
	02/23/09	47.79	6.84	477.54	0.16	-57.60	187	22.1	0.250 U	2,500	1.18	1.6
	04/22/09	48.74	6.75	397.91	0.40	-161.40	162	33.6	0.250 U	2,200	746	2.0
	06/24/09	60.08	6.67	584.31	0.04	-54.65	202	19.3	0.250 U	4,900	1.46	3.0
	08/18/09	67.93	6.60	587.53	0.06	27.15	194	5.5	0.250 U	1,600	1.09	2.0
	10/27/09	60.06	6.50	483.54	0.09	9.18	153	33.6	0.250 U	1,100	1.03	1.0
	10/27/10	60.39	6.48	731.32	0.20	-82.10	201	16	0.250 U	1,600	1.46	1.8
	12/14/11	51.35	6.58	612.41	0.16	40	161	51	0.250 U	740	1.08	1.0

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]
MW-521	10/21/08	59.50	6.57	818.08	-0.01	4.73	172	63.9	0.200 U	888	1.42	0.9
	12/09/08	53.28	6.77	555.86	0.38	-70.66	174	37.3	0.200 U	1,310	1.48	0.5
	02/23/09	46.76	6.78	408.37	0.11	-33.28	150	50.8	0.250 U	1,200	1.44	0.6
	04/21/09	52.18	6.65	282.87	0.33	643.50	105	43.5	0.250 U	66	0.587	0.2
	06/23/09	62.33	6.68	366.61	0.35	12.69	142	33.4	0.250 U	530	0.649	1.0
	08/19/09	66.65	6.54	504.12	0.14	-9.28	172	46.1	0.250 U	740	0.899	1.5
	10/26/09	60.51	6.71	701.29	0.15	-191.41	154	52.3	0.250 U	3,100	1.73	1.5
	10/27/10	59.20	6.50	541.24	0.18	-90.60	177	38.2	0.250 U	1,200	1.25	1.6
	12/14/11	45.43	7.11	220.14	11.97	90	145	143	0.250 U	200	1.04	1.4
MW-522	10/21/08	62.31	6.57	756.65	0.06	-47.72	251	18.0	0.200 U	972	1.70	5.2
	12/09/08	53.30	6.71	548.80	0.14	-98.92	200	73.9	0.200 U	297	1.07	5.2
	02/23/09	48.06	6.56	503.15	0.12	-50.16	171	108	0.250 U	260	1.16	4.6
	04/21/09	49.60	6.65	393.02	0.11	699.67	154	76.6	0.250 U	74	0.880	5.2
	06/23/09	59.64	6.61	442.11	0.05	-75.88	186	51.0	0.250 U	140	0.963	3.0
	08/18/09	68.79	6.61	621.20	0.07	-68.46	244	29.5	0.250 U	580	1.26	3.0
	10/26/09	61.92	6.43	1,166.69	0.09	-25.26	206	560	0.280	400	0.947	3.0
	10/26/10	59.92	6.30	4,979,442.00	0.43	-104.90	208	628	0.250 U	180	0.758	0.8
	12/14/12	53.35	6.54	552.82	0.04	-16.41	203	106	0.250 U	230	1.04	1.5
MW-523	10/21/08	61.66	6.66	870.33	0.01	24.73	221	45.7	0.200 U	1,940 D	3.28	0.8
	12/09/08	54.24	6.71	587.13	0.31	31.67	218	53.2	0.200 U	482	3.01	0.6
	02/23/09	47.46	6.67	420.64	0.41	98.18	164	70	0.250 U	31	1.12	0.0
	04/21/09	49.53	6.76	353.07	0.35	-56.71	146	56.8	0.250 U	280	1.39	0.0
	06/23/09	62.92	6.77	437.56	2.42	141.87	164	42.4	0.250 U	5.0 U	0.593	0.0
	08/18/09	68.16	6.64	614.62	0.16	53.81	199	21.0	0.250 U	1,600	1.380	0.0
	10/26/09	62.44	6.65	720.56	0.28	62.64	248	46.5	0.250 U	420	2.95	1.0
	10/26/10	60.60	6.57	815.65	0.58	31.43	220	102	0.250 U	400	1.15	1.0
	12/13/11	53.06	6.64	599.47	0.29	70	224	44.2	0.400	72	1.31	0.8
MW-524	10/21/08	60.03	6.46	965.29	-0.04	16.91	115	402	0.340	51.0	0.623	1.6
	12/09/08	52.74	6.58	421.64	2.81	154.94	70.6	172	0.620	2.10	0.0353	0.0
	02/23/09	47.66	6.62	337.04	2.35	118.32	76.5	141	0.480	6.2	0.0159	0.2
	04/21/09	48.81	6.60	309.12	4.93	68.52	73.2	119	0.250 U	12	0.0308	0.0
	06/23/09	59.55	6.59	374.54	0.55	139.04	86.0	121	0.250 U	5.0 U	0.0235	0.0
	08/18/09	65.03	6.49	468.64	0.50	108.31	104	154	0.250 U	7.9	0.0537	0.0
	10/26/09	59.41	6.27	685.50	0.66	259.84	38	410	0.450	5.0 U	0.0106	1.0
	10/26/10	59.22	6.45	1,908,568.00	4.24	131.09	52.6	225	0.260	5.0 U	0.84	0.4
	12/13/11	48.68	6.60	287.04	4.27	200	44.4	200	0.550 U	5.0 U	0.0048	0.0

Table 4

Summary of Groundwater Analytical Data
Natural Attenuation Parameters
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	Temperature (°F)[1]	pH[1]	Conductivity (µS/cm)[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (µg/L)[4]	Manganese (mg/L)[5]	Ferrous Iron by Field Measurement (mg/L)[6]

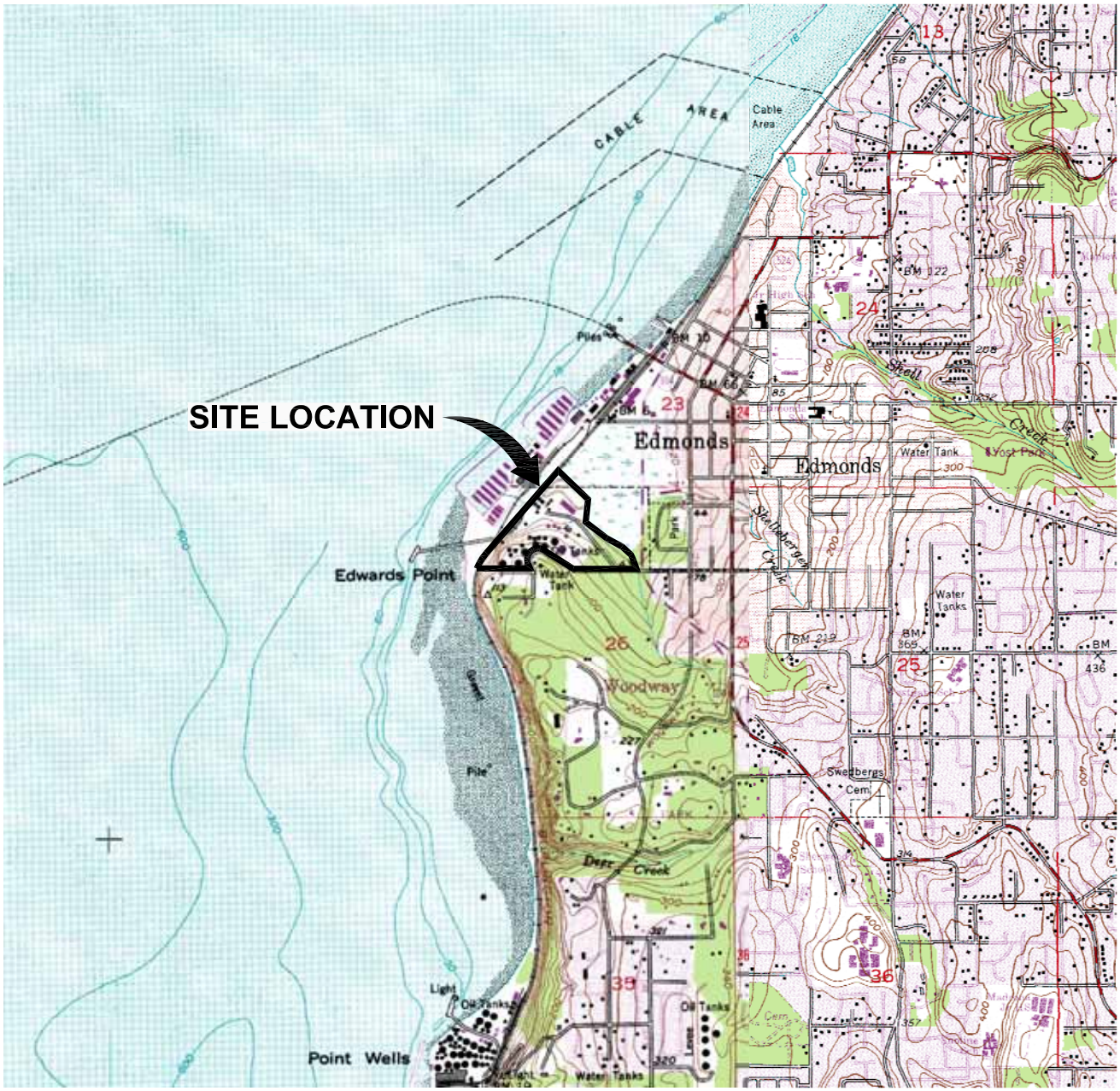
Notes:

[1]: Temperature, pH, DO, conductivity and ORP measured using an In-Situ® 9500 and flow through cell.
[2]: Total Alkalinity analyzed using EPA method 310.1
[3]: Sulfate and nitrate analyzed by EPA method 300.0.
[4]: Methane analyzed using method RSK 175.
[5]: Manganese analyzed using EPA method 6020.
[6]: Ferrous iron field measurement analyzed using a Hach field kit.
°F = Degrees Fahrenheit
µS/cm = microsiemens per centimeter
DO = Dissolved oxygen
mg/L = milligrams per liter
µg/L = micrograms per liter
ORP = Oxidation-reduction potential
mV = millivolts
$CaCO_3$ = Calcium carbonate
EPA = Environmental Protection Agency
NA = Not Analyzed

Lab Qualifiers	Definition
D	Sample required dilution due to high concentrations of target analyte.
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UJ	The compound was analyzed for but not detected. The associated value is the estimated compound quantitation limit.
W	The analysis holding time was not met.
P	Due to interfering peaks on the chromatogram, the value reported for methane represents the lowest reporting limit attainable.

ARCADIS

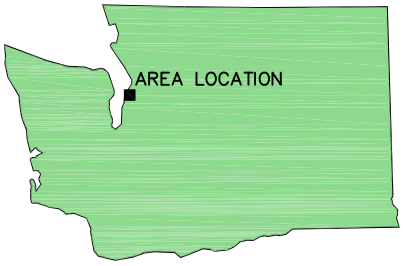
Figures



REFERENCE: USGS QUADS., 7.5 MIN. SERIES (TOPOGRAPHIC) - EDMONDS EAST, WASH. AND EDMONDS WEST, WASH.

0 0.5 1.0

Approximate Scale: 1"=0.5 Miles



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL TERMINAL
EDMONDS, WASHINGTON

2011 ANNUAL GROUNDWATER MONITORING REPORT

SITE LOCATION MAP

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FIGURE
1

CITY: (TAMPA,FL) SYRACUSE, NY GROUP: ENVCAD DB: JAR, PGL, A.Schilling PM: D. RASAR LYR: ON=*;OFF=*REF*
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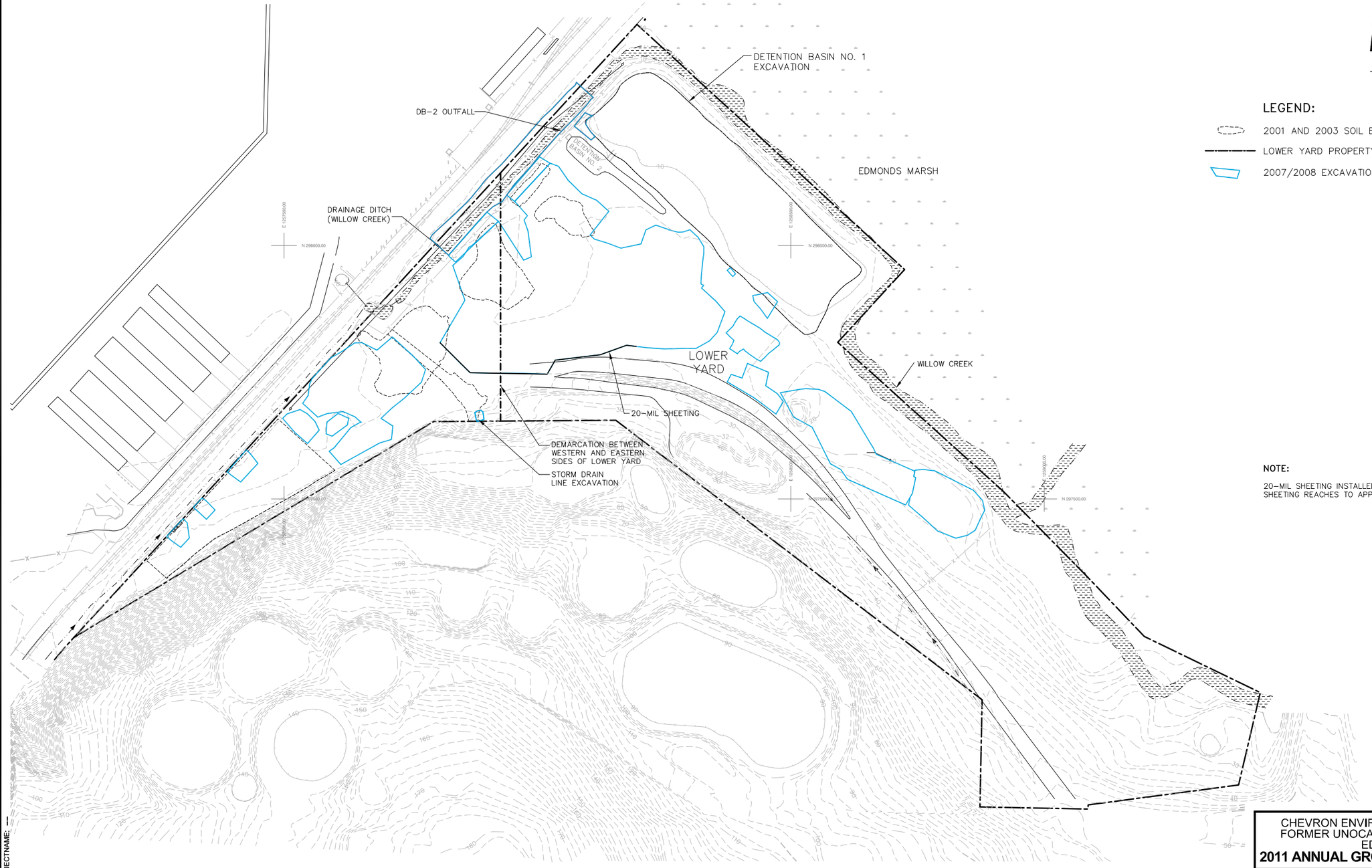

LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- LOWER YARD PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES

NOTE:

20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

SITE LAYOUT MAP

ARCADIS

FIGURE
2

CITY: (TAMPA, FL) SYRACUSE, NY GROUP: ENVCAD DB: (J. RICHARDS), K. DAVIS, P. LISTER PM: R. ANDRESEN TM: S. ZORN TR: D. RASAR LYR: ON="OFF=*REF*
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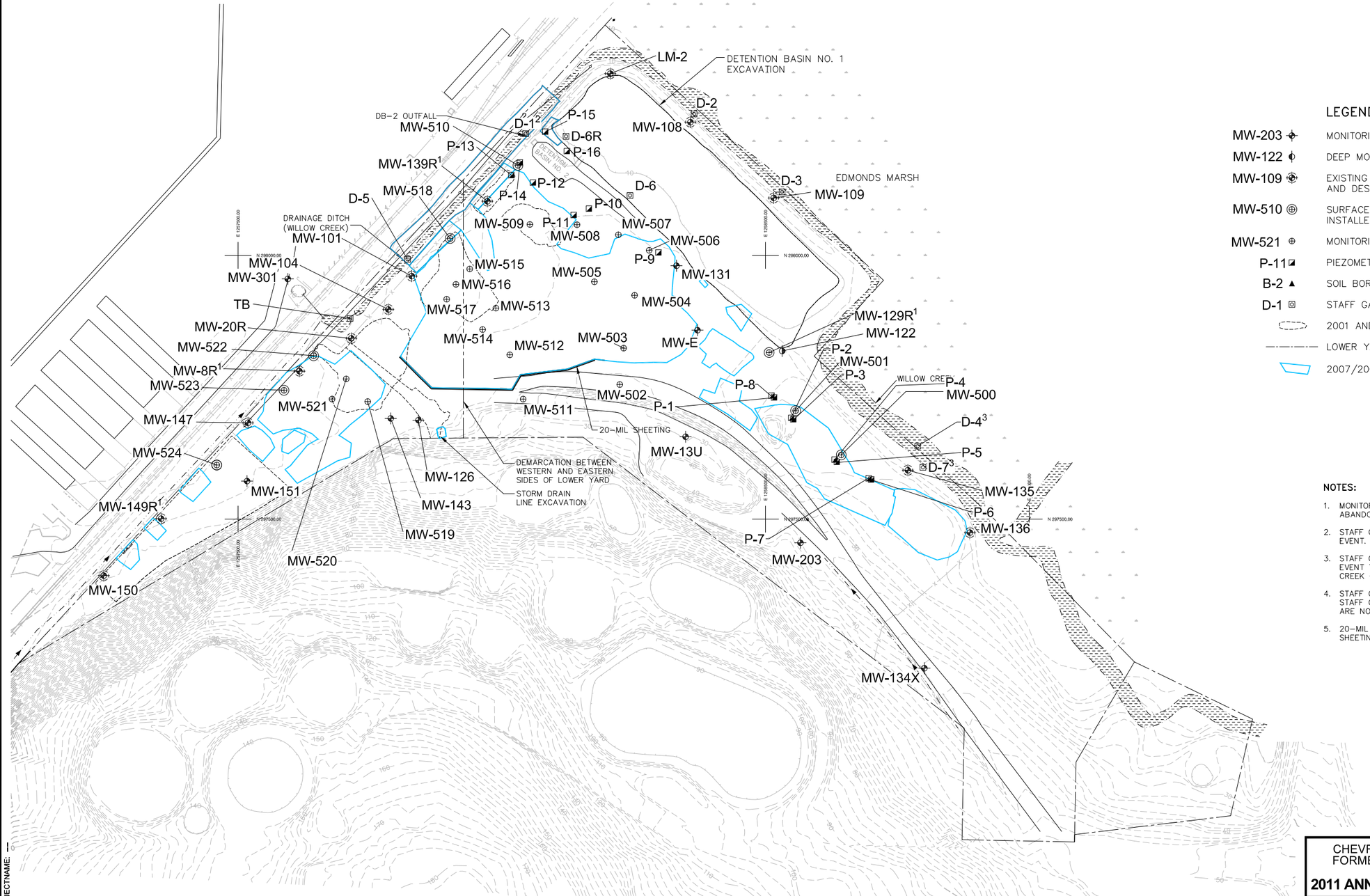

LEGEND:

MW-203 ⊕	MONITORING WELL LOCATION AND DESIGNATION
MW-122 ◐	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109 ⊕	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510 ⊕	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521 ⊕	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11 ◪	PIEZOMETER
B-2 ▲	SOIL BORING
D-1 ⊡	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
3. STAFF GAUGE D-4 WAS ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT TO REPLACE STAFF GAUGE D-7 WHICH IS NOT WITHIN THE WILLOW CREEK CHANNEL.
4. STAFF GAUGES WERE RESURVEYED BY OTAK INCORPORATED JUNE 1, 2009. STAFF GAUGES WERE SURVEYED FROM TOP OF GAUGE AND WATER LEVELS ARE NOW MEASURED FROM TOP DOWN TO WATER.
5. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

MONITORING WELL LOCATIONS

ARCADIS

FIGURE 3

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=REF, (FRZ)
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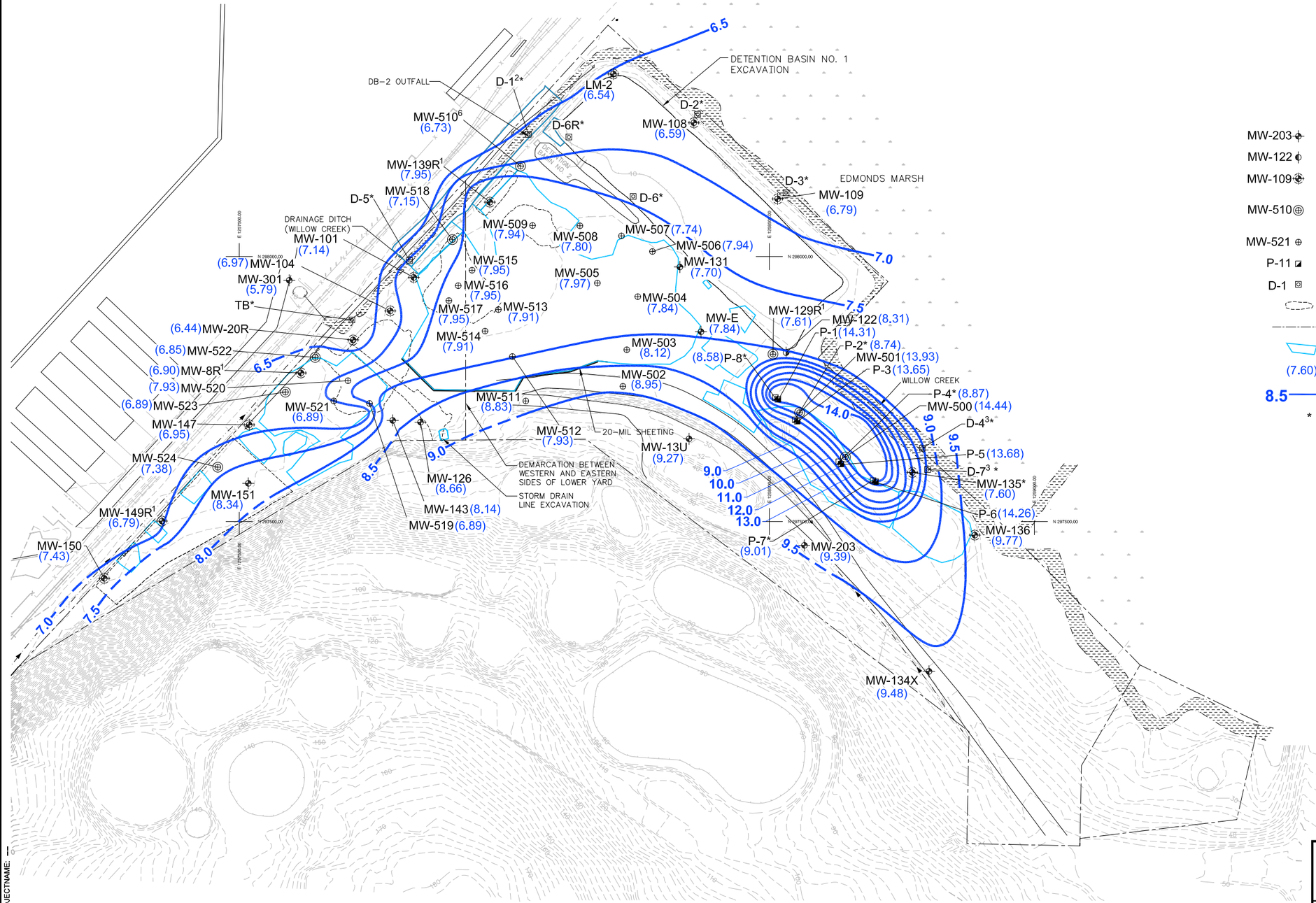

LEGEND:

MW-203 ⊕	MONITORING WELL LOCATION AND DESIGNATION
MW-122 ◐	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109 ⊕	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510 ⊕	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521 ⊕	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11 ◪	PIEZOMETER
D-1 ⊡	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
(7.60)	GROUNDWATER CONTOUR (0.5 FEET INTERVAL)
8.5	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
*	NOT USED IN CONTOURING

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
3. STAFF GAUGE D-4 WAS ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT TO REPLACE STAFF GAUGE D-7 WHICH IS NOT WITHIN THE WILLOW CREEK CHANNEL.
4. STAFF GAUGES WERE RESURVEYED BY OTAK INCORPORATED JUNE 1, 2009. STAFF GAUGES WERE SURVEYED FROM TOP OF GAUGE AND WATER LEVELS ARE NOW MEASURED FROM TOP DOWN TO WATER.
5. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.
6. GROUNDWATER ELEVATION ADJUSTED FOR THE PRESENCE OF LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL).

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

FIRST QUARTER, 2011 GROUNDWATER ELEVATIONS AND CONTOURS MARCH 21, 2011

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FIGURE
4

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=*REF (FRZ)
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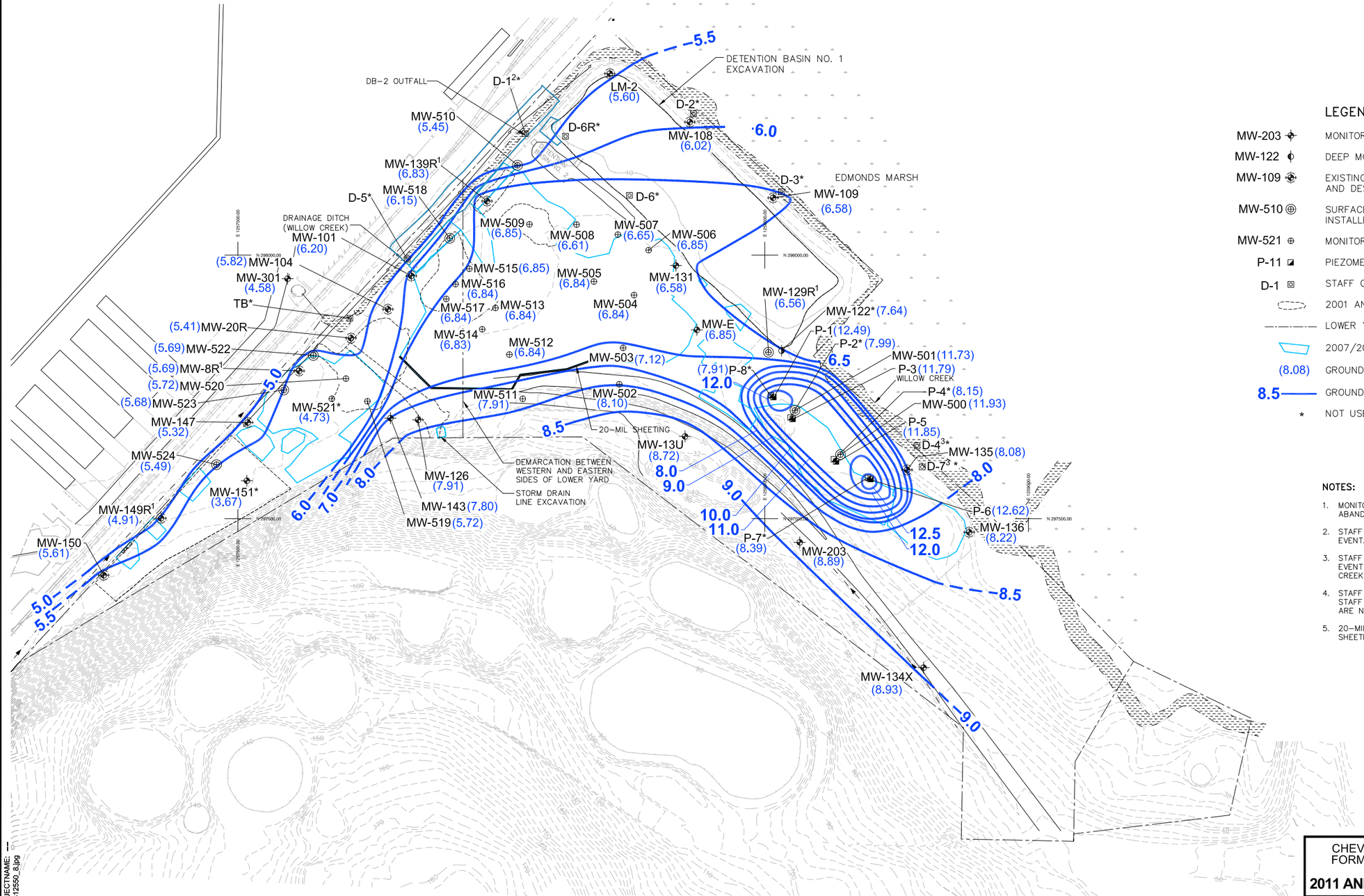

LEGEND:

MW-203	MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11	PIEZOMETER
D-1	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
(8.08)	GROUNDWATER CONTOUR (0.5 FEET INTERVAL)
8.5	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
*	NOT USED IN CONTOURING

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
3. STAFF GAUGE D-4 WAS ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT TO REPLACE STAFF GAUGE D-7 WHICH IS NOT WITHIN THE WILLOW CREEK CHANNEL.
4. STAFF GAUGES WERE RESURVEYED BY OTAK INCORPORATED JUNE 1, 2009. STAFF GAUGES WERE SURVEYED FROM TOP OF GAUGE AND WATER LEVELS ARE NOW MEASURED FROM TOP DOWN TO WATER.
5. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

SECOND QUARTER, 2011 GROUNDWATER ELEVATIONS AND CONTOURS JUNE 14, 2011

ARCADIS

FIGURE 5

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=REF, (FRZ)
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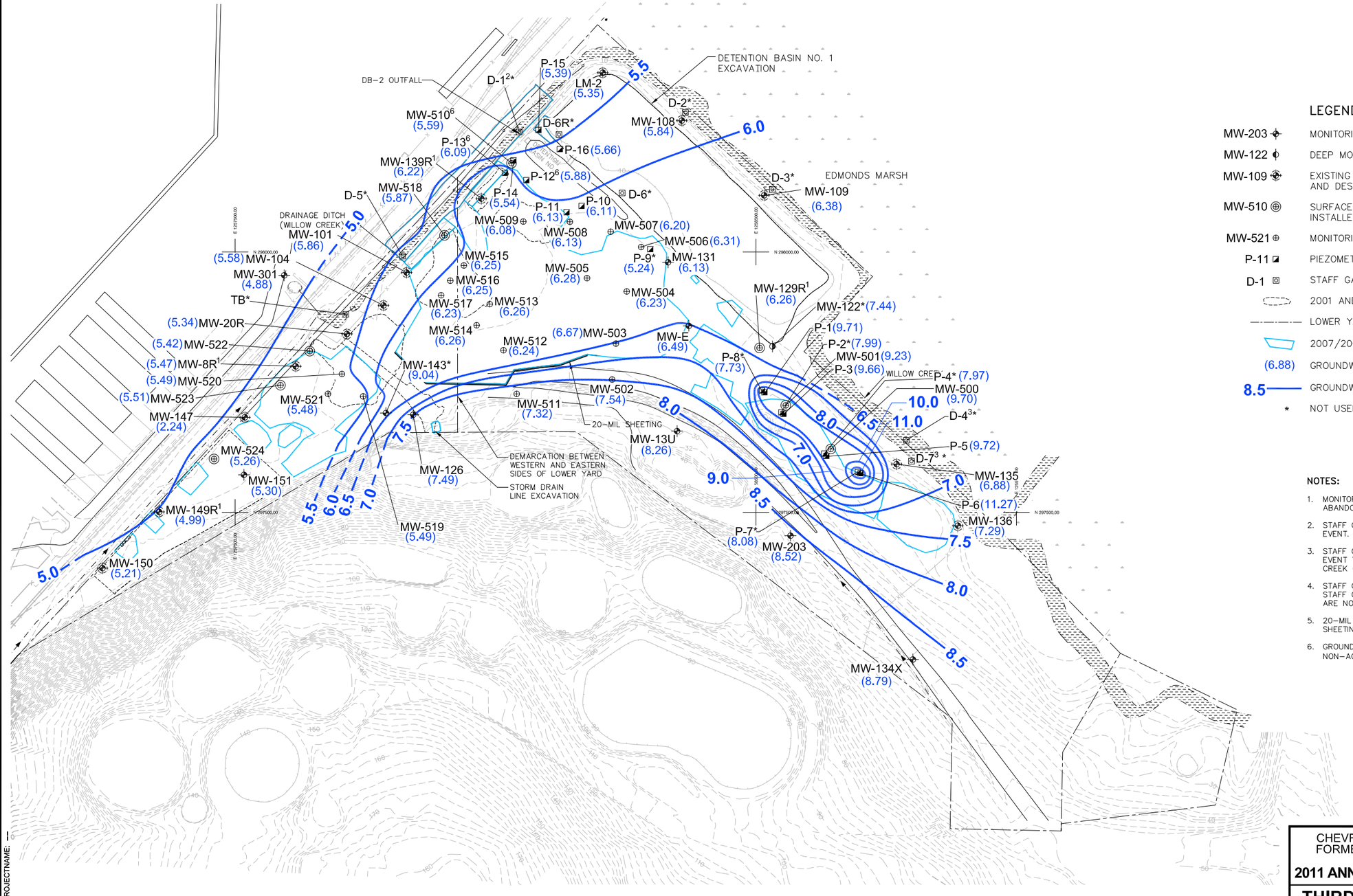

LEGEND:

MW-203	MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11	PIEZOMETER
D-1	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
(6.88)	GROUNDWATER CONTOUR (0.5 FEET INTERVAL)
8.5	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
*	NOT USED IN CONTOURING

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
3. STAFF GAUGE D-4 WAS ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT TO REPLACE STAFF GAUGE D-7 WHICH IS NOT WITHIN THE WILLOW CREEK CHANNEL.
4. STAFF GAUGES WERE RESURVEYED BY OTAK INCORPORATED JUNE 1, 2009. STAFF GAUGES WERE SURVEYED FROM TOP OF GAUGE AND WATER LEVELS ARE NOW MEASURED FROM TOP DOWN TO WATER.
5. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.
6. GROUNDWATER ELEVATION ADJUSTED FOR THE PRESENCE OF LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL).

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

THIRD QUARTER, 2011 GROUNDWATER ELEVATIONS AND CONTOURS SEPTEMBER 26, 2011

ARCADIS

FIGURE 6

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=REF, (FRZ)
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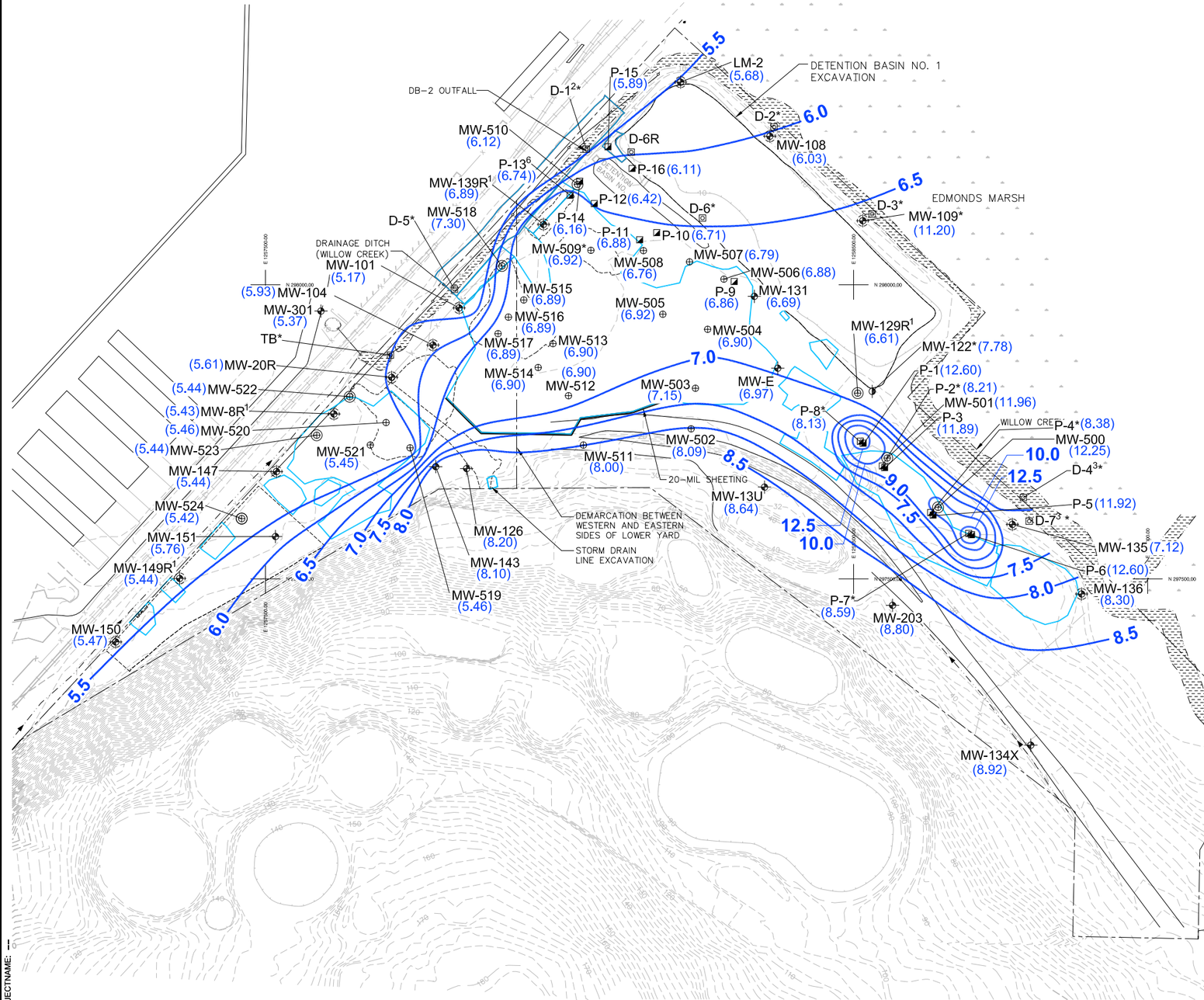

LEGEND:

MW-203	MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11	PIEZOMETER
D-1	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
(6.88)	GROUNDWATER CONTOUR (0.5 FEET INTERVAL)
8.5	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
*	NOT USED IN CONTOURING

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
3. STAFF GAUGE D-4 WAS ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT TO REPLACE STAFF GAUGE D-7 WHICH IS NOT WITHIN THE WILLOW CREEK CHANNEL.
4. STAFF GAUGES WERE RESURVEYED BY OTAK INCORPORATED JUNE 1, 2009. STAFF GAUGES WERE SURVEYED FROM TOP OF GAUGE AND WATER LEVELS ARE NOW MEASURED FROM TOP DOWN TO WATER.
5. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.
6. GROUNDWATER ELEVATION ADJUSTED FOR THE PRESENCE OF LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL).

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

FOURTH QUARTER, 2011 GROUNDWATER ELEVATIONS AND CONTOURS DECEMBER 12, 2011

ARCADIS

FIGURE 7

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=*REF; (FRZ)
G:\ENV\CAD\SYRACUSE\ACT\B00453620000300000\11DWG\GWMR453622W01.dwg LAYOUT: 7 SAVED: 3/2/2012 1:57 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: C-LD2B-PDF-CONV PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/2/2012 2:00 PM BY: SCHILLING, ADAM
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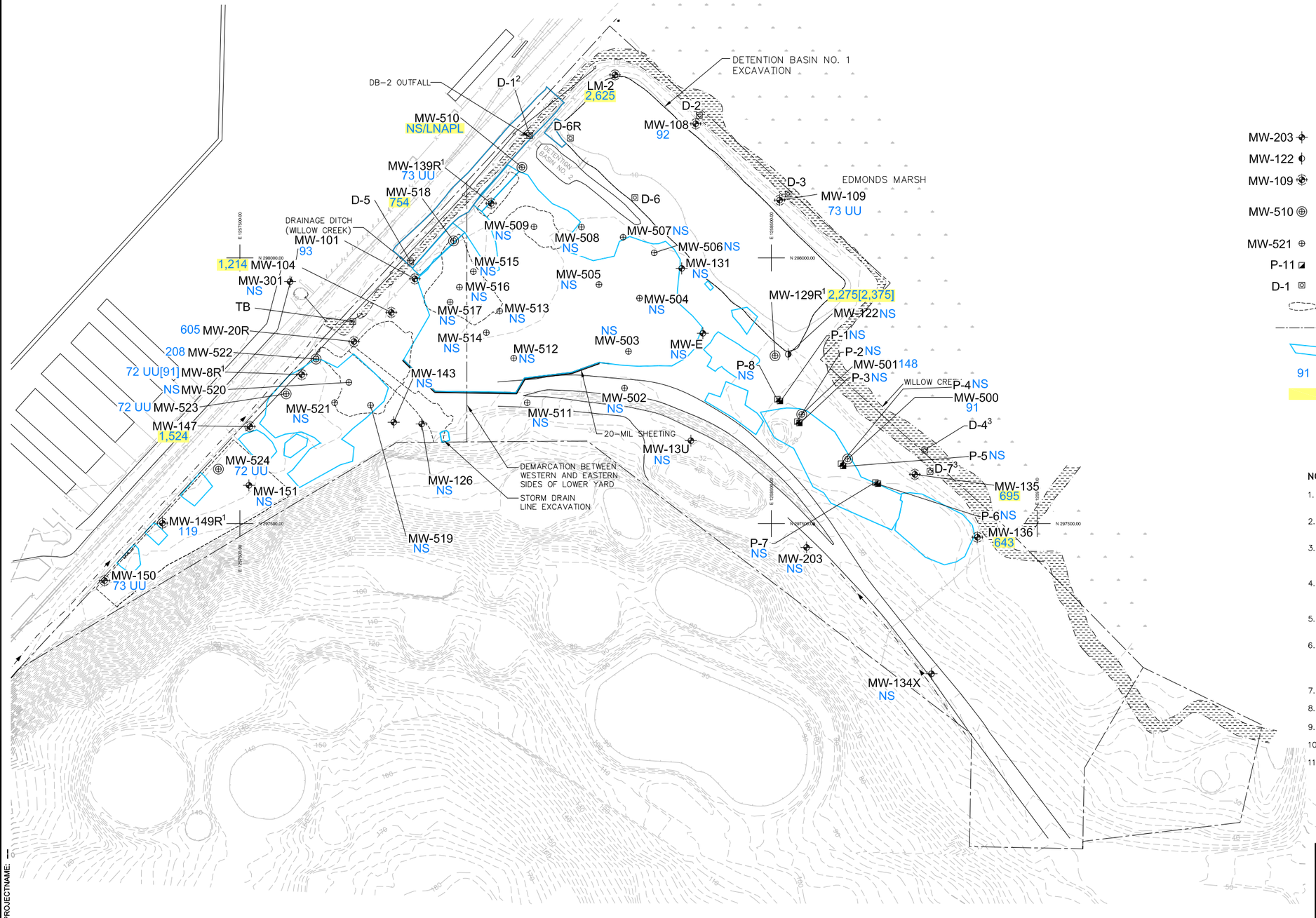


LEGEND:

MW-203	MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11	PIEZOMETER
D-1	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
91	TOTAL PETROLEUM HYDROCARBON (TPH)
	HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
3. STAFF GAUGE D-4 WAS ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT TO REPLACE STAFF GAUGE D-7 WHICH IS NOT WITHIN THE WILLOW CREEK CHANNEL.
4. STAFF GAUGES WERE RESURVEYED BY OTAK INCORPORATED JUNE 1, 2009. STAFF GAUGES WERE SURVEYED FROM TOP OF GAUGE AND WATER LEVELS ARE NOW MEASURED FROM TOP DOWN TO WATER.
5. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.
6. TPH = TOTAL PETROLEUM HYDROCARBONS. TOTAL TPH CALCULATED BY SUMMING THE CONCENTRATIONS OF GASOLINE, DIESEL AND HEAVY OIL. FOR RESULTS WHICH DID NOT EXCEED METHOD REPORTING LIMITS, HALF OF THE REPORTING LIMIT WAS ADDED TO DETERMINE TOTAL TPH.
7. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
8. UU = THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS.
9. [ ] INDICATES DUPLICATE SAMPLE.
10. LNAPL = LIGHT NON-AQUEOUS PHASE LIQUIDS.
11. NS = NOT SAMPLED.

0 100' 200'
GRAPHIC SCALE

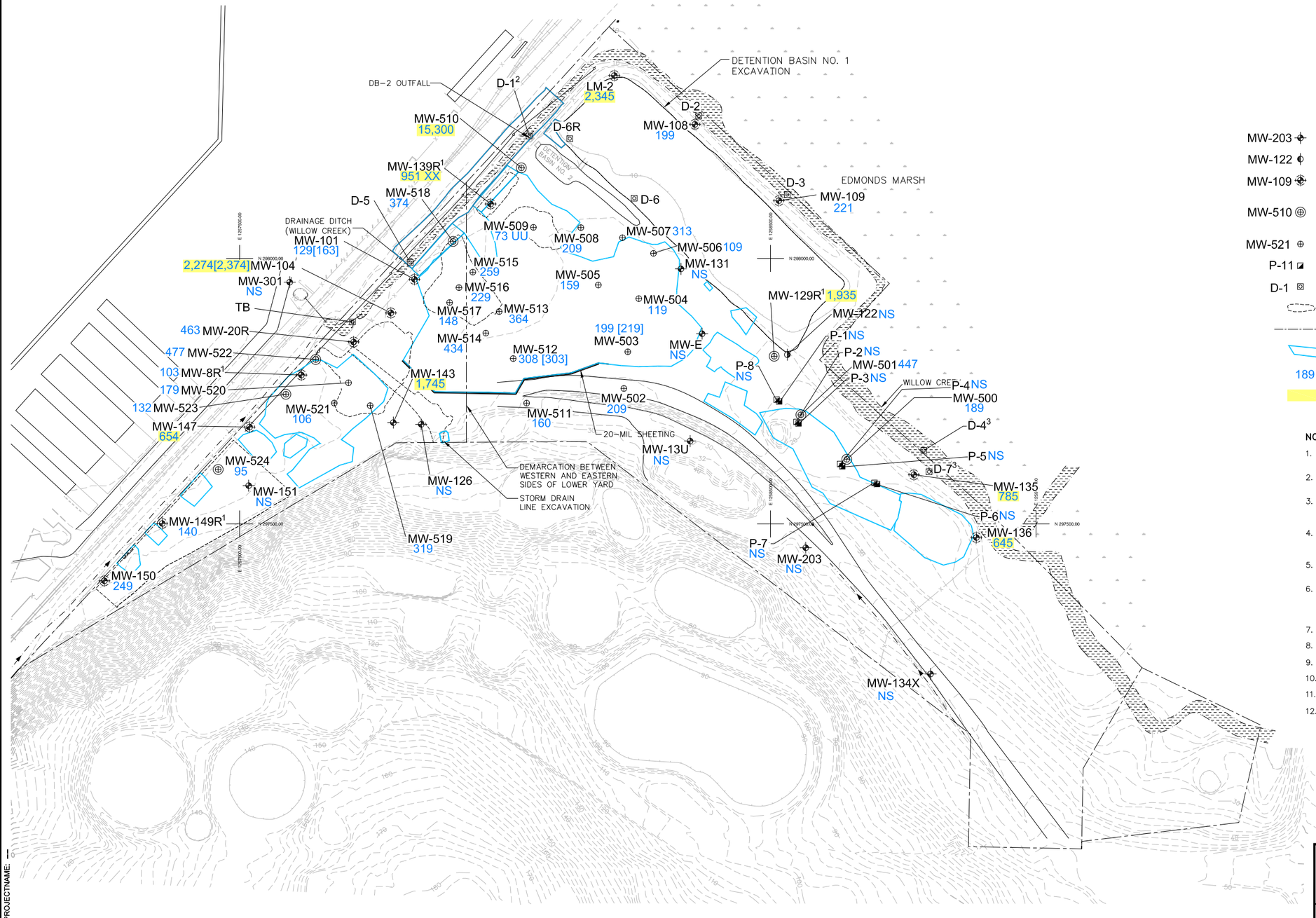
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

FIRST QUARTER, 2011 TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
8

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=*REF (FRZ)
G:\ENV\CAD\SYRACUSE\ACTIVE\00453621\0003\0000\11\DWG\GWMR45362C02.dwg LAYOUT: 8 SAVED: 2/20/2012 2:53 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: C-LD2B-PDF-CONV PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/2/2012 1:57 PM BY: SCHILLING, ADAM
XREFS: IMAGES: PROJECTNAME: ---
45362X01
45362X02
45362X00



LEGEND:

MW-203	MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11	PIEZOMETER
D-1	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
189	TOTAL PETROLEUM HYDROCARBON (TPH)
	HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
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5. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.
6. TPH = TOTAL PETROLEUM HYDROCARBONS. TOTAL TPH CALCULATED BY SUMMING THE CONCENTRATIONS OF GASOLINE, DIESEL AND HEAVY OIL FOR RESULTS WHICH DID NOT EXCEED METHOD REPORTING LIMITS, HALF OF THE REPORTING LIMIT WAS ADDED TO DETERMINE TOTAL TPH.
7. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
8. UU = THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS.
9. [ ] INDICATES DUPLICATE SAMPLE.
10. LNAPL = LIGHT NON-AQUEOUS PHASE LIQUIDS.
11. NS = NOT SAMPLED.
12. XX = SAMPLE WAS COLLECTED AS PART OF MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD). ANOMALOUS DETECTION OF HO WAS REANALYZED. THE SAMPLE EXTRACT WAS RE-INJECTED AND CONFIRMED THE REPORTED RESULTS. THE SAMPLE WAS RE-EXTRACTED PAST THE METHOD HOLD TIME. RESULTS FROM THE RE-EXTRACTION ARE N.D. (<MDL) FOR BOTH DRO AND HO. SINCE THE HOLD TIME HAD EXPIRED PRIOR TO THE RE-EXTRACTION, ALL REPORTED DATA IS TAKEN FROM THE ORIGINAL EXTRACTION.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

SECOND QUARTER, 2011
TOTAL TPH CONCENTRATIONS

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FIGURE
9

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=REF; (FRZ)
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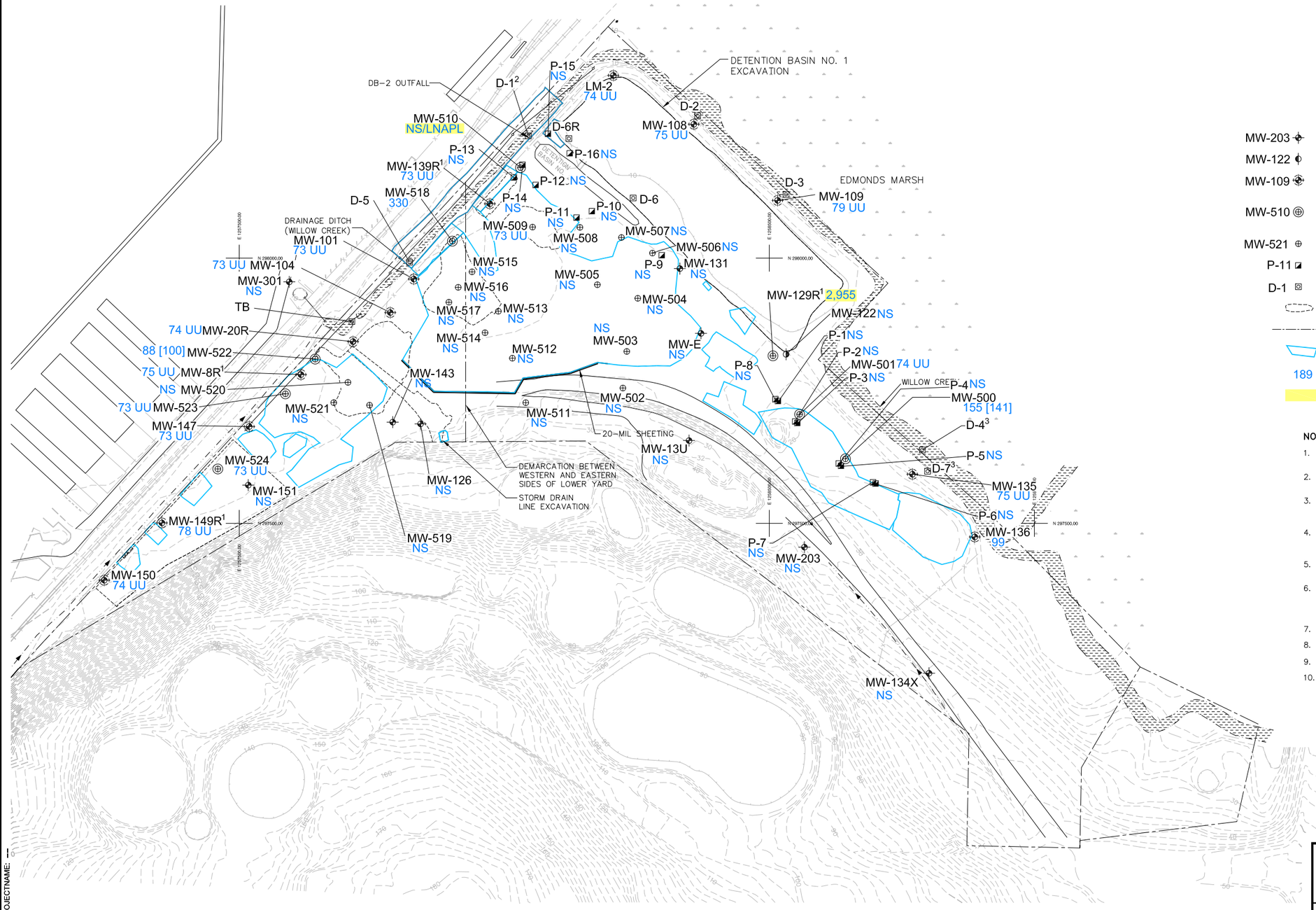

LEGEND:

MW-203	MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11	PIEZOMETER
D-1	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
189	TOTAL PETROLEUM HYDROCARBON (TPH)
	HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
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6. TPH = TOTAL PETROLEUM HYDROCARBONS. TOTAL TPH CALCULATED BY SUMMING THE CONCENTRATIONS OF GASOLINE, DIESEL AND HEAVY OIL FOR RESULTS WHICH DID NOT EXCEED METHOD REPORTING LIMITS, HALF OF THE REPORTING LIMIT WAS ADDED TO DETERMINE TOTAL TPH.
7. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
8. UU = THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS.
9. [ ] INDICATES DUPLICATE SAMPLE.
10. LNAPL = LIGHT NON-AQUEOUS PHASE LIQUIDS.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

THIRD QUARTER, 2011
TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
10

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=*REF; (FRZ)
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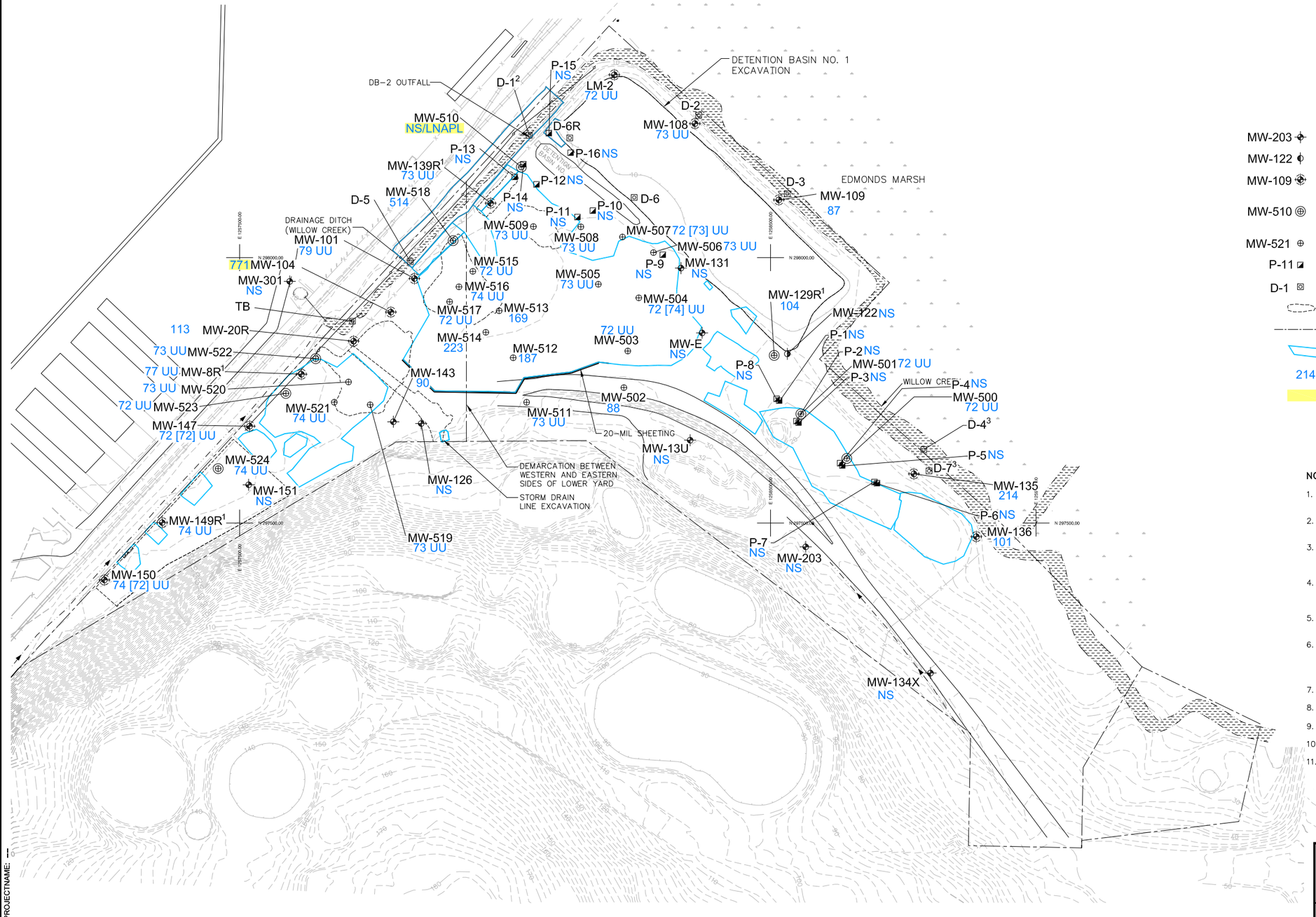

LEGEND:

MW-203	MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109	EXISTING SURFACE WATER COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION
MW-510	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
P-11	PIEZOMETER
D-1	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
214	TOTAL PETROLEUM HYDROCARBON (TPH)
	HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L

NOTES:

1. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. STAFF GAUGE D-1 RE-ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT.
3. STAFF GAUGE D-4 WAS ESTABLISHED PRIOR TO JUNE 2009 SAMPLING EVENT TO REPLACE STAFF GAUGE D-7 WHICH IS NOT WITHIN THE WILLOW CREEK CHANNEL.
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6. TPH = TOTAL PETROLEUM HYDROCARBONS. TOTAL TPH CALCULATED BY SUMMING THE CONCENTRATIONS OF GASOLINE, DIESEL AND HEAVY OIL. FOR RESULTS WHICH DID NOT EXCEED METHOD REPORTING LIMITS, HALF OF THE REPORTING LIMIT WAS ADDED TO DETERMINE TOTAL TPH.
7. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
8. UU = THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS.
9. [ ] INDICATES DUPLICATE SAMPLE.
10. LNAPL = LIGHT NON-AQUEOUS PHASE LIQUIDS.
11. NS = NOT SAMPLED.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
2011 ANNUAL GROUNDWATER MONITORING REPORT

FOURTH QUARTER, 2011 TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE 11

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: P. LISTER, P. LISTER, A.Schilling PM/TM: R. ANDRESEN LYR: ON=*;OFF=*REF (FRZ)
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45362X02
45362X00

ARCADIS

Appendix A

Edmonds, Washington Tide Tables

Edmonds, WA StationId: 9447427

Referenced to Station: SEATTLE (Madison St.), Elliott Bay (9447130)
Height offset in feet (low:*0.99 high: * 0.96) Time offset in mins (low:-4 high: 0)

Daily Tide Prediction in **Feet**
Time Zone: **LST/LDT**
Datum: **MLLW**

2011/03/21 - 2011/03/22

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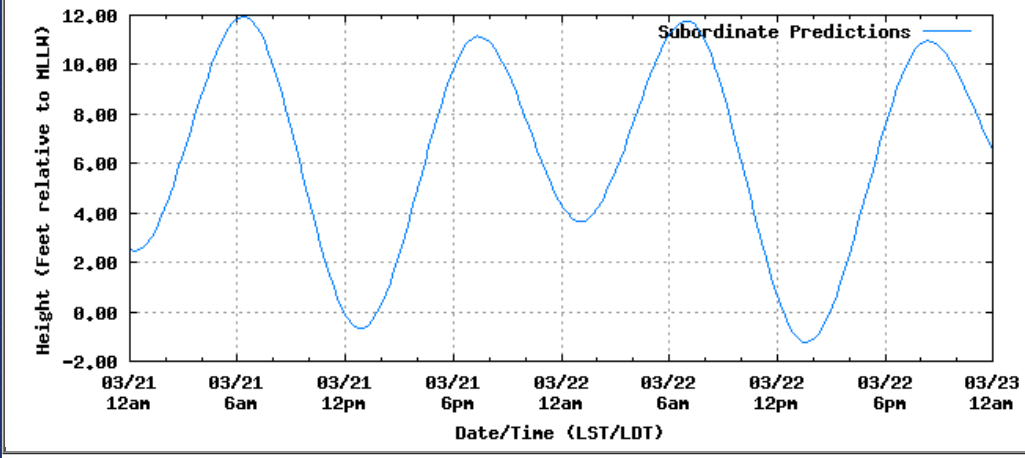

Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.
Note: For predictions of Subordinate stations, the solid blue line depicts a curve fit between the high and low values and approximates the segments between.

Begin Date: Mar 21 2011 | Time Range: Daily | Time Zone: LST/LDT | Data Units: Feet | Show Advanced Options

Submit Reset

Published Tide Tables Formats

Annual PDF | Annual TXT | Annual XML

Get Adobe Reader — Printer Friendly

High/Low Tide Predictions in Feet from 2011/03/21 - 2011/03/22

Download: TXT XML

Date	Day	Time	Hgt
03/21	Mon	12:18 AM	2.46 L
03/21	Mon	06:21 AM	11.93 H
03/21	Mon	12:50 PM	-0.68 L
03/21	Mon	07:23 PM	11.15 H
03/22	Tue	01:05 AM	3.64 L
03/22	Tue	06:58 AM	11.78 H
03/22	Tue	01:36 PM	-1.25 L
03/22	Tue	08:22 PM	10.97 H

Edmonds, WA StationId: 9447427

Referenced to Station: SEATTLE (Madison St.), Elliott Bay (9447130)
Height offset in feet (low:*0.99 high: * 0.96) Time offset in mins (low:-4 high: 0)

Daily Tide Prediction in **Feet**
Time Zone: **LST/LDT**
Datum: **MLLW**

2011/06/14 - 2011/06/15

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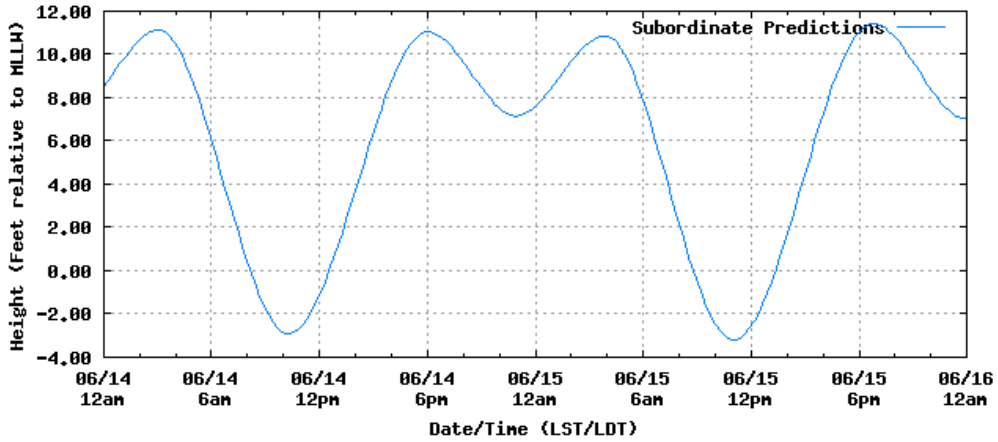

Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.
Note: For predictions of Subordinate stations, the solid blue line depicts a curve fit between the high and low values and approximates the segments between.

Begin Date: 03 21 2011 | Time Range: Daily | Time Zone: LST/LDT | Data Units: Feet | Show Advanced Options

Submit Reset

Published Tide Tables Formats

Annual PDF | Annual TXT | Annual XML

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High/Low Tide Predictions in Feet from 2011/06/14 - 2011/06/15

Download: TXT XML

Date	Day	Time	Hgt
06/14	Tue	03:04 AM	11.12 H
06/14	Tue	10:16 AM	-2.91 L
06/14	Tue	06:00 PM	11.04 H
06/14	Tue	10:56 PM	7.15 L
06/15	Wed	03:52 AM	10.87 H
06/15	Wed	11:00 AM	-3.21 L
06/15	Wed	06:45 PM	11.43 H
06/15	Wed	11:52 PM	7.07 L

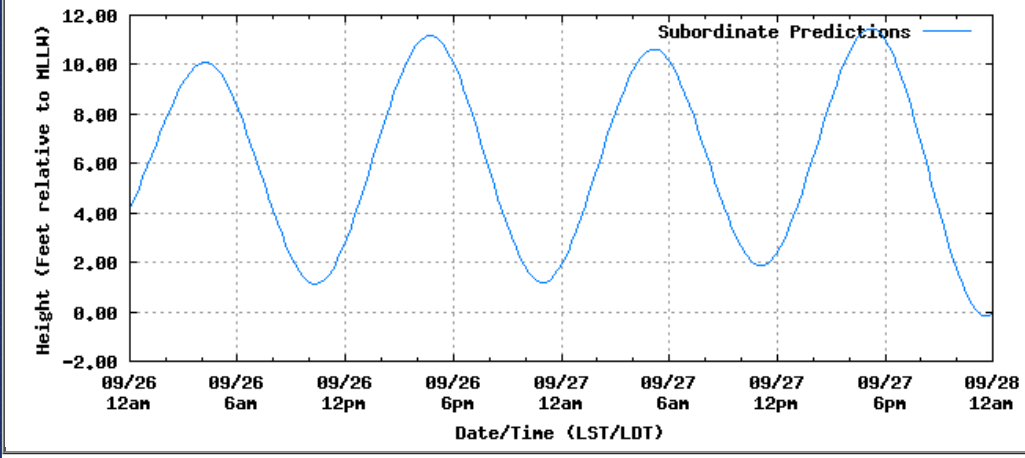
Edmonds, WA StationId: 9447427

Referenced to Station: SEATTLE (Madison St.), Elliott Bay (9447130)
Height offset in feet (low:*0.99 high: * 0.96) Time offset in mins (low:-4 high: 0)

Daily Tide Prediction in **Feet**
Time Zone: **LST/LDT**
Datum: **MLLW**

2011/09/26 - 2011/09/27

Back to Station Listing
Bookmark
Help



Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.
Note: For predictions of Subordinate stations, the solid blue line depicts a curve fit between the high and low values and approximates the segments between.

Begin Date: 03 / 21 / 2011 Time Range: Daily Time Zone: LST/LDT Data Units: Feet Show Advanced Options

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Published Tide Tables Formats

Annual PDF | Annual TXT | Annual XML

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High/Low Tide Predictions in Feet from 2011/09/26 - 2011/09/27

Download: TXT XML

Date	Day	Time	Hgt
09/26	Mon	04:13 AM	10.1 H
09/26	Mon	10:20 AM	1.11 L
09/26	Mon	04:42 PM	11.18 H
09/26	Mon	10:57 PM	1.18 L
09/27	Tue	05:08 AM	10.63 H
09/27	Tue	11:06 AM	1.85 L
09/27	Tue	05:14 PM	11.45 H
09/27	Tue	11:38 PM	-0.18 L

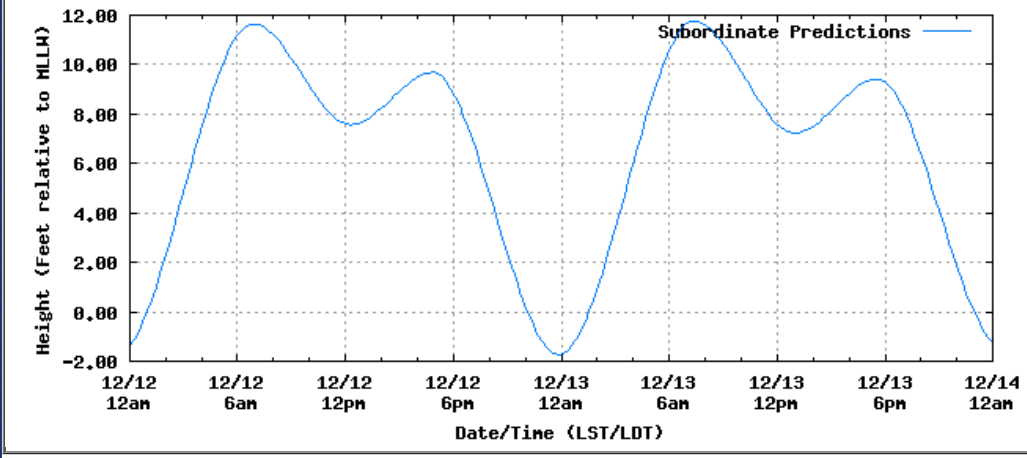
Edmonds, WA StationId: 9447427

Referenced to Station: SEATTLE (Madison St.), Elliott Bay (9447130)
Height offset in feet (low:*0.99 high: * 0.96) Time offset in mins (low:-4 high: 0)

Daily Tide Prediction in **Feet**
Time Zone: **LST/LDT**
Datum: **MLLW**

2011/12/12 - 2011/12/13

Back to Station Listing
Bookmark
Help



Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.
Note: For predictions of Subordinate stations, the solid blue line depicts a curve fit between the high and low values and approximates the segments between.

Begin Date: 03 / 21 / 2011 | Time Range: Daily | Time Zone: LST/LDT | Data Units: Feet

Show Advanced Options

Submit Reset

Published Tide Tables Formats

Annual PDF | Annual TXT | Annual XML

Get Adobe Reader

Printer Friendly

High/Low Tide Predictions in Feet from 2011/12/12 - 2011/12/13

Download: TXT XML

Date	Day	Time	Hgt
12/12	Mon	06:51 AM	11.65 H
12/12	Mon	12:17 PM	7.57 L
12/12	Mon	04:50 PM	9.68 H
12/12	Mon	11:51 PM	-1.74 L
12/13	Tue	07:23 AM	11.77 H
12/13	Tue	12:58 PM	7.23 L
12/13	Tue	05:34 PM	9.41 H

ARCADIS

Appendix B

First Quarter 2011 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Troll 9000 | Low-Flow System
03/23/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	6 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	LM-2
Well diameter	2 [in]
Well total depth	8 [ft]
Depth to top of screen	3 [ft]
Screen length	60 [in]
Depth to Water	1.88 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	626.78 [mL]
Calculated Sample Rate	251 [sec]
Sample rate	251 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	11:25:37	9.81	4.14	11757.78	3.66	1.13	0.31
	11:29:57	9.81	4.23	11963.88	6.08	0.97	0.30
	11:34:17	9.74	4.37	12554.00	9.99	0.80	0.27
	11:38:37	9.95	4.48	12911.67	16.61	0.79	0.25
	11:42:58	10.02	4.66	13889.26	2.54	0.70	0.22
Variance in last 3 readings	11:34:17	-0.07	0.14	590.12	3.91	-0.17	-0.02
	11:38:37	0.21	0.11	357.67	6.62	-0.01	-0.02
	11:42:58	0.07	0.17	977.59	-14.07	-0.08	-0.03

Notes: Sample ID = LM-2 @ 1150
final DO=.70
did not stabilize

ARCADIS

Troll 9000 | Low-Flow System
03/22/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-8R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.95 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	10:37:04	8.78	7.28	443.70	7.03	8.89	56.34
	10:40:09	8.74	7.29	443.94	5.41	8.85	52.48
	10:43:16	8.59	7.31	439.63	8.28	9.20	50.81
	10:46:23	8.56	7.31	439.95	3.43	9.58	49.87
	10:49:30	8.56	7.29	439.29	1.51	9.74	49.70
Variance in last 3 readings	10:43:16	-0.15	0.01	-4.31	2.87	0.36	-1.67
	10:46:23	-0.03	0.01	0.32	-4.85	0.38	-0.94
	10:49:30	0.00	-0.02	-0.66	-1.93	0.15	-0.17

Notes:

Sample ID = MW-8R @ 1150
DUP_1collected
DO= 9.47
No sheen was observed on purged water

ARCADIS

Troll 9000 | Low-Flow System
03/23/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-20R
Well diameter	2 [in]
Well total depth	14.4 [ft]
Depth to top of screen	4.4 [ft]
Screen length	120 [in]
Depth to Water	5.95 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	201 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.75 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:29:45	11.24	6.64	2448.08	6.70	1.13	-149.89
	13:32:52	11.03	6.68	2367.15	7.07	1.18	-145.22
	13:35:58	11.00	6.72	2394.69	6.54	1.14	-143.32
	13:39:06	10.99	6.75	2430.39	6.24	1.16	-143.31
	13:42:12	10.89	6.78	2467.63	8.90	1.08	-144.35
Variance in last 3 readings	13:35:58	-0.03	0.04	27.55	-0.53	-0.04	1.90
	13:39:06	-0.01	0.03	35.70	-0.30	0.02	0.02
	13:42:12	-0.10	0.03	37.23	2.66	-0.08	-1.05

Notes: Sample id= MW-20R @ 1445

purge water clear no sheen

ARCADIS

Troll 9000 | Low-Flow System
03/23/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	16 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-101
Well diameter	2 [in]
Well total depth	17.7 [ft]
Depth to top of screen	7.7 [ft]
Screen length	120 [in]
Depth to Water	7.75 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	671.42 [mL]
Calculated Sample Rate	202 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	10:59:57	12.01	6.72	315.22	5.09	8.57	47.88
	11:03:03	11.48	6.58	302.92	4.33	8.52	43.29
	11:06:10	11.19	6.55	296.78	2.42	8.31	42.25
	11:09:17	11.19	6.54	294.91	1.87	8.34	42.53
	11:12:23	11.14	6.53	294.78	1.42	8.40	43.50
Variance in last 3 readings	11:06:10	-0.28	-0.03	-6.14	-1.91	-0.21	-1.04
	11:09:17	-0.01	-0.01	-1.87	-0.55	0.03	0.28
	11:12:23	-0.05	-0.01	-0.12	-0.44	0.07	0.97

Notes: Sample ID = MW-101 @1215

no sheen was observed on the purge water

ARCADIS

Troll 9000 | Low-Flow System
03/23/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	25 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-104
Well diameter	2 [in]
Well total depth	18.2 [ft]
Depth to top of screen	8.25 [ft]
Screen length	120 [in]
Depth to Water	7.15 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	711.59 [mL]
Calculated Sample Rate	214 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:58:15	11.59	6.24	262.98	328.86	1.06	-105.93
	12:01:21	11.53	6.24	262.42	2806.38	1.08	-103.61
	12:04:27	11.43	6.22	263.36	877.47	1.10	-96.89
	12:07:33	11.36	6.25	266.36	2588.18	1.14	-99.88
	12:10:40	11.43	6.24	267.49	2769.72	1.21	-87.21
Variance in last 3 readings	12:04:27	-0.11	-0.02	0.93	-1928.91	0.02	6.72
	12:07:33	-0.06	0.03	3.00	1710.71	0.04	-2.99
	12:10:40	0.06	-0.01	1.13	181.53	0.08	12.66

Notes: Sample id= MW-104 @ 1315
purge water clear no sheen, orange biogrowth in purge water

ARCADIS

Troll 9000 | Low-Flow System
03/23/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-108
Well diameter	1 [in]
Well total depth	13.75 [ft]
Depth to top of screen	3.65 [ft]
Screen length	120 [in]
Depth to Water	5.89 [ft]

Pumping information:

Final pumping rate	100 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	401 [sec]
Sample rate	401 [sec]
Stabilized drawdown	3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	9:08:33	10.07	6.28	17331.31	6.82	0.20	-0.15
	9:15:29	10.25	6.30	18412.98	3.38	0.11	-0.17
	9:22:25	10.31	6.33	19048.15	1.37	0.08	-0.19
	9:29:22	10.23	6.36	19508.37	0.51	0.08	-0.20
	9:36:18	10.23	6.37	19719.42	0.07	0.07	-0.21
Variance in last 3 readings	9:22:25	0.06	0.03	635.18	-2.01	-0.02	-0.02
	9:29:22	-0.08	0.03	460.22	-0.86	0.00	-0.01
	9:36:18	0.00	0.02	211.05	-0.45	-0.01	-0.01

Notes: Sample ID = MW-108 @ 9:40
final DO=0.07 mg/L

ARCADIS

Troll 9000 | Low-Flow System
03/23/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First quarter GWM 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-109
Well diameter	1 [in]
Well total depth	13.4 [ft]
Depth to top of screen	3.3 [ft]
Screen length	120 [in]
Depth to Water	6.81 [ft]

Pumping information:

Final pumping rate	100 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	393 [sec]
Sample rate	393 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00
	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00
	7:50:24	8.78	5.82	7069.98	52.37	0.83	-0.05
	7:50:38	8.78	5.81	7015.50	53.60	0.79	-0.05
	7:57:26	9.10	6.09	9268.15	7.02	1.09	-0.11
Variance in last 3 readings	7:50:24	8.78	5.82	7069.98	52.37	0.83	-0.05
	7:50:38	0.00	0.00	-54.48	1.24	-0.04	0.00
	7:57:26	0.33	0.28	2252.65	-46.58	0.30	-0.06

Notes: MW-109 purged dry after 20 min/approx. 1 liters purged, began sampling after recharge.
Sample id = MW-109 @ 0805
do=1.09

ARCADIS

Troll 9000 | Low-Flow System
03/23/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-129R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	5.6 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	3.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:32:56	10.31	6.61	1371.04	3.81	0.08	-0.08
	13:36:19	10.26	6.60	1370.42	3.14	0.06	-0.09
	13:39:44	10.33	6.60	1369.93	2.74	0.05	-0.09
	13:43:07	10.35	6.60	1369.92	2.81	0.03	-0.09
	13:46:33	10.43	6.59	1371.42	2.98	0.02	-0.09
Variance in last 3 readings	13:39:44	0.07	0.00	-0.49	-0.40	-0.02	0.00
	13:43:07	0.02	0.00	-0.01	0.07	-0.02	0.00
	13:46:33	0.08	0.00	1.51	0.17	-0.01	0.00

Notes: Sample ID = MW-129R @ 1455
DO_0.02

the purge water was clear.no sheen

ARCADIS

Troll 9000 | Low-Flow System
03/24/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First quarter GWM 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-135
Well diameter	1 [in]
Well total depth	15.9 [ft]
Depth to top of screen	5.9 [ft]
Screen length	120 [in]
Depth to Water	10.53 [ft]

Pumping information:

Final pumping rate	100 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	401 [sec]
Sample rate	180 [sec]
Stabilized drawdown	12 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	8:19:43	9.59	6.48	759.77	68.48	0.52	-38.35
	8:22:49	9.70	6.49	732.54	41.25	0.53	-33.17
	8:25:55	10.06	6.48	696.99	16.83	0.40	-26.59
	8:29:02	9.85	6.48	728.42	9.30	0.30	-30.69
	8:32:09	9.90	6.48	733.84	9.40	0.26	-35.44
Variance in last 3 readings	8:25:55	0.35	-0.01	-35.55	-24.42	-0.13	6.59
	8:29:02	-0.20	0.00	31.43	-7.53	-0.10	-4.10
	8:32:09	0.05	0.01	5.43	0.09	-0.04	-4.75

Notes:

Sample ID = MW-135 @ 0935
DO=0.26 mg/L
no sheen on purge water.
did not stabilize

ARCADIS

Troll 9000 | Low-Flow System
03/24/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	14 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-136
Well diameter	1 [in]
Well total depth	13.87 [ft]
Depth to top of screen	4.1 [ft]
Screen length	120 [in]
Depth to Water	6.41 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	662.49 [mL]
Calculated Sample Rate	265 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	9:43:04	9.31	6.68	817.13	15.62	0.21	-71.25
	9:46:11	9.31	6.67	816.74	10.75	0.17	-73.09
	9:49:18	9.37	6.67	818.29	8.80	0.16	-74.68
	9:52:24	9.29	6.67	820.25	5.58	0.13	-75.96
	9:55:30	9.30	6.67	818.06	5.73	0.10	-76.91
Variance in last 3 readings	9:49:18	0.06	0.00	1.55	-1.95	-0.01	-1.59
	9:52:24	-0.08	0.00	1.96	-3.22	-0.03	-1.29
	9:55:30	0.00	0.00	-2.19	0.15	-0.03	-0.94

Notes: Sample id= MW-136 @1110

purge water appears clear. No sheen visible on purge water.

do=.10

ARCADIS

Troll 9000 Low-Flow System
03/23/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-139R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.03 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	262 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	8:10:48	8.03	6.99	332.02	0.02	2.33	36.54
	8:13:54	8.05	6.99	330.90	-0.05	2.24	34.05
	8:17:01	8.07	6.99	330.24	-0.09	2.23	32.12
	8:20:08	8.08	6.99	330.55	0.34	2.25	30.50
	8:23:14	8.09	7.00	330.92	0.01	2.21	28.44
Variance in last 3 readings	8:17:01	0.02	0.00	-0.66	-0.03	-0.01	-1.93
	8:20:08	0.01	0.00	0.30	0.43	0.02	-1.63
	8:23:14	0.01	0.01	0.37	-0.34	-0.04	-2.05

Notes: Sample ID = MW-139R @ 925
No sheen was observed on purge water.

ARCADIS

Troll 9000 | Low-Flow System
03/22/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-147
Well diameter	2 [in]
Well total depth	13.4 [ft]
Depth to top of screen	3.4 [ft]
Screen length	120 [in]
Depth to Water	4.85 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:28:43	8.97	6.33	466.98	59.43	0.35	2.34
	9:31:49	9.01	6.33	467.61	74.26	0.28	1.57
	9:34:56	9.01	6.33	468.25	46.60	0.26	1.62
	9:38:03	9.03	6.34	468.93	40.74	0.24	-0.86
	9:41:09	9.04	6.34	469.35	32.61	0.23	-2.01
Variance in last 3 readings	9:34:56	0.00	0.00	0.64	-27.65	-0.02	0.05
	9:38:03	0.02	0.00	0.68	-5.86	-0.01	-2.48
	9:41:09	0.01	0.00	0.42	-8.13	-0.02	-1.15

Notes: Sample id= MW-147 @1045
ORP did not stabilize
purge water clear.

ARCADIS

Troll 9000 | Low-Flow System
03/22/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First Quarter GWM 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	2.5 [ft]

Well Information:

Well Id	MW-149R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.78 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	0.6 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	8:03:58	7.88	6.42	689.36	25.06	5.85	0.27
	8:07:21	7.90	6.43	690.26	7.29	5.85	0.26
	8:10:46	7.91	6.43	689.84	1.46	5.85	0.25
	8:14:09	7.91	6.43	693.94	0.56	5.82	0.25
	8:17:34	7.90	6.43	699.04	0.69	5.79	0.24
Variance in last 3 readings	8:10:46	0.01	0.00	-0.41	-5.82	0.00	-0.01
	8:14:09	-0.01	0.00	4.10	-0.90	-0.03	-0.01
	8:17:34	-0.01	0.00	5.10	0.12	-0.02	0.00

Notes:

Sample ID = MW-149R @10:15
water appears very clear
no sheen observed on purged water
final DO=0.56 mg/L

ARCADIS

Troll 9000 | Low-Flow System
03/22/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	8 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-150
Well diameter	2 [in]
Well total depth	12.7 [ft]
Depth to top of screen	2.7 [ft]
Screen length	120 [in]
Depth to Water	5 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	635.71 [mL]
Calculated Sample Rate	191 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.05 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	8:15:45	8.39	6.25	375.36	0.74	3.62	149.80
	8:18:51	8.41	6.28	387.95	0.39	3.12	144.46
	8:21:57	8.40	6.33	403.89	0.53	2.78	139.42
	8:25:03	8.39	6.35	412.45	0.34	2.46	134.71
	8:28:11	8.39	6.38	420.40	0.47	2.18	130.14
Variance in last 3 readings	8:21:57	0.00	0.04	15.94	0.14	-0.34	-5.04
	8:25:03	-0.01	0.03	8.56	-0.19	-0.31	-4.70
	8:28:11	0.00	0.02	7.95	0.13	-0.28	-4.57

Notes:

Sample ID = MW-150
sample time = 930
no sheen visible in purge water
DO did not stabilize

ARCADIS

Troll 9000 | Low-Flow System
03/24/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First quarter GWM 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-500
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	2.35 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	262 [sec]
Sample rate	180 [sec]
Stabilized drawdown	5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	9:34:59	9.59	6.87	216.78	35.02	5.12	-0.02
	9:38:05	9.50	6.85	208.90	30.47	4.98	-0.02
	9:41:12	9.34	6.85	206.74	18.32	4.95	-0.02
	9:44:18	9.31	6.85	204.31	22.71	4.97	-0.02
	9:47:26	9.27	6.86	201.83	14.20	5.09	-0.02
Variance in last 3 readings	9:41:12	-0.16	0.00	-2.16	-12.15	-0.03	0.00
	9:44:18	-0.03	0.00	-2.43	4.39	0.03	0.00
	9:47:26	-0.05	0.01	-2.48	-8.51	0.11	0.00

Notes: sample mw-500 collected at 1055
purge water clear, no sheen, no odor

ARCADIS

Troll 9000 | Low-Flow System
03/24/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-501
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	1.45 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	258 [sec]
Sample rate	180 [sec]
Stabilized drawdown	7 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	8:07:05	9.90	6.47	242.65	9.85	0.34	-0.12
	8:10:11	9.88	6.48	241.04	8.91	0.27	-0.12
	8:13:18	9.86	6.48	241.01	7.75	0.25	-0.13
	8:16:23	9.81	6.48	241.25	10.76	0.20	-0.13
	8:19:31	9.79	6.48	240.96	13.07	0.20	-0.14
Variance in last 3 readings	8:13:18	-0.02	0.01	-0.02	-1.16	-0.02	0.00
	8:16:23	-0.05	0.00	0.24	3.01	-0.05	0.00
	8:19:31	-0.02	0.00	-0.29	2.31	0.00	0.00

Notes: Sample id= MW-501 @9:25

No sheen was observed on the purge water

ARCADIS

Troll 9000 | Low-Flow System
03/23/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-518
Well diameter	2 [in]
Well total depth	13.5 [ft]
Depth to top of screen	3.5 [ft]
Screen length	120 [in]
Depth to Water	7.2 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:25:37	9.10	6.60	624.41	297.66	0.32	-16.50
	9:28:43	9.10	6.60	625.26	309.39	0.29	-23.04
	9:31:51	9.11	6.60	628.87	304.56	0.29	-33.91
	9:34:57	9.04	6.60	627.22	312.67	0.27	-38.65
	9:38:04	9.03	6.60	628.96	309.64	0.31	-41.95
Variance in last 3 readings	9:31:51	0.01	0.00	3.61	-4.82	0.01	-10.86
	9:34:57	-0.07	0.00	-1.64	8.11	-0.02	-4.75
	9:38:04	-0.02	0.00	1.73	-3.03	0.03	-3.29

Notes:

Sample ID = MW-518 @ 10:40
No sheen was observed on purge water. Orange biogrowth in purge water
ORP would not stabilize
MS_MSD collected

ARCADIS

Troll 9000 | Low-Flow System
03/22/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13.5 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-522
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.01 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	660.26 [mL]
Calculated Sample Rate	199 [sec]
Sample rate	199 [sec]
Stabilized drawdown	3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	11:04:07	8.50	6.85	617.89	1.84	2.78	0.16
	11:07:33	8.52	6.84	606.66	1.71	2.63	0.15
	11:11:00	8.51	6.84	603.25	1.14	2.51	0.14
	11:14:25	8.55	6.84	598.29	3.52	2.31	0.13
	11:17:51	8.51	6.83	594.82	0.87	2.19	0.13
Variance in last 3 readings	11:11:00	-0.01	0.00	-3.42	-0.57	-0.12	-0.01
	11:14:25	0.04	0.00	-4.96	2.38	-0.20	-0.01
	11:17:51	-0.04	-0.01	-3.46	-2.65	-0.12	0.00

Notes: Sample id=MW-522 @1230
final DO = 2.19

ARCADIS

Troll 9000 | Low-Flow System
03/22/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First Quarter 2011 GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-523
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.58 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	157 [sec]
Sample rate	157 [sec]
Stabilized drawdown	0.03 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:57:19	8.23	6.57	417.76	0.01	1.25	0.21
	10:00:02	8.22	6.57	405.38	-0.39	1.32	0.21
	10:02:43	8.24	6.57	395.60	-0.32	1.40	0.21
	10:05:26	8.25	6.57	384.12	-0.10	1.48	0.21
	10:08:09	8.27	6.57	374.81	-0.54	1.56	0.21
Variance in last 3 readings	10:02:43	0.02	0.00	-9.79	0.07	0.09	0.00
	10:05:26	0.01	0.00	-11.48	0.22	0.08	0.00
	10:08:09	0.02	0.00	-9.30	-0.45	0.08	0.00

Notes: Sample id= MW-523 @ 1110
final DO=1.40
no sheen on purge water

ARCADIS

Troll 9000 Low-Flow System
03/22/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	First Quarter GWM 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12.5 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-524
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	5.73 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	655.79 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1	+/-0.1	+/-1	+/-0.1	+/-0.01
			+/-10 %	+/-10 %	+/-10 %	+/-15 %	+/-15 %
Last 5 Readings	8:55:57	7.69	6.74	602.63	14.58	10.69	0.24
	8:59:21	7.73	6.68	580.15	3.83	10.66	0.23
	9:02:44	7.79	6.67	554.52	1.60	10.46	0.23
	9:06:09	7.84	6.65	545.08	1.03	10.29	0.23
	9:09:32	7.86	6.65	533.47	0.56	10.20	0.23
Variance in last 3 readings	9:02:44	0.06	-0.01	-25.63	-2.22	-0.20	0.00
	9:06:09	0.06	-0.01	-9.44	-0.57	-0.16	0.00
	9:09:32	0.01	-0.01	-11.61	-0.47	-0.09	0.00

Notes: Sample ID= MW-524 @ 1020
no sheen was observed on purge water
final DO=10.20

ARCADIS

Appendix C

Second Quarter 2011 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter edmo
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	6 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	LM-2
Well diameter	2 [in]
Well total depth	8 [ft]
Depth to top of screen	3 [ft]
Screen length	60 [in]
Depth to Water	2.11 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	626.78 [mL]
Calculated Sample Rate	251 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:05:32	13.49	5.18	13550.35	9.51	0.37	227.82
	12:08:34	13.55	5.26	13628.40	10.59	0.59	217.65
	12:11:35	13.36	5.35	13974.49	13.62	0.66	199.60
	12:14:36	13.25	5.49	14681.29	8.60	0.64	158.24
	12:17:38	13.25	5.63	15089.79	6.96	0.77	114.45
Variance in last 3 readings	12:11:35	-0.20	0.09	346.09	3.04	0.07	-18.05
	12:14:36	-0.11	0.14	706.80	-5.02	-0.02	-41.36
	12:17:38	0.01	0.13	408.50	-1.64	0.13	-43.79

Notes: Sample ID = LM-2 @ 1230
final DO=0.77
Did not stabalize so 3 well volumes were purged.

ARCADIS

Troll 9000 | Low-Flow System
06/15/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Quarter GW Sampling
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	16 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-101
Well diameter	2 [in]
Well total depth	17.7 [ft]
Depth to top of screen	7.7 [ft]
Screen length	120 [in]
Depth to Water	8.99 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	671.42 [mL]
Calculated Sample Rate	202 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:55:15	13.85	6.38	287.41	3.48	1.65	-18.68
	14:58:26	13.79	6.38	291.16	0.43	1.57	-24.77
	15:01:35	13.75	6.39	295.35	0.40	1.48	-30.64
	15:04:41	13.59	6.40	297.18	0.52	1.45	-36.51
	15:07:47	13.40	6.41	299.58	0.39	1.37	-39.52
Variance in last 3 readings	15:01:35	-0.04	0.01	4.19	-0.04	-0.09	-5.87
	15:04:41	-0.16	0.01	1.83	0.12	-0.03	-5.87
	15:07:47	-0.19	0.01	2.40	-0.13	-0.09	-3.00

Notes: Sample ID = MW-101 @1515
DO = 1.37
no sheen was observed on the purge water. 3 well volumes purged.

ARCADIS

Troll 9000 Low-Flow System
06/15/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-104
Well diameter	2 [in]
Well total depth	18.2 [ft]
Depth to top of screen	8.2 [ft]
Screen length	120 [in]
Depth to Water	8.43 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:48:22	13.90	6.83	199.08	1.81	0.46	-77.19
	13:51:23	13.75	6.85	202.27	1.37	0.38	-79.12
	13:54:24	13.73	6.86	202.71	0.79	0.37	-78.48
	13:57:25	13.69	6.85	203.98	0.60	0.35	-77.42
	14:00:26	14.01	6.86	206.28	0.16	0.35	-74.09
Variance in last 3 readings	13:54:24	-0.02	0.01	0.43	-0.57	-0.02	0.64
	13:57:25	-0.03	0.00	1.28	-0.20	-0.01	1.07
	14:00:26	0.32	0.01	2.30	-0.44	0.00	3.33

Notes:

Sample id= MW-104 @ 1405
DO = 0.35
purge water clear no sheen
DUP_1

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter edmo
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-108
Well diameter	1 [in]
Well total depth	13.75 [ft]
Depth to top of screen	3.65 [ft]
Screen length	120 [in]
Depth to Water	6 [ft]

Pumping information:

Final pumping rate	125 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	321 [sec]
Sample rate	180 [sec]
Stabilized drawdown	3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:51:50	11.06	6.49	22102.47	11.00	0.07	-194.22
	10:54:51	11.06	6.49	21987.88	8.09	0.03	-202.39
	10:57:53	11.04	6.48	21877.72	4.14	0.01	-209.97
	11:00:54	11.03	6.48	21669.17	4.95	-0.01	-217.54
	11:03:55	11.48	7.09	2.47	12.16	10.45	-123.96
Variance in last 3 readings	10:57:53	-0.02	0.00	-110.16	-3.95	-0.03	-7.57
	11:00:54	0.00	0.00	-208.55	0.81	-0.01	-7.57
	11:03:55	0.45	0.60	-21666.70	7.21	10.46	93.58

Notes: Sample ID = MW-108 @ 1110
final DO=0.00

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter groun
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-109
Well diameter	1 [in]
Well total depth	13.4 [ft]
Depth to top of screen	3.3 [ft]
Screen length	120 [in]
Depth to Water	8.2 [ft]

Pumping information:

Final pumping rate	125 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	314 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:37:00	10.80	6.52	16549.08	12.00	2.50	-190.10
	9:40:01	10.88	6.56	17565.30	6.96	2.86	-195.58
	9:43:02	10.83	6.57	17857.28	3.92	3.03	-198.36
	9:46:04	10.87	6.59	18280.95	5.76	3.55	-196.10
	9:49:05	10.97	6.60	18539.99	3.29	4.74	-192.60
Variance in last 3 readings	9:43:02	-0.05	0.02	291.98	-3.04	0.18	-2.78
	9:46:04	0.04	0.01	423.67	1.84	0.51	2.26
	9:49:05	0.10	0.01	259.04	-2.47	1.19	3.50

Notes: MW-109 purged dry after 30 min/approx. 1.5 liters purged, began sampling after recharge.
Sample id = MW-109 @ 1005
do=unstabalized

ARCADIS

Troll 9000 | Low-Flow System
06/17/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter Edmc
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-129R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.37 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	3.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:39:31	12.54	6.61	1339.13	12.45	0.04	-132.93
	10:42:37	12.42	6.62	1342.76	10.24	0.02	-139.39
	10:45:44	12.26	6.62	1346.98	6.09	0.00	-145.04
	10:48:50	12.15	6.62	1351.18	3.50	-0.01	-150.01
	10:51:57	12.02	6.62	1354.03	2.17	-0.02	-154.59
Variance in last 3 readings	10:45:44	-0.16	0.00	4.22	-4.15	-0.02	-5.65
	10:48:50	-0.11	0.00	4.20	-2.59	-0.01	-4.97
	10:51:57	-0.13	0.00	2.86	-1.33	-0.01	-4.58

Notes: Sample ID = MW-129R @ 1055
DO -0.02

the purge water has no visible sheen

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second quarter GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-135
Well diameter	1 [in]
Well total depth	15.9 [ft]
Depth to top of screen	5.9 [ft]
Screen length	120 [in]
Depth to Water	11.22 [ft]

Pumping information:

Final pumping rate	100 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	401 [sec]
Sample rate	180 [sec]
Stabilized drawdown	6 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:33:08	10.88	6.49	914.87	33.02	0.16	-107.44
	9:36:14	10.78	6.49	930.56	29.43	0.12	-116.22
	9:39:21	10.72	6.48	941.33	6.78	0.08	-123.50
	9:42:28	10.68	6.47	949.16	3.55	0.07	-130.23
	9:45:34	10.71	6.47	948.66	3.33	0.06	-135.20
Variance in last 3 readings	9:39:21	-0.06	-0.01	10.77	-22.65	-0.04	-7.28
	9:42:28	-0.04	-0.01	7.83	-3.23	-0.01	-6.72
	9:45:34	0.03	0.00	-0.50	-0.22	-0.01	-4.97

Notes: Sample ID = MW-135 @ 950
DO=0.06 mg/L
no sheen on purge water.

ARCADIS

Troll 9000 | Low-Flow System
06/17/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	14 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-136
Well diameter	1 [in]
Well total depth	13.87 [ft]
Depth to top of screen	4.1 [ft]
Screen length	120 [in]
Depth to Water	7.71 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	662.49 [mL]
Calculated Sample Rate	265 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:32:28	10.66	6.83	656.00	12.72	0.15	-76.80
	9:35:34	10.48	6.84	654.62	8.87	0.09	-79.17
	9:38:41	10.43	6.85	652.44	4.27	0.07	-80.99
	9:41:47	10.38	6.86	649.64	3.65	0.05	-82.71
	9:44:53	10.30	6.86	645.43	2.41	0.03	-84.35
Variance in last 3 readings	9:38:41	-0.04	0.01	-2.17	-4.60	-0.03	-1.81
	9:41:47	-0.05	0.01	-2.81	-0.63	-0.02	-1.73
	9:44:53	-0.08	0.01	-4.20	-1.24	-0.02	-1.64

Notes: Sample id= MW-136 @1=950

purge water appears clear. No sheen visible on purge water.

do=0.03

ARCADIS

Troll 9000 Low-Flow System
06/16/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-139R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.02 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:45:20	14.35	6.98	316.54	0.12	2.26	-76.48
	10:48:26	14.25	6.97	316.26	1.80	2.22	-83.07
	10:51:33	14.18	6.97	316.19	-0.20	2.15	-85.90
	10:54:40	14.10	6.96	316.08	-0.25	2.09	-87.40
	10:57:46	14.06	6.96	316.01	-0.24	2.03	-87.66
Variance in last 3 readings	10:51:33	-0.07	0.00	-0.07	-2.00	-0.07	-2.83
	10:54:40	-0.08	-0.01	-0.11	-0.06	-0.06	-1.50
	10:57:46	-0.04	0.00	-0.06	0.01	-0.06	-0.26

Notes:

Sample ID = MW-139R @ 1100
MS_MSD
No sheen was observed on purge water.
final DO=2.03

ARCADIS

Troll 9000 | Low-Flow System
06/15/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-143
Well diameter	2 [in]
Well total depth	13.78 [ft]
Depth to top of screen	3.78 [ft]
Screen length	120 [in]
Depth to Water	4.45 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:38:58	15.18	6.39	496.77	11.66	0.17	-106.08
	13:42:05	14.97	6.41	518.68	4.30	0.12	-116.11
	13:45:11	14.79	6.41	520.87	2.96	0.11	-122.75
	13:48:18	14.59	6.40	522.17	1.39	0.13	-126.95
	13:51:24	14.43	6.39	524.00	1.06	0.11	-130.89
Variance in last 3 readings	13:45:11	-0.18	0.00	2.19	-1.33	-0.01	-6.64
	13:48:18	-0.20	0.00	1.30	-1.58	0.02	-4.20
	13:51:24	-0.16	-0.01	1.83	-0.32	-0.02	-3.94

Notes: Sample id= MW-143 @ 1400
DO =0.11

no sheen was observed on purge water

ARCADIS

Troll 9000 | Low-Flow System
06/15/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter 2010
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	16 [ft]
Pump placement from TOC	10 [ft]

Well Information:

Well Id	MW-147
Well diameter	2 [in]
Well total depth	13.4 [ft]
Depth to top of screen	3.4 [ft]
Screen length	120 [in]
Depth to Water	5.58 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	671.42 [mL]
Calculated Sample Rate	202 [sec]
Sample rate	202 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:46:17	12.64	6.56	610.66	464.33	-0.08	-211.82
	9:49:46	12.21	6.48	570.01	122.06	-0.06	-220.39
	9:53:15	12.10	6.47	568.06	69.57	-0.04	-230.15
	9:56:45	11.98	6.46	567.88	30.21	-0.03	-234.60
	10:00:14	11.99	6.45	568.26	21.25	-0.02	-237.13
Variance in last 3 readings	9:53:15	-0.11	-0.01	-1.95	-52.49	0.02	-9.76
	9:56:45	-0.12	-0.01	-0.18	-39.36	0.01	-4.45
	10:00:14	0.01	-0.01	0.38	-8.96	0.01	-2.53

Notes: Sample id= MW-147 @1010
final DO = not written down

purge water clear.

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	2.5 [ft]

Well Information:

Well Id	MW-149R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.5 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	157 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:02:57	14.76	6.50	513.47	0.88	2.32	-20.02
	14:06:04	14.66	6.49	511.64	0.72	2.24	-23.16
	14:09:11	14.62	6.49	507.17	0.09	2.26	-24.23
	14:12:17	14.84	6.48	508.76	0.17	2.33	-22.78
	14:15:23	14.94	6.48	507.21	-0.02	2.28	-22.91
Variance in last 3 readings	14:09:11	-0.03	-0.01	-4.47	-0.64	0.02	-1.08
	14:12:17	0.21	-0.01	1.59	0.08	0.07	1.45
	14:15:23	0.10	0.00	-1.55	-0.19	-0.05	-0.13

Notes: Sample ID = MW-149R @1425
water appears very clear
no sheen observed on purged water
final DO=2.28

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-150
Well diameter	2 [in]
Well total depth	12.7 [ft]
Depth to top of screen	2.7 [ft]
Screen length	120 [in]
Depth to Water	6.75 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:14:42	14.12	6.94	558.48	16.58	0.12	11.58
	14:17:48	14.19	6.94	556.37	20.67	0.06	11.41
	14:20:55	14.13	6.94	553.61	15.88	0.03	12.15
	14:24:01	14.15	6.94	552.01	15.04	0.03	12.45
	14:27:07	14.04	6.93	548.91	14.87	0.02	12.62
Variance in last 3 readings	14:20:55	-0.05	0.00	-2.76	-4.79	-0.03	0.73
	14:24:01	0.01	0.00	-1.60	-0.84	-0.01	0.30
	14:27:07	-0.11	0.00	-3.10	-0.17	0.00	0.17

Notes:

Sample ID = MW-150
sample time = 1430
DO=0.02 mg-L
no sheen visible in purge water

ARCADIS

Troll 9000 Low-Flow System
06/15/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-20R
Well diameter	2 [in]
Well total depth	14.4 [ft]
Depth to top of screen	4.4 [ft]
Screen length	120 [in]
Depth to Water	6.85 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	201 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:43:27	12.72	6.65	8045.58	1.54	0.16	-49.35
	14:46:34	12.71	6.66	8583.85	1.10	0.14	-51.27
	14:49:41	12.71	6.66	8767.14	1.41	0.11	-53.03
	14:52:48	12.81	6.67	8945.97	1.07	0.09	-56.53
	14:55:54	12.92	6.67	9024.99	0.68	0.08	-59.53
Variance in last 3 readings	14:49:41	0.00	0.00	183.30	0.31	-0.03	-1.75
	14:52:48	0.10	0.01	178.83	-0.34	-0.02	-3.51
	14:55:54	0.11	0.01	79.02	-0.39	-0.02	-2.99

Notes: Sample id= MW-20R @ 15:02
DO=0.08 mg/L

purge water clear no sheen

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-500
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.78 [ft]

Pumping information:

Final pumping rate	125 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	314 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:43:08	13.92	6.33	624.15	0.46	0.21	-23.42
	9:46:09	13.93	6.33	620.50	0.16	0.18	-24.36
	9:49:10	13.97	6.32	599.99	0.81	0.18	-25.35
	9:52:12	13.95	6.32	566.61	0.66	0.18	-27.87
	9:55:13	13.95	6.32	550.44	0.32	0.17	-31.93
Variance in last 3 readings	9:49:10	0.04	0.00	-20.51	0.66	0.00	-0.98
	9:52:12	-0.02	0.00	-33.38	-0.15	0.00	-2.52
	9:55:13	0.00	0.00	-16.17	-0.34	-0.01	-4.06

Notes: sample time =957
do=0.18
No sheen on purge water

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-501
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	3.55 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	258 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:07:35	14.91	6.48	463.74	4.86	0.25	-67.74
	11:10:37	14.96	6.48	464.30	4.55	0.21	-70.35
	11:13:37	15.04	6.47	465.08	4.30	0.18	-72.74
	11:16:38	15.07	6.47	467.05	4.79	0.16	-74.58
	11:19:39	15.07	6.47	467.76	2.81	0.14	-76.21
Variance in last 3 readings	11:13:37	0.08	0.00	0.77	-0.25	-0.03	-2.40
	11:16:38	0.04	0.00	1.97	0.49	-0.02	-1.84
	11:19:39	-0.01	0.00	0.71	-1.98	-0.02	-1.63

Notes: Sample id= MW-501 @11:25
DO=0.14 mg/L

No sheen was observed on the purge water

ARCADIS

Troll 9000 | Low-Flow System
06/17/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	2.5 [ft]

Well Information:

Well Id	MW-502
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.9 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:31:34	15.24	6.50	286.23	4.96	0.15	29.04
	11:34:40	15.30	6.53	278.42	4.86	0.11	28.25
	11:37:47	15.08	6.55	275.90	8.64	0.09	27.08
	11:40:54	14.99	6.55	276.37	11.64	0.07	26.00
	11:44:01	14.83	6.55	275.27	13.18	0.05	24.48
Variance in last 3 readings	11:37:47	-0.22	0.02	-2.52	3.78	-0.02	-1.17
	11:40:54	-0.09	0.00	0.46	3.00	-0.02	-1.08
	11:44:01	-0.15	0.00	-1.10	1.53	-0.02	-1.51

Notes: Sample id= MW-502 @11:45
DO=0.05 mg/L

purge water appears clear-No sheen.

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	DR	Pump Model/Type	GeoPump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Second Quarter 2011	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	11 [ft]
		Pump placement from TOC	3 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-503	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	649.1 [mL]
Well total depth	13 [ft]	Calculated Sample Rate	195 [sec]
Depth to top of screen	3 [ft]	Sample rate	180 [sec]
Screen length	120 [in]	Stabilized drawdown	1 [in]
Depth to Water	5.1 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.15 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:34:48	14.00	6.64	459.32	8.23	0.15	-24.97
	10:37:54	13.78	6.64	458.25	7.68	0.08	-25.88
	10:41:01	13.69	6.63	454.59	4.10	0.05	-26.76
	10:44:07	13.43	6.63	449.53	3.53	0.03	-28.24
	10:47:15	13.36	6.62	447.43	2.90	0.02	-29.42
Variance in last 3 readings	10:41:01	-0.09	-0.01	-3.66	-3.58	-0.04	-0.88
	10:44:07	-0.26	0.00	-5.05	-0.57	-0.02	-1.48
	10:47:15	-0.07	-0.01	-2.11	-0.63	-0.01	-1.18

Notes: Sample id=MW-503 @1050
DUP4
DO=0.02 mg/L

no sheen visible on purge water.

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-504
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.51 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	158 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:59:00	14.74	7.07	366.71	-0.38	0.65	65.66
	13:02:02	14.95	7.07	368.81	-0.10	0.60	64.50
	13:05:03	15.11	7.07	374.31	-0.38	0.61	62.75
	13:08:05	15.34	7.07	378.44	-0.10	0.59	61.08
	13:11:06	15.51	7.06	380.64	-0.28	0.59	60.74
Variance in last 3 readings	13:05:03	0.15	0.00	5.50	-0.29	0.00	-1.75
	13:08:05	0.23	0.00	4.13	0.28	-0.02	-1.67
	13:11:06	0.17	0.00	2.19	-0.18	0.00	-0.34

Notes: Sample ID = MW-504 @ 1316
purge water clear no sheen
final DO= 0.59

ARCADIS

Troll 9000 | Low-Flow System
06/17/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second quarter GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-505
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.61 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:39:53	31.80	7.04	1.27	3.34	6.88	3.66
	13:42:59	31.77	7.04	1.27	0.61	7.09	3.31
	13:46:06	31.93	7.04	1.26	0.39	7.21	3.70
	13:49:12	32.41	7.04	1.25	0.20	7.28	3.23
	13:52:20	33.37	7.04	1.23	0.44	7.33	18.92
Variance in last 3 readings	13:46:06	0.15	0.00	0.00	-0.22	0.11	0.39
	13:49:12	0.49	0.00	-0.01	-0.19	0.08	-0.47
	13:52:20	0.96	0.00	-0.02	0.23	0.04	15.69

Notes: Sample ID = MW-505 @ 1300
purge water clear no sheen

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-506
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	4 [ft]
Screen length	120 [in]
Depth to Water	6.6 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:07:03	13.54	7.18	364.29	0.46	0.19	-189.09
	14:10:09	13.53	7.18	364.59	1.09	0.15	-210.55
	14:13:16	13.51	7.17	365.60	0.47	0.13	-223.62
	14:16:22	13.28	7.16	365.89	0.51	0.10	-240.32
	14:19:28	13.40	7.17	365.42	0.30	0.11	-233.77
Variance in last 3 readings	14:13:16	-0.02	-0.01	1.01	-0.62	-0.02	-13.07
	14:16:22	-0.23	-0.01	0.29	0.05	-0.03	-16.71
	14:19:28	0.12	0.00	-0.47	-0.21	0.00	6.56

Notes: Sample ID =MW-506 @ 1420
DO=0.11 mg/L

No sheen was observed on the purge water

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-507
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.95 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:16:29	27.78	7.29	1.36	3.70	7.71	-17.71
	12:19:36	27.95	7.22	1.35	3.59	7.58	25.49
	12:22:42	28.22	7.04	1.35	3.41	7.51	22.20
	12:25:49	28.29	7.04	1.35	3.43	7.44	17.06
	12:28:56	28.53	7.04	1.34	3.44	7.31	11.58
Variance in last 3 readings	12:22:42	0.27	-0.18	-0.01	-0.18	-0.07	-3.29
	12:25:49	0.06	0.00	0.00	0.01	-0.08	-5.13
	12:28:56	0.25	0.00	-0.01	0.01	-0.12	-5.48

Notes: Sample ID= MW-507 @ 1200
No sheen was observed on purge water

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-508
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.84 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	157 [sec]
Sample rate	180 [sec]
Stabilized drawdown	3.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:28:00	14.80	6.38	694.34	4.20	0.03	62.65
	14:31:03	14.65	6.38	698.25	3.49	0.03	50.07
	14:34:03	14.34	6.39	695.17	4.09	0.02	39.75
	14:37:05	14.21	6.39	697.88	3.47	0.02	32.35
	14:40:06	14.17	6.38	697.02	1.80	0.02	27.98
Variance in last 3 readings	14:34:03	-0.31	0.00	-3.09	0.60	-0.01	-10.31
	14:37:05	-0.13	0.00	2.71	-0.62	0.00	-7.41
	14:40:06	-0.04	-0.01	-0.86	-1.67	-0.01	-4.37

Notes:

Sample ID = MW-508 @ 1450
final DO=0.02
No sheen observed on purge water.
pumped 3 well volumes ORP did not stabilize

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-509
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	3.45 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:01:34	15.75	6.83	252.28	14.77	0.36	-174.80
	12:04:40	15.77	6.81	251.46	6.67	0.35	-180.84
	12:07:47	15.79	6.81	250.41	3.07	0.35	-182.21
	12:10:53	15.78	6.81	250.12	2.29	0.37	-182.17
	12:14:00	15.80	6.83	249.96	1.34	0.40	-181.74
Variance in last 3 readings	12:07:47	0.02	0.00	-1.05	-3.59	0.00	-1.37
	12:10:53	-0.01	-0.01	-0.30	-0.79	0.01	0.04
	12:14:00	0.03	0.02	-0.16	-0.95	0.03	0.43

Notes: Sample ID = MW-509 @ 1215
purge water clear no sheen
final DO= 0.40 mg/L

ARCADIS

Troll 9000 Low-Flow System
06/20/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-510
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.35 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:26:02	13.13	6.43	724.47	7.68	0.09	-126.21
	9:29:08	13.04	6.43	718.87	5.26	0.03	-135.38
	9:32:14	13.04	6.44	709.63	4.73	0.01	-141.11
	9:35:21	13.03	6.45	702.74	6.22	0.00	-145.31
	9:38:27	13.04	6.45	696.99	4.65	-0.02	-148.99
Variance in last 3 readings	9:32:14	0.00	0.01	-9.23	-0.53	-0.02	-5.74
	9:35:21	-0.01	0.01	-6.90	1.49	-0.02	-4.20
	9:38:27	0.02	0.00	-5.74	-1.57	-0.01	-3.68

Notes: Sample ID = MW-510 at 0940
Sheen was observed on purge water. DO=-0.02

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	14 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-511
Well diameter	2 [in]
Well total depth	15 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.3 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	662.49 [mL]
Calculated Sample Rate	199 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:50:39	12.11	6.73	191.06	2.71	4.81	144.10
	12:53:45	11.94	6.72	191.43	0.10	4.58	150.46
	12:56:52	11.86	6.73	191.18	0.17	4.49	154.46
	12:59:58	11.85	6.76	191.61	-0.17	4.42	157.44
	13:03:05	11.84	6.73	191.64	0.48	4.38	160.00
Variance in last 3 readings	12:56:52	-0.09	0.01	-0.25	0.06	-0.09	4.01
	12:59:58	0.00	0.02	0.43	-0.34	-0.07	2.98
	13:03:05	-0.01	-0.02	0.03	0.65	-0.04	2.56

Notes: Sample id=MW-511 @1305

final DO=4.38
no sheen visible on purge water.

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second quarter edmor
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-512
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.4 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:01:21	14.99	6.90	423.63	0.67	0.23	-183.25
	13:04:26	14.99	6.88	407.44	0.64	0.25	-176.74
	13:07:34	14.97	6.87	395.48	0.95	0.28	-170.61
	13:10:40	14.98	6.85	388.32	0.76	0.31	-166.59
	13:13:47	14.99	6.84	383.26	0.56	0.34	-162.09
Variance in last 3 readings	13:07:34	-0.02	-0.01	-11.96	0.30	0.03	6.12
	13:10:40	0.01	-0.02	-7.17	-0.19	0.03	4.03
	13:13:47	0.00	-0.01	-5.05	-0.20	0.03	4.50

Notes: Sample id=MW-512 @1315

NO sheen on purge water- clear

DO =0.34mgL

ARCADIS

Troll 9000 Low-Flow System
06/16/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	11 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-513
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.26 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	649.1 [mL]
Calculated Sample Rate	195 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:24:14	14.80	6.78	309.13	6.01	0.25	-68.46
	14:27:20	14.79	6.79	305.26	4.95	0.22	-68.64
	14:30:27	14.75	6.78	301.71	4.08	0.21	-68.04
	14:33:33	14.65	6.77	298.13	2.15	0.21	-67.39
	14:36:40	14.59	6.78	295.08	1.56	0.23	-66.49
Variance in last 3 readings	14:30:27	-0.03	-0.01	-3.55	-0.87	-0.01	0.60
	14:33:33	-0.10	-0.01	-3.58	-1.93	0.01	0.64
	14:36:40	-0.06	0.01	-3.04	-0.59	0.01	0.90

Notes: Sample id= MW-513 @ 14:43

DO=0.23 mg/L

no sheen on purge water

ARCADIS

Troll 9000 Low-Flow System
06/16/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	11 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-514
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.57 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	649.1 [mL]
Calculated Sample Rate	195 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:26:19	15.05	6.65	312.18	2.96	0.25	-59.01
	13:29:25	15.09	6.65	311.47	0.88	0.20	-60.85
	13:32:33	15.17	6.65	308.33	1.17	0.18	-61.54
	13:35:39	15.24	6.64	303.69	0.16	0.18	-60.89
	13:38:45	15.28	6.64	299.84	0.44	0.19	-60.25
Variance in last 3 readings	13:32:33	0.09	0.00	-3.14	0.30	-0.02	-0.68
	13:35:39	0.07	0.00	-4.64	-1.01	0.00	0.64
	13:38:45	0.04	0.00	-3.84	0.28	0.01	0.64

Notes: Sample ID = MW-514 @ 13:45
DO=0.19 mg/L

purge water appears clear with no sheen

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Edmonds GWM 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-515
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.77 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:08:41	14.41	6.76	303.11	0.84	0.63	21.98
	10:11:47	14.38	6.75	298.01	0.36	0.63	19.46
	10:14:54	14.44	6.75	298.36	0.43	0.60	19.07
	10:18:00	14.44	6.75	300.21	0.31	0.59	18.35
	10:21:06	14.42	6.75	297.75	0.24	0.59	18.00
Variance in last 3 readings	10:14:54	0.06	0.00	0.35	0.07	-0.02	-0.38
	10:18:00	0.00	0.00	1.85	-0.12	-0.02	-0.73
	10:21:06	-0.01	0.00	-2.45	-0.07	0.00	-0.34

Notes: Sample ID = MW-515 @ 1026
no sheen on ppurge water, clear
DO=0.59

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	11 [ft]
Pump placement from TOC	2.5 [ft]

Well Information:

Well Id	MW-516
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.42 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	649.1 [mL]
Calculated Sample Rate	156 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.1 +/-15 %
Last 5 Readings	11:15:41	16.08	6.73	294.06	0.00	1.88	129.68
	11:18:47	16.15	6.73	294.17	1.13	1.86	129.72
	11:21:54	16.14	6.73	294.97	0.15	1.82	129.89
	11:25:00	16.40	6.73	295.75	-0.20	1.77	129.63
	11:28:06	16.39	6.73	296.65	-0.24	1.73	130.10
Variance in last 3 readings	11:21:54	-0.01	0.00	0.80	-0.98	-0.05	0.17
	11:25:00	0.26	0.00	0.78	-0.36	-0.04	-0.26
	11:28:06	-0.01	0.00	0.89	-0.04	-0.05	0.47

Notes: sample id= MW-516 @ 1133
No sheen observed on water.
do=1.73

ARCADIS

Troll 9000 | Low-Flow System
06/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-517
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	5.17 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:22:21	15.59	6.75	275.19	2.91	1.97	67.09
	12:25:28	15.58	6.75	275.14	2.76	1.85	62.77
	12:28:34	15.56	6.75	275.23	1.18	1.82	60.37
	12:31:41	15.52	6.75	273.14	1.06	1.83	58.88
	12:34:47	15.49	6.75	272.50	0.91	1.93	57.89
Variance in last 3 readings	12:28:34	-0.03	0.00	0.09	-1.59	-0.03	-2.39
	12:31:41	-0.04	0.00	-2.09	-0.11	0.00	-1.50
	12:34:47	-0.03	0.00	-0.64	-0.15	0.10	-0.98

Notes: Sample ID = MW-517 @ 12:41
DO=1.93 mg/L

Purge water clear with no sheen.

ARCADIS

Troll 9000 Low-Flow System
06/16/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	DR	Pump Model/Type	Geopump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Second Quarter 2011	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	12 [ft]
		Pump placement from TOC	3 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-518	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	653.56 [mL]
Well total depth	13.5 [ft]	Calculated Sample Rate	197 [sec]
Depth to top of screen	3.5 [ft]	Sample rate	180 [sec]
Screen length	120 [in]	Stabilized drawdown	2 [in]
Depth to Water	8.19 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:51:17	13.16	6.54	530.64	2.60	0.63	-106.37
	9:54:24	13.19	6.54	537.80	1.16	0.62	-115.32
	9:57:30	13.46	6.55	535.13	0.70	0.59	-122.99
	10:00:37	13.26	6.55	544.23	0.52	0.56	-126.28
	10:03:44	13.35	6.55	535.33	0.54	0.55	-131.38
Variance in last 3 readings	9:57:30	0.27	0.01	-2.67	-0.46	-0.03	-7.67
	10:00:37	-0.19	0.00	9.09	-0.18	-0.03	-3.30
	10:03:44	0.08	0.01	-8.90	0.02	-0.01	-5.10

Notes: Sample ID = MW-518 @ 10:05
No sheen was observed on purge water.
final DO=0.55 mg/L

ARCADIS

Troll 9000 Low-Flow System
06/15/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-519
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.92 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:38:02	14.55	6.95	655.32	8.68	0.05	-65.38
	12:41:02	14.47	6.97	650.78	15.62	0.06	-68.64
	12:44:03	14.47	6.98	653.80	8.33	0.06	-72.25
	12:47:04	14.46	6.98	644.98	14.02	0.05	-75.72
	12:50:05	14.49	6.98	633.37	11.28	0.04	-78.98
Variance in last 3 readings	12:44:03	0.01	0.01	3.02	-7.29	0.00	-3.60
	12:47:04	-0.01	0.00	-8.83	5.69	0.00	-3.48
	12:50:05	0.02	0.00	-11.61	-2.74	-0.01	-3.26

Notes: Sample ID = MW-519 @ 1255

DO=0.04 mg/L

Purge water clear no sheen

ARCADIS

Troll 9000 Low-Flow System
06/15/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter2011 G
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-520
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	1 [ft]
Screen length	120 [in]
Depth to Water	7.6 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:32:37	14.56	6.67	309.74	-0.26	0.37	136.44
	12:35:44	14.46	6.67	313.02	0.00	0.33	132.46
	12:38:50	14.38	6.67	315.68	-0.01	0.31	122.20
	12:41:57	14.29	6.67	319.44	-0.30	0.28	105.39
	12:45:03	14.17	6.67	320.51	-0.41	0.27	90.80
Variance in last 3 readings	12:38:50	-0.08	0.00	2.66	-0.01	-0.03	-10.26
	12:41:57	-0.08	0.00	3.76	-0.29	-0.03	-16.81
	12:45:03	-0.13	0.00	1.07	-0.11	-0.01	-14.58

Notes: Sample ID = MW-520 @ 1255

No sheen was observed on purged water
DO: 0.28

ARCADIS

Troll 9000 Low-Flow System
06/15/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-521
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.5 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.02 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:01:50	14.30	6.64	399.85	499.16	0.50	-91.96
	12:04:56	14.32	6.61	384.93	29.16	0.50	-96.45
	12:08:03	14.25	6.62	381.49	8.21	0.54	-98.42
	12:11:09	14.28	6.62	375.55	6.04	0.60	-98.98
	12:14:15	14.40	6.61	372.80	6.11	0.64	-97.18
Variance in last 3 readings	12:08:03	-0.07	0.01	-3.45	-20.95	0.04	-1.97
	12:11:09	0.03	-0.01	-5.93	-2.17	0.06	-0.56
	12:14:15	0.12	-0.01	-2.75	0.07	0.05	1.80

Notes: Sample ID = MW-521 @ 1225
no sheen was observed on purged water
DO=0.64 mg/L

ARCADIS

Troll 9000 | Low-Flow System
06/15/11 | ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13.5 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-522
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	8.13 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	660.26 [mL]
Calculated Sample Rate	199 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:22:05	13.39	6.60	376.56	0.07	0.11	-0.55
	11:25:12	13.42	6.60	376.38	-0.22	0.11	0.14
	11:28:19	13.46	6.60	375.49	-0.22	0.11	-0.63
	11:31:25	13.47	6.61	377.28	0.12	0.10	-1.10
	11:34:31	13.49	6.60	377.37	-0.26	0.10	-1.49
Variance in last 3 readings	11:28:19	0.04	0.00	-0.89	0.00	0.00	-0.77
	11:31:25	0.01	0.00	1.79	0.34	0.00	-0.47
	11:34:31	0.03	0.00	0.09	-0.39	0.00	-0.39

Notes:

Sample id=MW-522 @1140
final DO = 0.10 mg/L
ORP did not stabilize
no sheen visible on purge water.

ARCADIS

Troll 9000 Low-Flow System
06/15/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-523
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.8 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	157 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:47:22	13.52	6.68	312.66	0.88	0.60	246.27
	9:50:28	13.45	6.68	306.41	0.24	0.56	231.04
	9:53:34	13.42	6.67	304.17	0.34	0.57	215.30
	9:56:42	13.42	6.67	303.00	-0.25	0.57	201.95
	9:59:48	13.38	6.67	302.45	0.18	0.58	190.11
Variance in last 3 readings	9:53:34	-0.03	0.00	-2.24	0.09	0.01	-15.74
	9:56:42	0.00	-0.01	-1.17	-0.59	0.00	-13.35
	9:59:48	-0.03	0.00	-0.55	0.43	0.01	-11.85

Notes: Sample id= MW-523 @ 1005
final DO=0.58
no sheen on purge water

ARCADIS

Troll 9000 Low-Flow System
06/17/11 ISI Low-Flow Log

Project Information:

Operator Name	HN
Company Name	ARCADIS
Project Name	Second quarter 2011 (
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12.5 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-524
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.76 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	655.79 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:25:18	15.38	6.68	347.55	1.16	4.84	105.39
	14:28:20	15.11	6.66	346.46	0.88	4.83	115.06
	14:31:21	14.97	6.65	347.39	0.75	4.76	121.95
	14:34:23	14.85	6.64	341.17	0.70	4.59	127.21
	14:37:24	14.72	6.64	341.50	0.40	4.52	131.49
Variance in last 3 readings	14:31:21	-0.14	-0.01	0.93	-0.14	-0.07	6.89
	14:34:23	-0.12	-0.01	-6.23	-0.05	-0.17	5.26
	14:37:24	-0.13	0.00	0.33	-0.29	-0.06	4.28

Notes: Sample ID= MW-524 @ 1444
no sheen was observed on purge water
final DO=4.52

ARCADIS

Troll 9000 Low-Flow System
06/15/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Second Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-8R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	8.15 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.03 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:06:45	15.59	6.69	418.31	0.08	0.56	-104.33
	11:09:53	14.26	6.69	419.37	-0.07	0.53	-112.13
	11:12:59	14.19	6.69	416.82	0.18	0.43	-123.31
	11:16:06	14.16	6.69	417.64	-0.22	0.37	-133.80
	11:19:11	14.09	6.69	417.10	-0.12	0.34	-144.04
Variance in last 3 readings	11:12:59	-0.07	0.00	-2.55	0.25	-0.10	-11.18
	11:16:06	-0.03	0.00	0.82	-0.40	-0.06	-10.49
	11:19:11	-0.06	0.00	-0.55	0.10	-0.03	-10.24

Notes: Sample ID = MW-8R @ 1120
DO= 0.34
No sheen was observed on purged water, purged 3 volumes.ORP did not stabilize

ARCADIS

Appendix D

Third Quarter 2011 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Troll 9000 | Low-Flow System
09/28/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Third Quarter edmond
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	6 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	LM-2
Well diameter	2 [in]
Well total depth	8 [ft]
Depth to top of screen	3 [ft]
Screen length	60 [in]
Depth to Water	2.82 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	626.78 [mL]
Calculated Sample Rate	251 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:07:00	15.13	5.90	22921.27	3.35	2.06	-88.21
	13:10:07	15.14	5.91	23071.57	2.97	2.17	-91.20
	13:13:12	15.13	5.92	23039.68	2.84	2.25	-93.21
	13:16:19	15.15	5.93	23111.48	2.78	2.34	-95.27
	13:19:26	15.16	5.93	23201.98	4.50	2.44	-96.55
Variance in last 3 readings	13:13:12	-0.01	0.01	-31.89	-0.14	0.07	-2.01
	13:16:19	0.02	0.01	71.80	-0.06	0.09	-2.05
	13:19:26	0.00	0.01	90.50	1.72	0.10	-1.28

Notes: Sample ID = LM-2 @ 1320
final DO=2.34 but unstable
Did not stabaze so 3 well volumes were purged.

ARCADIS

Troll 9000 Low-Flow System
09/27/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	DR	Pump Model/Type	Geopump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Third Quarter GW Sar	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	16 [ft]
		Pump placement from TOC	3 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-101	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	671.42 [mL]
Well total depth	17.7 [ft]	Calculated Sample Rate	202 [sec]
Depth to top of screen	7.7 [ft]	Sample rate	180 [sec]
Screen length	120 [in]	Stabilized drawdown	1 [in]
Depth to Water	9.6 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:41:43	17.27	6.35	2201.05	0.77	1.08	36.84
	13:44:49	17.44	6.34	2328.58	1.06	1.04	36.21
	13:47:56	17.59	6.33	2400.78	1.17	1.02	36.08
	13:51:02	17.63	6.33	2479.03	1.38	1.01	35.92
	13:54:09	17.67	6.32	2529.39	1.12	0.96	35.58
Variance in last 3 readings	13:47:56	0.14	-0.01	72.21	0.11	-0.02	-0.13
	13:51:02	0.04	-0.01	78.24	0.21	-0.01	-0.17
	13:54:09	0.04	-0.01	50.36	-0.26	-0.05	-0.34

Notes: Sample ID = MW-101 @1357
DO = 0.96
no sheen was observed on the purge water.

ARCADIS

Troll 9000 Low-Flow System
09/27/11 ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Third quarter 2011 GV
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-104
Well diameter	2 [in]
Well total depth	18.2 [ft]
Depth to top of screen	8.2 [ft]
Screen length	120 [in]
Depth to Water	8.46 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:05:32	16.25	6.41	917.41	10.22	0.06	-103.46
	13:08:38	16.21	6.40	920.06	110.45	0.05	-104.40
	13:11:46	16.15	6.39	924.59	58.71	0.04	-104.60
	13:14:52	16.16	6.40	910.53	127.48	0.04	-105.41
	13:17:59	16.13	6.39	905.27	476.84	0.02	-106.22
Variance in last 3 readings	13:11:46	-0.06	-0.01	4.53	-51.73	-0.01	-0.21
	13:14:52	0.01	0.00	-14.05	68.76	-0.01	-0.81
	13:17:59	-0.02	-0.01	-5.27	349.36	-0.02	-0.81

Notes: Sample id= MW-104 @ 1320
DO = 0.02
purge water clear no sheen

ARCADIS

Troll 9000 Low-Flow System
09/28/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	SWM	Pump Model/Type	Geopump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Third Quarter edmond	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	15 [ft]
		Pump placement from TOC	2 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-108	Final pumping rate	125 [mL/min]
Well diameter	1 [in]	Flowcell volume	666.95 [mL]
Well total depth	13.75 [ft]	Calculated Sample Rate	321 [sec]
Depth to top of screen	3.65 [ft]	Sample rate	180 [sec]
Screen length	120 [in]	Stabilized drawdown	3 [in]
Depth to Water	6.3 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:44:49	11.87	6.43	16628.32	10.34	0.44	-180.40
	10:47:56	11.86	6.45	16537.34	1.93	0.48	-185.32
	10:51:02	11.83	6.46	16459.12	4.56	0.46	-190.62
	10:54:09	11.84	6.48	16207.90	2.59	0.43	-192.89
	10:57:14	11.83	6.49	16068.42	2.81	0.66	-201.78
Variance in last 3 readings	10:51:02	-0.02	0.01	-78.21	2.62	-0.02	-5.30
	10:54:09	0.00	0.02	-251.22	-1.97	-0.03	-2.27
	10:57:14	-0.01	0.01	-139.48	0.23	0.23	-8.89

Notes: Sample ID = MW-108 @ 1100
final DO=0.66

ARCADIS

Troll 9000 | Low-Flow System
09/28/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Third Quarter groundv
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-109
Well diameter	1 [in]
Well total depth	13.4 [ft]
Depth to top of screen	3.3 [ft]
Screen length	120 [in]
Depth to Water	6.84 [ft]

Pumping information:

Final pumping rate	125 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	314 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00
	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00
	9:30:49	14.50	6.13	1.27	16.66	10.28	242.28
	9:35:01	13.06	6.23	14994.54	57.83	1.87	-111.78
	9:38:06	12.94	6.28	17149.31	25.22	1.42	-128.33
Variance in last 3 readings	9:30:49	14.50	6.13	1.27	16.66	10.28	242.28
	9:35:01	-1.43	0.10	14993.27	41.17	-8.40	-354.07
	9:38:06	-0.12	0.05	2154.78	-32.61	-0.45	-16.55

Notes: MW-109 purged dry after 20 min/approx. 1.0 liters purged, began sampling after recharge.
Sample id = MW-109 @ 0950
do=unstabalized

ARCADIS

Troll 9000 Low-Flow System
09/28/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Third quarter 2011 GV
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-129R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.4 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:26:24	13.31	6.73	1416.20	4.29	0.18	-88.73
	12:29:48	13.51	6.72	1417.89	3.87	0.15	-89.15
	12:33:13	13.46	6.72	1426.95	6.18	0.16	-91.50
	12:36:36	13.63	6.72	1431.35	9.74	0.15	-93.29
	12:40:01	13.72	6.72	1445.28	9.26	0.15	-93.66
Variance in last 3 readings	12:33:13	-0.05	0.00	9.06	2.31	0.00	-2.35
	12:36:36	0.16	0.00	4.40	3.56	-0.01	-1.79
	12:40:01	0.09	0.00	13.93	-0.48	0.01	-0.37

Notes: Sample ID = MW-129R at 1255

sheen was observed on purge water. Small amount of LNAPL on if probe
final DO=0.15

ARCADIS

Troll 9000 | Low-Flow System
09/28/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Third quarter 2011 GV
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-135
Well diameter	1 [in]
Well total depth	15.9 [ft]
Depth to top of screen	5.9 [ft]
Screen length	120 [in]
Depth to Water	11.24 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	267 [sec]
Sample rate	267 [sec]
Stabilized drawdown	6 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:27:25	12.14	6.60	2456.78	0.63	0.44	-54.90
	10:32:03	12.09	6.60	2502.71	0.33	0.32	-54.75
	10:36:40	12.05	6.59	2489.71	0.17	0.28	-54.55
	10:41:15	12.06	6.60	2467.08	0.01	0.25	-53.84
	10:45:52	12.08	6.59	2452.23	-0.03	0.24	-52.82
Variance in last 3 readings	10:36:40	-0.04	0.00	-13.00	-0.16	-0.03	0.20
	10:41:15	0.01	0.00	-22.63	-0.16	-0.03	0.71
	10:45:52	0.02	0.00	-14.85	-0.04	-0.01	1.02

Notes: Sample ID = MW-135 @ 1055
DO=0.24 mg/L
no sheen on purge water.

ARCADIS

Troll 9000 Low-Flow System
09/28/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Third Quarter 2011 G\
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	14 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-136
Well diameter	1 [in]
Well total depth	13.87 [ft]
Depth to top of screen	4.1 [ft]
Screen length	120 [in]
Depth to Water	8.55 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	662.49 [mL]
Calculated Sample Rate	265 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:49:53	12.82	6.49	756.93	9.76	0.21	-62.32
	10:52:59	12.63	6.50	765.91	9.09	0.16	-63.52
	10:56:06	12.44	6.50	775.97	14.48	0.14	-64.29
	10:59:12	12.35	6.49	779.00	24.11	0.11	-64.89
	11:02:20	12.29	6.50	787.33	6.35	0.10	-65.45
Variance in last 3 readings	10:56:06	-0.19	0.00	10.06	5.39	-0.03	-0.77
	10:59:12	-0.09	-0.01	3.02	9.63	-0.02	-0.60
	11:02:20	-0.06	0.01	8.34	-17.76	-0.01	-0.56

Notes: Sample id= MW-136 @1=1104

purge water appears clear. No sheen visible on purge water.

do=.=0.10

ARCADIS

Troll 9000 | Low-Flow System
09/27/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Third quarter 2011 GV
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-139R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.59 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:02:51	20.69	7.05	368.16	0.03	0.30	-88.20
	14:05:57	21.13	7.04	372.46	0.00	0.30	-90.12
	14:09:04	21.14	7.04	373.66	0.29	0.30	-91.02
	14:12:10	21.07	7.03	372.15	0.40	0.32	-90.59
	14:15:16	20.78	7.03	368.89	0.68	0.29	-89.69
Variance in last 3 readings	14:09:04	0.01	0.00	1.21	0.29	0.00	-0.90
	14:12:10	-0.07	-0.01	-1.52	0.11	0.02	0.43
	14:15:16	-0.28	0.00	-3.25	0.28	-0.03	0.90

Notes: Sample ID = MW-139R @ 1440
No sheen was observed on purge water.
final DO=0.04

ARCADIS

Troll 9000 | Low-Flow System
09/27/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Third Quarter 2011 G\
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	16 [ft]
Pump placement from TOC	10 [ft]

Well Information:

Well Id	MW-147
Well diameter	2 [in]
Well total depth	13.4 [ft]
Depth to top of screen	3.4 [ft]
Screen length	120 [in]
Depth to Water	5.62 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	671.42 [mL]
Calculated Sample Rate	202 [sec]
Sample rate	202 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:49:48	13.90	6.49	366.31	7.08	0.11	-52.55
	10:53:17	14.04	6.48	360.94	4.91	0.08	-57.86
	10:56:47	14.27	6.48	355.30	4.58	0.06	-61.62
	11:00:16	14.42	6.48	350.90	3.59	0.05	-65.08
	11:03:45	14.36	6.48	346.47	5.36	0.04	-67.60
Variance in last 3 readings	10:56:47	0.22	0.00	-5.64	-0.32	-0.02	-3.76
	11:00:16	0.15	0.00	-4.40	-1.00	-0.01	-3.46
	11:03:45	-0.06	0.00	-4.43	1.77	-0.01	-2.52

Notes: Sample id= MW-147 @1115
final DO = 0.04

purge water clear.

ARCADIS

Troll 9000 | Low-Flow System
09/27/11 | ISI Low-Flow Log

Project Information:

Operator Name	SW M
Company Name	ARCADIS
Project Name	Third Quarter GWM 2
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	2.5 [ft]

Well Information:

Well Id	MW-149R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.8 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	157 [sec]
Sample rate	180 [sec]
Stabilized drawdown	3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:58:29	15.51	6.48	460.39	8.10	0.07	69.00
	10:01:35	15.50	6.49	460.10	12.33	0.07	69.08
	10:04:42	15.50	6.48	459.94	41.43	0.06	68.87
	10:07:48	15.51	6.50	459.91	28.34	0.07	68.32
	10:10:55	15.50	6.49	458.97	32.64	0.06	67.38
Variance in last 3 readings	10:04:42	0.00	0.00	-0.16	29.10	0.00	-0.21
	10:07:48	0.01	0.01	-0.03	-13.08	0.00	-0.55
	10:10:55	-0.01	-0.01	-0.94	4.30	0.00	-0.94

Notes:

Sample ID = MW-149R @1010
water appears very clear
no sheen observed on purged water
final DO=0.06

ARCADIS

Troll 9000 Low-Flow System
09/27/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	SLM	Pump Model/Type	GeoPump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Third Quarter 2011 Sa	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	10 [ft]
		Pump placement from TOC	3 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-150	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	644.63 [mL]
Well total depth	12.7 [ft]	Calculated Sample Rate	194 [sec]
Depth to top of screen	2.7 [ft]	Sample rate	194 [sec]
Screen length	120 [in]	Stabilized drawdown	0 [in]
Depth to Water	7.09 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:55:55	16.40	6.62	578.72	4.13	0.01	-12.35
	9:59:17	16.42	6.62	587.72	5.08	0.00	-13.60
	10:02:38	16.40	6.62	596.57	6.48	0.00	-14.32
	10:05:59	16.41	6.62	604.06	6.91	-0.01	-15.27
	10:09:20	16.45	6.62	610.16	12.64	-0.01	-15.95
Variance in last 3 readings	10:02:38	-0.02	0.00	8.85	1.40	-0.01	-0.73
	10:05:59	0.01	0.00	7.49	0.43	0.00	-0.94
	10:09:20	0.04	0.00	6.11	5.73	0.00	-0.69

Notes:

Sample ID = MW-150
sample time = 1015
DO=-0.01 mg-L
no sheen visible in purge water

ARCADIS

Troll 9000 | Low-Flow System
09/27/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Third quarter 2011 GV
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-20R
Well diameter	2 [in]
Well total depth	14.4 [ft]
Depth to top of screen	4.4 [ft]
Screen length	120 [in]
Depth to Water	6.8 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	201 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:25:36	15.03	6.86	22522.10	3.12	0.20	-64.76
	12:28:43	15.08	6.87	22410.49	1.42	0.17	-66.26
	12:31:49	15.11	6.87	22354.23	1.51	0.15	-67.00
	12:34:57	15.15	6.86	21888.64	1.30	0.13	-70.09
	12:38:03	15.07	6.86	22155.10	1.38	0.12	-73.05
Variance in last 3 readings	12:31:49	0.03	0.00	-56.26	0.08	-0.03	-0.74
	12:34:57	0.04	-0.01	-465.59	-0.21	-0.02	-3.09
	12:38:03	-0.08	0.00	266.46	0.08	-0.01	-2.96

Notes: Sample id= MW-20R @ 1241
DO=0.12 mg/L

purge water clear no sheen

ARCADIS

Troll 9000 Low-Flow System
09/28/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Third quarter 2011 GV
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-500
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.18 [ft]

Pumping information:

Final pumping rate	125 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	314 [sec]
Sample rate	180 [sec]
Stabilized drawdown	4 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:10:39	17.05	6.24	1006.83	184.85	0.15	-50.65
	9:13:46	17.10	6.23	988.32	434.35	0.14	-48.30
	9:16:53	17.14	6.22	990.42	89.00	0.13	-47.36
	9:19:59	17.15	6.23	997.73	94.11	0.12	-48.35
	9:23:05	17.13	6.24	1020.80	307.37	0.11	-48.86
Variance in last 3 readings	9:16:53	0.04	0.00	2.10	-345.35	0.00	0.94
	9:19:59	0.01	0.01	7.31	5.11	-0.02	-0.98
	9:23:05	-0.02	0.01	23.08	213.26	-0.01	-0.51

Notes: sample time =927
DUP_2 collected
do=0.11
No sheen on purge water

ARCADIS

Troll 9000 | Low-Flow System
09/28/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Third quarter 2011 GV
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-501
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.71 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	258 [sec]
Sample rate	258 [sec]
Stabilized drawdown	0.2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	8:54:16	16.45	6.45	1157.59	4.01	0.11	-63.62
	8:58:43	16.70	6.46	1159.91	2.39	0.10	-63.18
	9:03:10	16.75	6.46	1169.20	1.88	0.10	-63.26
	9:07:38	16.79	6.46	1178.30	2.38	0.11	-65.01
	9:12:05	16.77	6.46	1188.85	3.21	0.11	-66.59
Variance in last 3 readings	9:03:10	0.04	0.00	9.29	-0.52	0.00	-0.08
	9:07:38	0.04	0.00	9.09	0.51	0.00	-1.75
	9:12:05	-0.02	0.00	10.56	0.82	0.01	-1.57

Notes: Sample id= MW-501 @0915
do=0.11

No sheen was observed on the purge water

ARCADIS

Troll 9000 | Low-Flow System
09/27/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Third Quarter 2011 G\
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-518
Well diameter	2 [in]
Well total depth	13.5 [ft]
Depth to top of screen	3.5 [ft]
Screen length	120 [in]
Depth to Water	8.87 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:39:58	18.22	6.88	427.42	15.73	0.10	-96.45
	13:43:21	18.28	6.84	439.89	11.61	0.09	-89.86
	13:46:46	18.21	6.80	447.43	7.56	0.10	-84.05
	13:50:10	18.19	6.77	456.05	4.21	0.12	-80.58
	13:53:35	18.21	6.77	462.93	1.94	0.14	-78.87
Variance in last 3 readings	13:46:46	-0.07	-0.04	7.54	-4.05	0.01	5.81
	13:50:10	-0.01	-0.03	8.62	-3.35	0.02	3.46
	13:53:35	0.01	-0.01	6.87	-2.26	0.02	1.71

Notes: Sample ID = MW-518 @ 1405
No sheen was observed on purge water.
final DO=0.14

ARCADIS

Troll 9000 | Low-Flow System
09/27/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Third Quarter 2011 G\
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13.5 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-522
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	8.37 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	660.26 [mL]
Calculated Sample Rate	199 [sec]
Sample rate	199 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:48:52	17.19	6.59	521.18	8.49	0.07	-42.62
	11:52:18	17.16	6.60	518.17	7.70	0.05	-46.68
	11:55:45	17.14	6.61	515.96	4.99	0.04	-49.46
	11:59:12	17.14	6.61	514.10	3.61	0.03	-51.81
	12:02:37	17.14	6.62	513.08	1.99	0.02	-53.82
Variance in last 3 readings	11:55:45	-0.02	0.01	-2.21	-2.71	-0.02	-2.78
	11:59:12	0.00	0.01	-1.86	-1.38	-0.01	-2.35
	12:02:37	0.00	0.01	-1.03	-1.63	-0.01	-2.01

Notes:

Sample id=MW-522 @1215
final DO = 0.02 mg/L
WELL IS DUP-1
no sheen visible on purge water.

ARCADIS

Troll 9000 Low-Flow System
09/27/11 ISI Low-Flow Log

Project Information:

Operator Name	swm
Company Name	ARCADIS
Project Name	Third Quarter 2011 Sa
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-523
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.98 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	157 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:13:34	18.15	6.60	487.62	19.38	0.12	41.33
	11:16:41	18.15	6.60	487.26	19.01	0.11	38.72
	11:19:47	18.17	6.59	487.05	17.28	0.11	36.58
	11:22:54	18.16	6.59	486.69	18.79	0.11	34.78
	11:26:00	18.19	6.59	486.85	26.64	0.10	32.98
Variance in last 3 readings	11:19:47	0.03	-0.01	-0.21	-1.74	0.00	-2.14
	11:22:54	-0.01	0.00	-0.36	1.51	0.00	-1.80
	11:26:00	0.03	0.00	0.16	7.85	0.00	-1.80

Notes: Sample id= MW-523 @ 1130
final DO=0.10
no sheen on purge water

ARCADIS

Troll 9000 | Low-Flow System
09/27/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Third quarter 2011 GV
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12.5 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-524
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.77 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	655.79 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [mS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:24:41	17.50	6.52	0.35	1.30	0.65	192.29
	10:27:47	17.42	6.52	0.34	1.25	0.57	184.97
	10:30:53	17.28	6.52	0.34	1.11	0.56	180.64
	10:34:00	17.17	6.52	0.34	0.59	0.54	178.41
	10:37:08	17.10	6.53	0.34	0.78	0.51	177.59
Variance in last 3 readings	10:30:53	-0.14	0.01	0.00	-0.14	-0.01	-4.33
	10:34:00	-0.11	0.00	0.00	-0.52	-0.03	-2.23
	10:37:08	-0.07	0.01	0.00	0.19	-0.03	-0.82

Notes: Sample ID= MW-524 @ 1039
no sheen was observed on purge water
final DO=0.51

ARCADIS

Troll 9000 Low-Flow System
09/27/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	DR	Pump Model/Type	Geopump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Third Quarter 2011 G\	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	13 [ft]
		Pump placement from TOC	3 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-8R	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	658.02 [mL]
Well total depth	13 [ft]	Calculated Sample Rate	198 [sec]
Depth to top of screen	3 [ft]	Sample rate	180 [sec]
Screen length	120 [in]	Stabilized drawdown	1 [in]
Depth to Water	8.25 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [mS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:34:45	18.61	6.68	0.54	0.20	0.54	-5.88
	11:37:52	18.63	6.68	0.54	0.11	0.55	-7.54
	11:40:58	18.65	6.68	0.53	0.36	0.57	-9.08
	11:44:05	18.66	6.67	0.53	0.61	0.59	-9.71
	11:47:11	18.66	6.67	0.53	0.22	0.60	-11.29
Variance in last 3 readings	11:40:58	0.02	0.00	0.00	0.25	0.02	-1.54
	11:44:05	0.01	0.00	0.00	0.25	0.02	-0.64
	11:47:11	0.00	0.00	0.00	-0.39	0.01	-1.58

Notes: Sample ID = MW-8R @ 1151
DO= 0.60
No sheen was observed on purged water, purged 3 volumes.ORP did not stabilize

ARCADIS

Appendix E

Fourth Quarter 2011 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Troll 9000 Low-Flow System
12/16/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth quarter 2011ec
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	6 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	LM-2
Well diameter	2 [in]
Well total depth	8 [ft]
Depth to top of screen	3 [ft]
Screen length	60 [in]
Depth to Water	2.57 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	626.78 [mL]
Calculated Sample Rate	251 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:32:04	9.84	4.18	17104.54	5.56	0.74	0.36
	11:35:11	9.84	4.13	17027.88	3.23	0.81	0.37
	11:38:17	9.87	4.11	17017.13	4.42	0.84	0.37
	11:41:24	9.88	4.10	17038.08	3.30	0.85	0.37
	11:44:30	9.90	4.12	17054.02	9.17	0.85	0.37
Variance in last 3 readings	11:38:17	0.03	-0.02	-10.75	1.20	0.03	0.00
	11:41:24	0.01	0.00	20.95	-1.12	0.02	0.00
	11:44:30	0.02	0.01	15.94	5.87	0.00	0.00

Notes: Sample ID = LM-2 @ 1200
final DO=0.85
3.4=FE

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	16 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-101
Well diameter	2 [in]
Well total depth	17.7 [ft]
Depth to top of screen	7.7 [ft]
Screen length	120 [in]
Depth to Water	8.83 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	671.42 [mL]
Calculated Sample Rate	202 [sec]
Sample rate	202 [sec]
Stabilized drawdown	0.8 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:09:49	54.34	6.54	923.41	0.01	1.16	0.11
	13:13:13	54.37	6.52	991.96	-0.05	1.04	0.11
	13:16:37	54.41	6.53	1013.59	-0.53	0.99	0.11
	13:20:00	54.43	6.53	1081.73	-0.45	0.97	0.10
	13:23:24	54.44	6.54	1095.90	-0.41	0.95	0.10
Variance in last 3 readings	13:16:37	0.04	0.01	21.63	-0.49	-0.05	0.00
	13:20:00	0.02	0.00	68.15	0.08	-0.02	0.00
	13:23:24	0.01	0.00	14.17	0.04	-0.02	0.00

Notes: Sample ID = MW-101 @1305
DO = 1.35mg/L FE= 0
no sheen was observed on the purge water

ARCADIS

Troll 9000 Low-Flow System
12/13/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	25 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-104
Well diameter	2 [in]
Well total depth	18.2 [ft]
Depth to top of screen	8.2 [ft]
Screen length	120 [in]
Depth to Water	8.13 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	711.59 [mL]
Calculated Sample Rate	214 [sec]
Sample rate	214 [sec]
Stabilized drawdown	1.25 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [µg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:56:33	12.22	6.17	774.53	323.28	129.36	-0.01
	11:00:15	12.18	6.18	799.50	278.47	120.97	-0.01
	11:03:57	12.01	6.19	822.79	153.33	124.32	-0.01
	11:07:39	11.89	6.19	843.68	193.39	136.91	-0.01
	11:11:21	11.82	6.19	863.19	375.36	142.79	-0.01
Variance in last 3 readings	11:03:57	-0.17	0.01	23.29	-125.14	3.36	0.00
	11:07:39	-0.12	0.00	20.88	40.05	12.59	0.00
	11:11:21	-0.07	0.01	19.51	181.97	5.87	0.00

Notes:

Sample id= MW-104 @ 1120
DO = missed
purge water clear no sheen
Fe=3.0

ARCADIS

Troll 9000 | Low-Flow System
12/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth quarter edmon
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-108
Well diameter	1 [in]
Well total depth	13.75 [ft]
Depth to top of screen	3.65 [ft]
Screen length	120 [in]
Depth to Water	6.5 [ft]

Pumping information:

Final pumping rate	125 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	321 [sec]
Sample rate	160 [sec]
Stabilized drawdown	3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:13:24	10.83	6.29	20574.46	74.99	0.16	-0.09
	10:16:10	10.85	6.28	20443.32	61.16	0.11	-0.10
	10:18:55	10.91	6.27	20269.60	42.37	0.09	-0.10
	10:21:41	10.96	6.27	20171.97	23.90	0.09	-0.10
	10:24:27	11.04	6.27	20084.25	13.21	0.07	-0.11
Variance in last 3 readings	10:18:55	0.06	-0.01	-173.72	-18.79	-0.02	0.00
	10:21:41	0.05	0.00	-97.63	-18.47	0.00	0.00
	10:24:27	0.08	0.00	-87.72	-10.69	-0.01	0.00

Notes: Sample ID = MW-108 @ 1050
final DO=0.07 mg/L
2.0=fe

ARCADIS

Troll 9000 | Low-Flow System
12/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth quarter 2011gr
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-109
Well diameter	1 [in]
Well total depth	13.4 [ft]
Depth to top of screen	3.3 [ft]
Screen length	120 [in]
Depth to Water	8.91 [ft]

Pumping information:

Final pumping rate	125 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	314 [sec]
Sample rate	160 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:10:20	10.62	6.31	13539.20	3.29	1.57	-0.10
	9:13:05	10.58	6.33	13631.02	1.97	1.75	-0.10
	9:15:51	10.52	6.34	13602.99	1.69	1.71	-0.11
	9:18:37	10.47	6.35	13590.12	1.20	1.66	-0.11
	9:21:22	10.43	6.35	13573.50	0.74	1.60	-0.12
Variance in last 3 readings	9:15:51	-0.06	0.01	-28.04	-0.28	-0.04	-0.01
	9:18:37	-0.05	0.00	-12.87	-0.49	-0.05	0.00
	9:21:22	-0.04	0.01	-16.62	-0.45	-0.06	0.00

Notes:

MW-109
Sample id = MW-109 @ 0940
Fe=0.6
do=1.60

ARCADIS

Troll 9000 Low-Flow System
12/19/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 E
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-129R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.41 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	180 [sec]
Stabilized drawdown	3.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:04:41	10.75	6.50	1461.94	5.13	0.14	-0.11
	10:07:43	10.87	6.51	1461.82	3.60	0.08	-0.11
	10:10:43	10.99	6.52	1507.74	17.58	0.05	-0.11
	10:13:45	11.13	6.52	1590.85	39.27	0.03	-0.11
	10:16:46	11.24	6.52	1679.97	17.09	0.01	-0.11
Variance in last 3 readings	10:10:43	0.12	0.00	45.92	13.99	-0.03	0.00
	10:13:45	0.13	0.00	83.11	21.68	-0.02	0.00
	10:16:46	0.11	0.01	89.12	-22.18	-0.02	0.00

Notes: Sample ID = MW-129R @ 1040
DO 0.01
FE=5.0

the purge water has visible sheen

ARCADIS

Troll 9000 | Low-Flow System
12/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	slm
Company Name	ARCADIS
Project Name	Fourth quarter 2011 G
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	15 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-135
Well diameter	1 [in]
Well total depth	15.9 [ft]
Depth to top of screen	5.9 [ft]
Screen length	120 [in]
Depth to Water	11.37 [ft]

Pumping information:

Final pumping rate	100 [mL/min]
Flowcell volume	666.95 [mL]
Calculated Sample Rate	401 [sec]
Sample rate	180 [sec]
Stabilized drawdown	12 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:45:13	10.97	6.59	1253.97	29.27	0.14	-0.01
	13:48:19	10.98	6.58	1249.31	21.05	0.11	-0.02
	13:51:27	10.98	6.58	1233.64	13.73	0.08	-0.02
	13:54:33	11.00	6.57	1215.07	9.68	0.06	-0.02
	13:57:39	11.01	6.57	1200.88	7.09	0.04	-0.02
Variance in last 3 readings	13:51:27	0.00	-0.01	-15.68	-7.32	-0.03	0.00
	13:54:33	0.02	0.00	-18.57	-4.05	-0.02	0.00
	13:57:39	0.02	0.00	-14.19	-2.59	-0.02	0.00

Notes:

Sample ID = MW-135 @ 1420
DO=0.04 mg/L
Fe=7 mg/L
no sheen on purge water.

ARCADIS

Troll 9000 | Low-Flow System
12/16/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	14 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-136
Well diameter	1 [in]
Well total depth	13.87 [ft]
Depth to top of screen	4.1 [ft]
Screen length	120 [in]
Depth to Water	7.82 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	662.49 [mL]
Calculated Sample Rate	265 [sec]
Sample rate	265 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:41:30	10.96	6.44	2927438.00	1.68	0.02	-84.27
	13:46:05	10.98	6.44	2933228.50	1.80	0.02	-87.14
	13:50:39	10.99	6.44	2939695.75	2.82	0.00	-90.05
	13:55:14	11.02	6.44	2951423.25	19.12	0.00	-92.32
	13:59:49	11.04	6.43	2964572.75	18.49	-0.01	-94.97
Variance in last 3 readings	13:50:39	0.01	0.00	6467.25	1.02	-0.01	-2.91
	13:55:14	0.03	0.00	11727.50	16.31	0.00	-2.27
	13:59:49	0.02	0.00	13149.50	-0.64	-0.01	-2.65

Notes: Sample id= MW-136 @1405

purge water appears clear. No sheen visible on purge water.

do=-0.01
fe=2.0

ARCADIS

Troll 9000 Low-Flow System
12/15/11 ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-139R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.01 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:17:23	51.30	7.02	256.62	317.23	3.29	0.08
	12:20:41	51.25	7.01	257.28	334.06	3.07	0.08
	12:24:00	51.27	7.00	257.88	456.84	2.89	0.07
	12:27:18	51.35	7.00	259.31	490.60	2.69	0.07
	12:30:36	51.33	6.99	258.44	331.05	2.69	0.07
Variance in last 3 readings	12:24:00	0.02	0.00	0.60	122.78	-0.18	0.00
	12:27:18	0.07	-0.01	1.44	33.77	-0.20	0.00
	12:30:36	-0.02	0.00	-0.88	-159.55	-0.01	0.00

Notes: Sample ID = MW-139R @ 1235
No sheen was observed on purge water. orange biogrowth in purge water
final DO=2.69 Fe= 0.0 mg/L

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-143
Well diameter	2 [in]
Well total depth	13.78 [ft]
Depth to top of screen	3.78 [ft]
Screen length	120 [in]
Depth to Water	4 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:38:00	11.66	6.36	389.10	33.09	0.12	-74.61
	10:41:07	11.66	6.35	390.17	150.61	0.08	-77.61
	10:44:13	11.57	6.35	391.02	150.81	0.07	-79.45
	10:47:20	11.57	6.36	391.68	335.00	0.07	-80.78
	10:50:26	11.51	6.36	392.01	365.59	0.08	-81.55
Variance in last 3 readings	10:44:13	-0.09	0.00	0.85	0.20	-0.01	-1.84
	10:47:20	0.00	0.00	0.66	184.20	0.00	-1.33
	10:50:26	-0.06	0.00	0.33	30.58	0.00	-0.77

Notes: Sample id= MW-143 @ 1051
DO =0.08 FE =5.5

no sheen was observed on purge water

ARCADIS

Troll 9000 Low-Flow System
12/13/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-147
Well diameter	2 [in]
Well total depth	13.4 [ft]
Depth to top of screen	3.4 [ft]
Screen length	120 [in]
Depth to Water	5.55 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:41:08	11.44	5.99	441.32	1.60	0.14	-9.51
	13:44:14	11.42	5.99	440.86	1.62	0.13	-12.24
	13:47:20	11.39	5.99	440.75	1.13	0.12	-10.61
	13:50:28	11.37	5.99	440.52	1.48	0.13	-10.27
	13:53:34	11.40	5.99	440.75	0.75	0.12	-13.48
Variance in last 3 readings	13:47:20	-0.03	0.00	-0.11	-0.48	-0.01	1.63
	13:50:28	-0.02	0.00	-0.23	0.34	0.00	0.34
	13:53:34	0.02	0.00	0.23	-0.72	-0.01	-3.21

Notes:

Sample id= MW-147 @1357
final DO = 0.20 mg/L
Fe=1.6 mg/L
DUP2 collected

purge water clear.

ARCADIS

Troll 9000 | Low-Flow System
12/13/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter GWM
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	2.5 [ft]

Well Information:

Well Id	MW-149R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.59 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	157 [sec]
Sample rate	157 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:00:26	50.47	6.39	277.62	-0.54	0.80	0.22
	11:03:03	50.51	6.39	277.79	-0.55	0.75	0.22
	11:05:43	50.48	6.39	277.83	-0.52	0.71	0.22
	11:08:21	50.49	6.39	278.04	-0.54	0.70	0.22
	11:10:59	50.53	6.39	277.74	-0.76	0.67	0.21
Variance in last 3 readings	11:05:43	-0.03	0.00	0.05	0.02	-0.04	0.00
	11:08:21	0.01	0.00	0.21	-0.02	-0.01	0.00
	11:10:59	0.04	0.00	-0.30	-0.23	-0.03	0.00

Notes:

Sample ID = MW-149R @11:15
water appears very clear
no sheen observed on purged water
final DO=0.67 mg/L
Fe=0

ARCADIS

Troll 9000 Low-Flow System
12/13/11 ISI Low-Flow Log

Project Information:

Operator Name	SM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 S
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	8 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-150
Well diameter	2 [in]
Well total depth	12.7 [ft]
Depth to top of screen	2.7 [ft]
Screen length	120 [in]
Depth to Water	6.9 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	635.71 [mL]
Calculated Sample Rate	191 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0.1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:19:57	10.85	6.53	619.47	0.46	0.08	4.11
	11:23:03	10.81	6.54	619.02	0.45	0.07	3.68
	11:26:10	10.83	6.54	617.90	0.39	0.06	3.59
	11:29:15	10.84	6.54	618.80	1.27	0.06	3.34
	11:32:21	10.87	6.54	619.48	0.59	0.06	3.17
Variance in last 3 readings	11:26:10	0.02	0.00	-1.13	-0.05	-0.01	-0.09
	11:29:15	0.00	0.00	0.90	0.87	-0.01	-0.26
	11:32:21	0.04	0.00	0.68	-0.68	0.00	-0.17

Notes:

Sample ID = MW-150
sample time = 1137
fe=2.0 do=0.06
DUP1
no sheen visible in purge water

ARCADIS

Troll 9000 | Low-Flow System
12/14/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	nonds 2011 Sampling
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	11 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-20R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.5 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	649.1 [mL]
Calculated Sample Rate	195 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:23:54	11.94	6.55	10719.69	267.32	0.00	-17.71
	12:27:00	11.92	6.55	10633.80	147.32	0.00	-23.57
	12:30:07	11.92	6.56	10552.22	640.76	0.00	-29.09
	12:33:13	11.96	6.56	10535.60	155.72	-0.01	-34.53
	12:36:20	11.93	6.56	10515.91	128.34	-0.01	-39.92
Variance in last 3 readings	12:30:07	-0.01	0.00	-81.57	493.44	0.00	-5.52
	12:33:13	0.04	0.00	-16.62	-485.03	-0.01	-5.44
	12:36:20	-0.03	0.00	-19.69	-27.38	0.00	-5.39

Notes: Sample ID = MW-20R @ 1239
DO_0.01 FE_2.6
did not stabilize

the purge water was clear.no sheen

ARCADIS

Troll 9000 Low-Flow System
12/16/11 ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-500
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.69 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	262 [sec]
Sample rate	262 [sec]
Stabilized drawdown	3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:50:40	10.65	6.24	952295.25	22.32	0.20	-89.24
	10:55:12	10.81	6.21	1013932.38	9.14	0.19	-98.91
	10:59:44	11.03	6.22	1040324.88	7.57	0.16	-103.52
	11:04:15	11.26	6.24	1072528.75	7.09	0.14	-103.22
	11:08:46	11.41	6.26	1101366.63	4.90	0.13	-103.35
Variance in last 3 readings	10:59:44	0.23	0.01	26392.50	-1.58	-0.03	-4.62
	11:04:15	0.22	0.02	32203.88	-0.48	-0.02	0.30
	11:08:46	0.15	0.01	28837.88	-2.19	-0.01	-0.13

Notes:

Sample time= 1105
do=0.13
dtw= 4.69
fe= 5.2

ARCADIS

Troll 9000 Low-Flow System
12/16/11 ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fouth Quarter 2011 e
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-501
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	3.76 [ft]

Pumping information:

Final pumping rate	150 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	258 [sec]
Sample rate	258 [sec]
Stabilized drawdown	11 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:16:27	11.32	6.29	1352204.13	42.95	0.15	-154.84
	9:20:55	11.24	6.30	1361640.88	36.20	0.11	-156.84
	9:25:22	11.20	6.31	1358168.63	23.11	0.07	-159.66
	9:29:50	11.21	6.31	1359983.75	15.76	0.04	-161.63
	9:34:17	11.26	6.31	1364320.50	13.92	0.02	-162.31
Variance in last 3 readings	9:25:22	-0.04	0.00	-3472.25	-13.09	-0.04	-2.82
	9:29:50	0.00	0.00	1815.13	-7.35	-0.03	-1.97
	9:34:17	0.06	0.00	4336.75	-1.84	-0.02	-0.68

Notes:

Sample id= MW-501 @09:35
DO=0.02 mg/L
Fe=4.2 mg/L
No sheen was observed on the purge water

ARCADIS

Troll 9000 Low-Flow System
12/16/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-502
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	5 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:25:59	12.06	6.12	285.15	2448.43	0.07	137.25
	13:28:59	11.97	6.12	284.03	2267.41	0.06	134.81
	13:32:00	11.93	6.12	282.62	2434.78	0.06	132.50
	13:35:01	11.91	6.12	281.49	2282.18	0.05	129.84
	13:38:02	11.90	6.12	280.64	1093.09	0.05	127.40
Variance in last 3 readings	13:32:00	-0.04	0.00	-1.41	167.36	-0.01	-2.31
	13:35:01	-0.02	0.00	-1.13	-152.59	0.00	-2.65
	13:38:02	-0.01	0.00	-0.85	-1189.09	0.00	-2.44

Notes:

Sample id= MW-502 @1347
DO=0.0.05 mg/L
Fe=0.8 mg/L
MS MSD collected
purge water appears clear-No sheen.

ARCADIS

Troll 9000 Low-Flow System
12/15/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	11 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-503
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	5.3 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	649.1 [mL]
Calculated Sample Rate	195 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.15 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:05:56	12.93	6.28	447.31	22.12	0.05	-14.90
	14:09:03	12.98	6.27	447.79	11.74	0.03	-15.45
	14:12:10	12.89	6.27	444.43	5.61	0.02	-16.13
	14:15:16	12.83	6.27	443.82	3.05	0.01	-16.90
	14:18:22	12.80	6.26	443.34	2.57	0.00	-17.75
Variance in last 3 readings	14:12:10	-0.09	-0.01	-3.36	-6.13	-0.01	-0.68
	14:15:16	-0.06	0.00	-0.61	-2.57	-0.01	-0.77
	14:18:22	-0.03	0.00	-0.49	-0.48	-0.01	-0.85

Notes: Sample id=MW-503 @1421
DO=0.00 mg/L
Fe=5.2 mg/L
no sheen visible on purge water.

ARCADIS

Troll 9000 Low-Flow System
12/16/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	DR	Pump Model/Type	Geopump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Fourth Quarter 2011 C	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	10 [ft]
		Pump placement from TOC	1 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-504	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	644.63 [mL]
Well total depth	13 [ft]	Calculated Sample Rate	194 [sec]
Depth to top of screen	3 [ft]	Sample rate	180 [sec]
Screen length	120 [in]	Stabilized drawdown	0.5 [in]
Depth to Water	6.55 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:28:56	12.34	6.86	388.51	2797.72	1.35	151.05
	11:31:57	12.38	6.86	393.27	2797.72	1.33	151.17
	11:34:58	12.40	6.85	396.88	2797.72	1.29	151.55
	11:37:59	12.38	6.84	403.19	2797.73	1.11	152.41
	11:41:00	12.41	6.83	412.10	2797.73	0.96	153.17
Variance in last 3 readings	11:34:58	0.03	-0.01	3.61	0.00	-0.03	0.38
	11:37:59	-0.02	-0.01	6.31	0.00	-0.18	0.85
	11:41:00	0.02	-0.01	8.91	0.00	-0.15	0.77

Notes:

Sample ID = MW-504 @ 1147
DUP-4 collected
purge water clear no sheen

final DO=0.96

Fe=0.0

ARCADIS

Troll 9000 Low-Flow System
12/15/11 ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-505
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.59 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	194 [sec]
Stabilized drawdown	0.3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:54:04	53.60	6.77	530.84	2797.70	0.54	-0.01
	13:57:20	53.55	6.77	530.49	2797.70	0.62	0.00
	14:00:35	53.60	6.77	530.14	2382.50	0.61	0.00
	14:03:50	53.59	6.77	530.05	1824.53	0.63	0.00
	14:07:05	53.63	6.77	530.14	2797.70	0.65	0.00
Variance in last 3 readings	14:00:35	0.05	0.00	-0.35	-415.20	-0.01	0.00
	14:03:50	-0.01	0.00	-0.09	-557.98	0.03	0.00
	14:07:05	0.04	0.00	0.09	973.18	0.02	0.00

Notes:

Sample ID = MW-505 @ 13:45
DO=0.65 mg/L
Fe=1.2 mg/L
purge water clear no sheen

ARCADIS

Troll 9000 Low-Flow System
12/15/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-506
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	4 [ft]
Screen length	120 [in]
Depth to Water	6.3 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:51:39	11.47	7.04	284.29	1.24	0.24	28.89
	12:54:45	11.46	7.04	284.19	1.09	0.21	31.54
	12:57:51	11.47	7.03	283.96	0.73	0.19	33.89
	13:00:57	11.44	7.03	283.49	0.37	0.17	36.12
	13:04:04	11.43	7.04	283.39	0.46	0.15	38.13
Variance in last 3 readings	12:57:51	0.01	0.00	-0.22	-0.36	-0.02	2.35
	13:00:57	-0.02	0.00	-0.47	-0.37	-0.03	2.22
	13:04:04	-0.01	0.01	-0.10	0.10	-0.02	2.01

Notes:

Sample ID =MW-506 @ 1307
DO=0.15 mg/L
Fe=0.0 mg/L
No sheen was observed on the purge water

ARCADIS

Troll 9000 Low-Flow System
12/16/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-507
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:06:38	12.16	6.65	859.32	16.97	0.22	132.46
	9:09:39	12.23	6.65	854.60	14.53	0.21	124.45
	9:12:39	12.27	6.65	850.15	22.08	0.19	119.18
	9:15:41	12.31	6.65	845.52	13.05	0.21	115.58
	9:18:41	12.31	6.65	843.34	28.04	0.21	113.30
Variance in last 3 readings	9:12:39	0.04	0.00	-4.45	7.55	-0.02	-5.27
	9:15:41	0.04	0.00	-4.63	-9.03	0.01	-3.60
	9:18:41	0.00	0.00	-2.18	14.98	0.00	-2.27

Notes: Sample ID= MW-507 @ 927
DUP 3 collected
DO_0.21 FE_0.8
No sheen was observed on purge water

ARCADIS

Troll 9000 | Low-Flow System
12/15/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-508
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.75 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	2 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	11:38:08	12.25	6.40	702.72	0.58	0.00	-14.52
	11:41:15	12.32	6.40	708.65	0.07	0.00	-15.59
	11:44:22	12.36	6.40	713.91	-0.26	0.01	-15.46
	11:47:29	12.40	6.40	719.08	-0.22	0.01	-16.22
	11:50:35	12.51	6.41	723.53	0.05	0.01	-17.85
Variance in last 3 readings	11:44:22	0.04	0.00	5.25	-0.32	0.00	0.13
	11:47:29	0.04	0.00	5.17	0.04	0.00	-0.77
	11:50:35	0.11	0.00	4.45	0.27	0.00	-1.62

Notes: Sample ID = MW-508 @ 1153

No sheen observed on purge water.
DO =0.01
Fe=5.0

ARCADIS

Troll 9000 | Low-Flow System
12/15/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	8 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-509
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	3.44 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	635.71 [mL]
Calculated Sample Rate	191 [sec]
Sample rate	191 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:30:23	49.58	6.86	236.55	12.72	0.97	0.08
	10:33:35	49.51	6.87	236.01	12.29	1.00	0.09
	10:36:47	49.60	6.86	236.36	11.84	0.97	0.09
	10:40:00	49.66	6.86	236.52	10.75	1.02	0.09
	10:43:12	49.65	6.86	236.46	10.38	1.05	0.09
Variance in last 3 readings	10:36:47	0.09	0.00	0.35	-0.45	-0.04	0.00
	10:40:00	0.07	0.00	0.16	-1.09	0.05	0.00
	10:43:12	-0.01	0.00	-0.05	-0.37	0.03	0.00

Notes:

Sample ID = MW-509 @ 10:35
purge water clear no sheen
final DO= 1.05 mg/L
Fe=0.0 mg/L

ARCADIS

Troll 9000 Low-Flow System
12/19/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	11 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-511
Well diameter	2 [in]
Well total depth	15 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.4 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	649.1 [mL]
Calculated Sample Rate	195 [sec]
Sample rate	180 [sec]
Stabilized drawdown	1.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:08:12	10.16	6.32	259.63	0.19	5.51	221.12
	10:11:19	10.30	6.31	256.83	0.66	5.36	212.58
	10:14:25	10.38	6.31	256.23	0.07	5.33	205.36
	10:17:32	10.45	6.30	255.48	0.67	5.21	200.02
	10:20:38	10.42	6.30	255.22	0.32	5.16	196.26
Variance in last 3 readings	10:14:25	0.08	0.00	-0.61	-0.59	-0.03	-7.22
	10:17:32	0.07	0.00	-0.75	0.60	-0.12	-5.34
	10:20:38	-0.03	0.00	-0.26	-0.35	-0.05	-3.76

Notes: Sample id=MW-511 @1027
Fe=0.0
final DO=5.16
no sheen visible on purge water.

ARCADIS

Troll 9000 | Low-Flow System
12/15/11 | ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 e
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	GeoPump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-512
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	6.4 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:02:23	10.94	6.99	348.88	1.84	0.03	-104.54
	9:05:29	10.95	6.96	330.20	0.60	0.02	-101.12
	9:08:36	10.94	6.93	321.89	1.00	0.02	-98.00
	9:11:42	10.94	6.91	316.15	0.16	0.02	-95.13
	9:14:49	10.94	6.90	306.64	0.17	0.02	-92.48
Variance in last 3 readings	9:08:36	-0.01	-0.02	-8.31	0.40	0.00	3.12
	9:11:42	0.00	-0.02	-5.74	-0.84	0.00	2.87
	9:14:49	0.00	-0.01	-9.51	0.01	0.00	2.65

Notes:

Sample id=MW-512 @919
MS MSD collected
NO sheen on purge water- clear

rdo=0.02
Fe=3.2

ARCADIS

Troll 9000 | Low-Flow System
12/15/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	11 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-513
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.26 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	649.1 [mL]
Calculated Sample Rate	195 [sec]
Sample rate	195 [sec]
Stabilized drawdown	0.4 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	8:53:06	52.84	6.69	291.38	3.61	0.06	-0.06
	8:56:23	52.86	6.70	291.55	2.89	0.02	-0.06
	8:59:38	52.54	6.70	290.92	2.47	0.01	-0.06
	9:02:56	52.47	6.70	290.42	2.57	0.02	-0.06
	9:06:11	52.17	6.69	289.77	4.30	0.05	-0.06
Variance in last 3 readings	8:59:38	-0.31	0.00	-0.63	-0.43	-0.01	0.00
	9:02:56	-0.07	0.00	-0.50	0.10	0.01	0.00
	9:06:11	-0.30	-0.01	-0.65	1.74	0.03	0.00

Notes:

Sample id= MW-513 @ 9:15
DO=0.05 mg/L
Fe=3.1 mg/L
no sheen on purge water

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	SLM	Pump Model/Type	Geopump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Fourth quarter GWM	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	11 [ft]
		Pump placement from TOC	2 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-514	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	649.1 [mL]
Well total depth	13 [ft]	Calculated Sample Rate	195 [sec]
Depth to top of screen	3 [ft]	Sample rate	160 [sec]
Screen length	120 [in]	Stabilized drawdown	0 [in]
Depth to Water	4.45 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [µg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:27:08	11.18	6.53	389.35	4.70	116.77	-0.09
	14:29:54	11.10	6.53	387.70	5.23	122.64	-0.09
	14:32:40	11.04	6.53	387.74	6.29	117.61	-0.09
	14:35:25	11.00	6.53	388.59	5.17	110.89	-0.09
	14:38:11	10.98	6.53	389.84	4.85	101.66	-0.09
Variance in last 3 readings	14:32:40	-0.06	0.00	0.04	1.06	-5.04	0.00
	14:35:25	-0.04	0.00	0.85	-1.12	-6.71	0.00
	14:38:11	-0.02	0.00	1.25	-0.32	-9.23	0.00

Notes:

Sample ID = MW-514 @ 1500
DO=102 ug/l
Fe=3.0 mg/L
purge water appears clear with no sheen

ARCADIS

Troll 9000 | Low-Flow System
12/14/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-515
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.76 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	0.3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	14:04:31	50.73	6.90	283.65	0.40	0.09	0.05
	14:07:49	50.69	6.90	282.95	-0.13	0.10	0.05
	14:11:08	50.61	6.90	280.80	-0.32	0.08	0.04
	14:14:27	50.50	6.90	278.85	-0.44	0.06	0.04
	14:17:44	50.52	6.90	278.52	-0.53	0.05	0.04
Variance in last 3 readings	14:11:08	-0.08	0.00	-2.15	-0.20	-0.02	0.00
	14:14:27	-0.11	0.00	-1.95	-0.11	-0.02	0.00
	14:17:44	0.03	0.01	-0.33	-0.09	-0.02	0.00

Notes: Sample ID = MW-515 @ 1425
DO_0.05 FE_0.0
no sheen on ppurge water, clear

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth quarter 2011 G
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	11 [ft]
Pump placement from TOC	2.5 [ft]

Well Information:

Well Id	MW-516
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	4.4 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	649.1 [mL]
Calculated Sample Rate	156 [sec]
Sample rate	156 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [µg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.1 +/-15 %
Last 5 Readings	13:25:42	10.41	6.72	399.12	5.61	2030.25	0.11
	13:28:23	10.31	6.69	399.41	2.38	2357.56	0.11
	13:31:05	10.24	6.68	398.47	1.31	2389.45	0.11
	13:33:47	10.23	6.68	398.21	1.48	2511.14	0.11
	13:36:28	10.22	6.67	399.03	1.14	2391.97	0.11
Variance in last 3 readings	13:31:05	-0.07	-0.01	-0.94	-1.06	31.89	0.00
	13:33:47	-0.01	0.00	-0.26	0.17	121.69	0.00
	13:36:28	-0.01	-0.01	0.82	-0.34	-119.17	0.00

Notes: sample id= MW-516 @ 1400
No sheen observed on water.
do=2392
fe=0.0

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:

Operator Name	DR
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 I
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	10 [ft]
Pump placement from TOC	1 [ft]

Well Information:

Well Id	MW-517
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	5.2 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	644.63 [mL]
Calculated Sample Rate	194 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:17:46	10.32	6.81	296.33	32.32	0.15	39.83
	13:20:53	10.28	6.79	294.11	52.14	0.13	42.31
	13:23:59	10.26	6.78	293.31	51.43	0.13	43.34
	13:27:07	10.25	6.77	293.04	1047.18	0.09	43.59
	13:30:13	10.23	6.76	292.70	1062.10	0.07	43.46
Variance in last 3 readings	13:23:59	-0.02	-0.01	-0.80	-0.72	0.00	1.03
	13:27:07	-0.01	-0.01	-0.26	995.76	-0.04	0.26
	13:30:13	-0.02	0.00	-0.34	14.91	-0.02	-0.13

Notes: Sample ID = MW-517 @ 13:37
DO=0.07 mg/L
Fe=0.6 mg/L
Purge water clear with no sheen.

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-518
Well diameter	2 [in]
Well total depth	13.5 [ft]
Depth to top of screen	3.5 [ft]
Screen length	120 [in]
Depth to Water	8.28 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	160 [sec]
Stabilized drawdown	1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [µg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:31:00	12.40	6.53	673.07	4.62	742.01	0.04
	12:33:45	12.37	6.54	667.70	4.36	731.94	0.03
	12:36:32	12.34	6.55	656.26	3.45	699.21	0.02
	12:39:18	12.28	6.56	651.67	3.68	605.21	0.01
	12:42:03	12.31	6.57	645.67	3.36	559.05	0.00
Variance in last 3 readings	12:36:32	-0.03	0.01	-11.44	-0.91	-32.73	-0.01
	12:39:18	-0.06	0.01	-4.59	0.23	-94.00	-0.01
	12:42:03	0.03	0.01	-6.00	-0.33	-46.16	-0.01

Notes: Sample ID = MW-518 @ 1300
No sheen was observed on purge water.
final DO=559 FE=4.0

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	2 [ft]

Well Information:

Well Id	MW-519
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.14 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	0.3 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:51:24	50.97	6.71	425.34	-0.12	0.08	-0.04
	10:54:43	50.99	6.70	413.49	-0.36	0.02	-0.04
	10:58:01	51.02	6.69	407.81	-0.44	0.00	-0.04
	11:01:19	51.04	6.69	405.36	-0.70	-0.01	-0.04
	11:04:37	51.03	6.69	402.43	-0.54	-0.01	-0.04
Variance in last 3 readings	10:58:01	0.03	-0.01	-5.68	-0.08	-0.02	0.00
	11:01:19	0.02	0.00	-2.46	-0.26	-0.01	0.00
	11:04:37	-0.01	0.00	-2.92	0.16	-0.01	0.00

Notes:

Sample ID = MW-519 @ 11:05
DO=-0.1 mg/L
Fe=0.0 mg/L
Purge water clear no sheen

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth quarter GWM 2
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-520
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	1 [ft]
Screen length	120 [in]
Depth to Water	7.85 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	180 [sec]
Stabilized drawdown	0 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [µg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	10:38:54	10.74	6.58	608.53	-0.12	256.92	-0.03
	10:42:01	10.72	6.58	612.06	-0.20	220.84	-0.04
	10:45:09	10.72	6.58	611.03	-0.24	183.07	-0.04
	10:48:15	10.73	6.58	612.08	-0.27	167.12	-0.04
	10:51:21	10.75	6.58	612.41	-0.29	163.77	-0.04
Variance in last 3 readings	10:45:09	0.00	0.00	-1.03	-0.04	-37.77	0.00
	10:48:15	0.01	0.00	1.05	-0.03	-15.95	0.00
	10:51:21	0.02	0.00	0.33	-0.02	-3.36	0.00

Notes: Sample ID = MW-520 @ 1100

No sheen was observed on purged water
DO: 164
Fe=1.0
NEVER STABALIZED

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	SWM	Pump Model/Type	Geopump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Fourth Quarter 2011 E	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	13 [ft]
		Pump placement from TOC	2 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-521	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	658.02 [mL]
Well total depth	13 [ft]	Calculated Sample Rate	198 [sec]
Depth to top of screen	3 [ft]	Sample rate	198 [sec]
Screen length	120 [in]	Stabilized drawdown	0.29 [in]
Depth to Water	6.74 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:52:10	43.73	7.17	214.63	-0.95	12.22	0.08
	9:55:30	44.09	7.16	217.69	-0.73	12.17	0.08
	9:58:49	44.67	7.17	220.15	-0.97	12.07	0.08
	10:02:09	45.04	7.15	220.32	-0.96	11.97	0.08
	10:05:28	45.43	7.11	220.14	-0.77	11.97	0.09
Variance in last 3 readings	9:58:49	0.58	0.01	2.46	-0.24	-0.10	0.00
	10:02:09	0.37	-0.02	0.17	0.01	-0.10	0.00
	10:05:28	0.38	-0.04	-0.18	0.20	-0.01	0.00

Notes:

Sample ID = MW-521 @ 9:05
no sheen was observed on purged water
DO=0.44 mg/L
Fe=1.4 mg/L

*The sample parameter data was not saved at the time of sampling. Parameter data is not representative of GW at time of sampling. All parameters were within acceptable ranges prior to sample collection.

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	DR	Pump Model/Type	GeoPump
Company Name	ARCADIS	Tubing Type	poly
Project Name	Fourth Quarter 2011 C	Tubing Diameter	0.17 [in]
Site Name	Edmonds Terminal	Tubing Length	11 [ft]
		Pump placement from TOC	1 [ft]

Well Information:		**Pumping information:**	
Well Id	MW-522	Final pumping rate	200 [mL/min]
Well diameter	2 [in]	Flowcell volume	649.1 [mL]
Well total depth	13 [ft]	Calculated Sample Rate	195 [sec]
Depth to top of screen	3 [ft]	Sample rate	180 [sec]
Screen length	120 [in]	Stabilized drawdown	1 [in]
Depth to Water	8.5 [ft]		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:11:19	11.83	6.54	551.48	588.22	0.05	-14.07
	9:14:26	11.85	6.54	552.90	709.35	0.04	-14.98
	9:17:32	11.85	6.54	554.23	721.03	0.04	-15.72
	9:20:38	11.86	6.54	552.82	857.22	0.04	-16.41
	9:23:44	11.85	6.54	553.02	794.17	0.04	-17.14
Variance in last 3 readings	9:17:32	0.00	0.00	1.33	11.68	0.00	-0.74
	9:20:38	0.01	0.00	-1.40	136.19	0.00	-0.69
	9:23:44	-0.01	0.00	0.19	-63.04	0.00	-0.73

Notes: Sample id=MW-522 @927
final DO = 0.04 mg/L
fe=1.5

no sheen visible on purge water.

ARCADIS

Troll 9000 Low-Flow System
12/13/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 S
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-523
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	8.07 [ft]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	653.56 [mL]
Calculated Sample Rate	157 [sec]
Sample rate	157 [sec]
Stabilized drawdown	0.1 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [µg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	13:28:30	11.67	6.64	606.71	7.02	337.49	0.08
	13:31:13	11.70	6.64	604.51	6.24	327.42	0.07
	13:33:55	11.70	6.64	601.56	5.23	313.99	0.07
	13:36:38	11.73	6.64	600.46	4.50	307.28	0.07
	13:39:21	11.70	6.64	599.47	3.94	299.73	0.07
Variance in last 3 readings	13:33:55	0.00	0.00	-2.95	-1.02	-13.43	0.00
	13:36:38	0.03	0.00	-1.10	-0.73	-6.71	0.00
	13:39:21	-0.03	0.00	-0.99	-0.56	-7.55	0.00

Notes: Sample id= MW-523 @ 1400
final DO=300 fe=0.8
no sheen on purge water

ARCADIS

Troll 9000 | Low-Flow System
12/13/11 | ISI Low-Flow Log

Project Information:

Operator Name	SWM
Company Name	ARCADIS
Project Name	Fourth Quarter 2011 C
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	12.5 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-524
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	7.74 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	655.79 [mL]
Calculated Sample Rate	197 [sec]
Sample rate	197 [sec]
Stabilized drawdown	0.5 [in]

Low-Flow Sampling Stabilization Summary

	Time	Temp [F]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	12:43:02	48.69	6.65	289.61	0.32	4.60	0.21
	12:46:20	48.67	6.63	288.85	-0.19	4.46	0.20
	12:49:39	48.62	6.61	287.99	-0.39	4.42	0.20
	12:52:56	48.75	6.60	288.09	-0.27	4.33	0.20
	12:56:14	48.68	6.60	287.04	-0.47	4.27	0.20
Variance in last 3 readings	12:49:39	-0.05	-0.02	-0.86	-0.20	-0.04	0.00
	12:52:56	0.13	-0.01	0.10	0.11	-0.09	0.00
	12:56:14	-0.07	0.00	-1.05	-0.20	-0.06	0.00

Notes:

Sample ID= MW-524 @ 1305
no sheen was observed on purge water
final DO=missed
iron FE=0.0

ARCADIS

Troll 9000 Low-Flow System
12/14/11 ISI Low-Flow Log

Project Information:

Operator Name	SLM
Company Name	ARCADIS
Project Name	Fourth quarter 2011 G
Site Name	Edmonds Terminal

Pump Information:

Pump Model/Type	Geopump
Tubing Type	poly
Tubing Diameter	0.17 [in]
Tubing Length	13 [ft]
Pump placement from TOC	3 [ft]

Well Information:

Well Id	MW-8R
Well diameter	2 [in]
Well total depth	13 [ft]
Depth to top of screen	3 [ft]
Screen length	120 [in]
Depth to Water	8.4 [ft]

Pumping information:

Final pumping rate	200 [mL/min]
Flowcell volume	658.02 [mL]
Calculated Sample Rate	198 [sec]
Sample rate	160 [sec]
Stabilized drawdown	0.03 [in]

Low-Flow Sampling Stabilization Summary

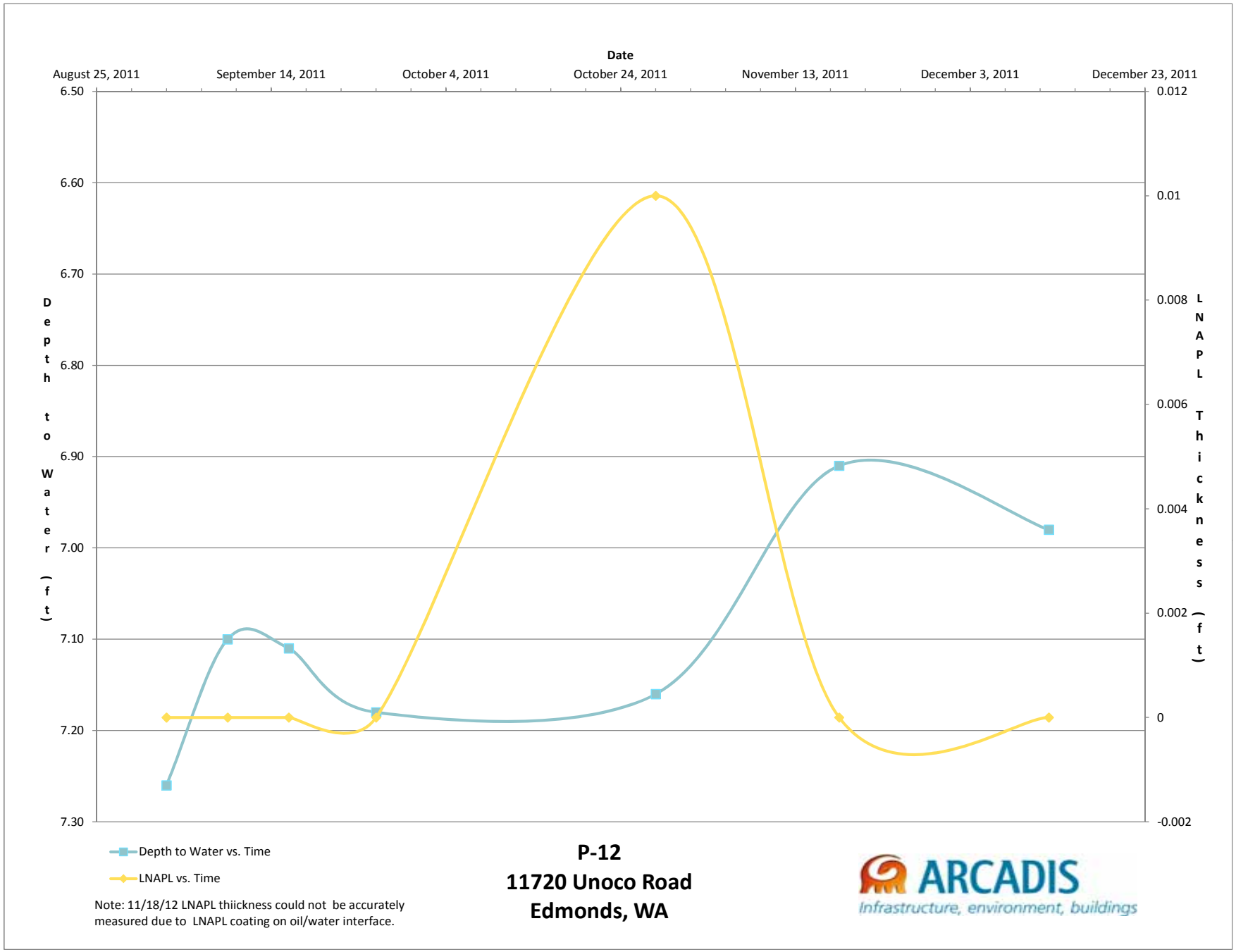
	Time	Temp [C]	pH [pH]	Cond [µS/cm @25C]	Turb [NTU]	RDO [µg/L]	ORP [V]
Stabilization Settings			+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-1 +/-10 %	+/-0.1 +/-15 %	+/-0.01 +/-15 %
Last 5 Readings	9:04:22	11.52	6.57	677.17	0.51	993.78	0.02
	9:07:09	11.55	6.57	673.15	0.27	896.43	0.01
	9:09:55	11.54	6.57	671.07	0.41	859.50	0.00
	9:12:41	11.57	6.57	666.97	0.56	799.08	0.00
	9:15:27	11.58	6.57	663.65	1.38	751.24	-0.01
Variance in last 3 readings	9:09:55	-0.01	0.00	-2.08	0.14	-36.93	-0.01
	9:12:41	0.03	0.00	-4.10	0.14	-60.43	-0.01
	9:15:27	0.02	0.00	-3.31	0.82	-47.84	-0.01

Notes: Sample ID = MW-8R @ 0910
DO= 751 FE=.2
No sheen was observed on purged water, purged 3 volumes.ORP did not stabize

ARCADIS

Appendix F

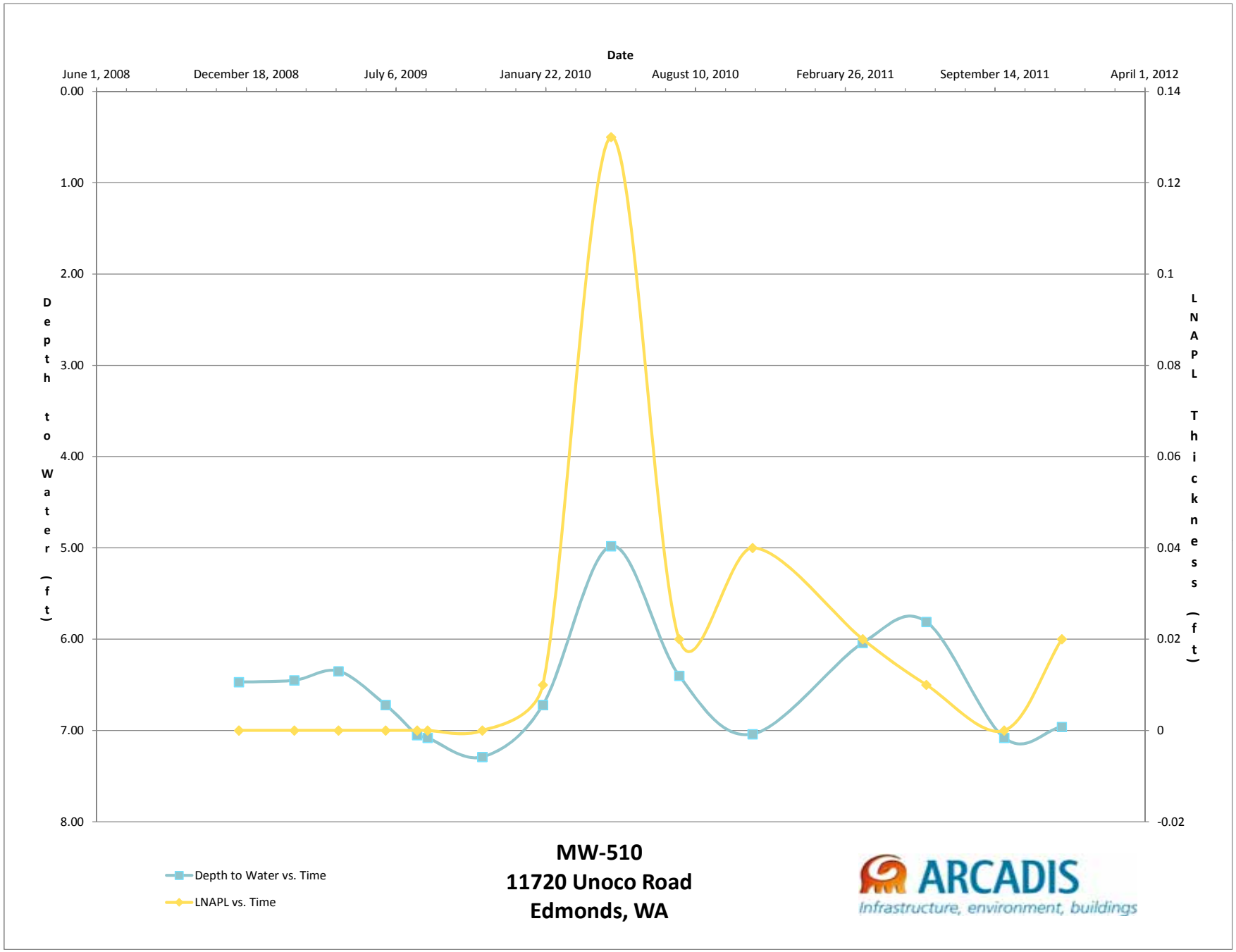
LNAPL vs. Depth to Water Hydrographs

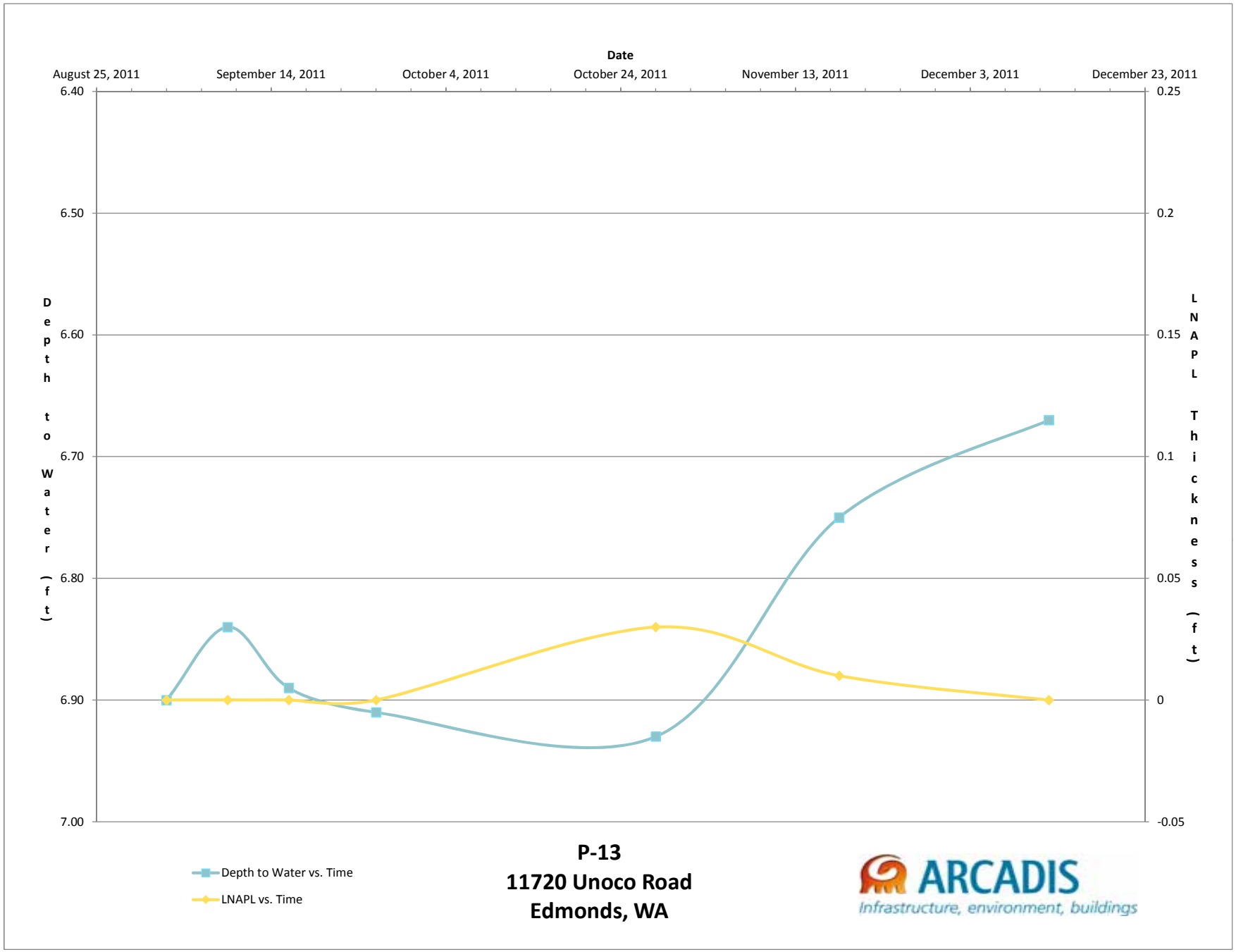


Note: 11/18/12 LNAPL thiickness could not be accurately measured due to LNAPL coating on oil/water interface.

P-12
11720 Unoco Road
Edmonds, WA

ARCADIS
Infrastructure, environment, buildings


Date
June 1, 2008
December 18, 2008
July 6, 2009
January 22, 2010
August 10, 2010
February 26, 2011
September 14, 2011
April 1, 2012
Depth to Water (ft)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
LNAPL Thickness (ft)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
-0.02
Depth to Water vs. Time
LNAPL vs. Time
MW-510
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings



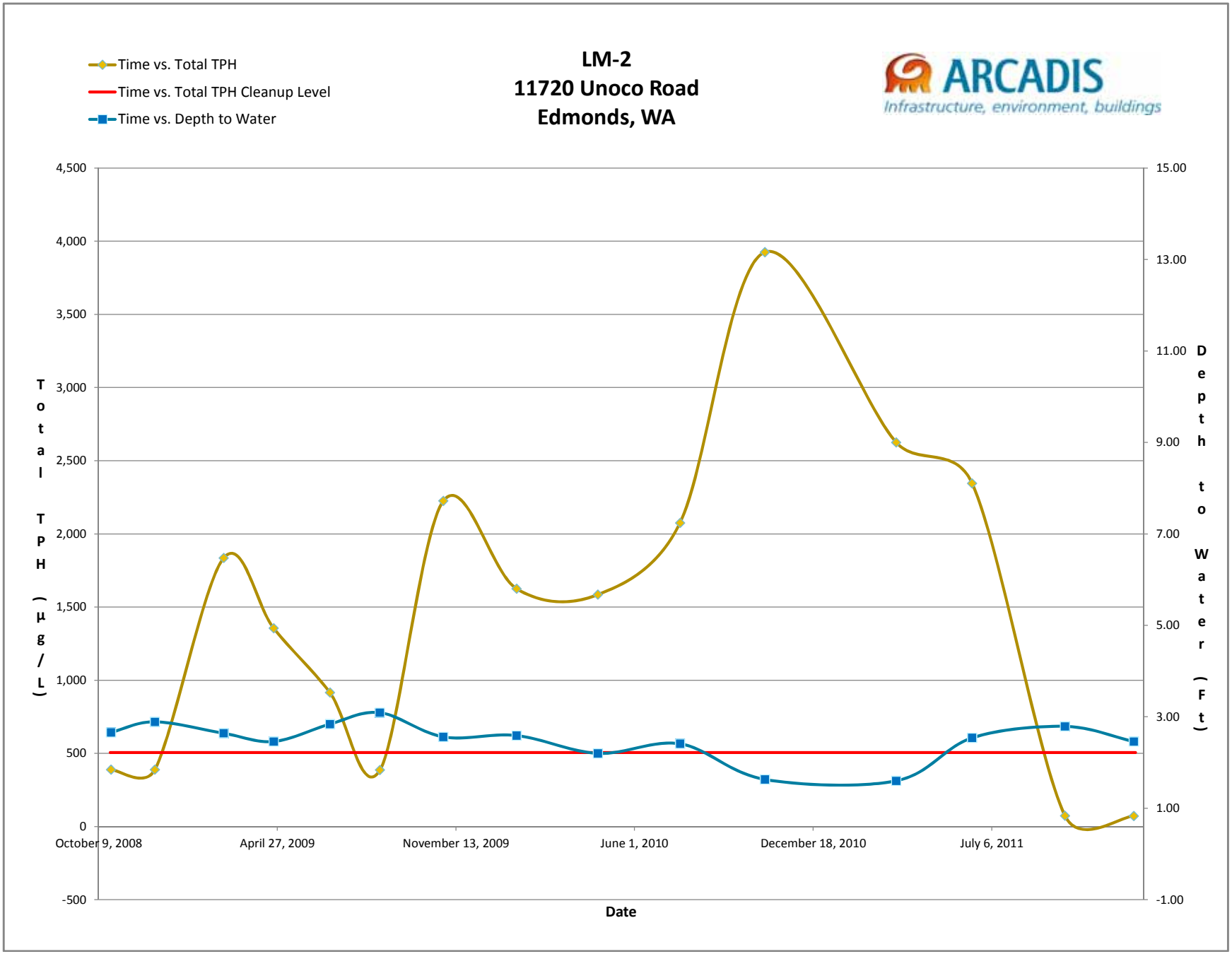
P-13
11720 Unoco Road
Edmonds, WA

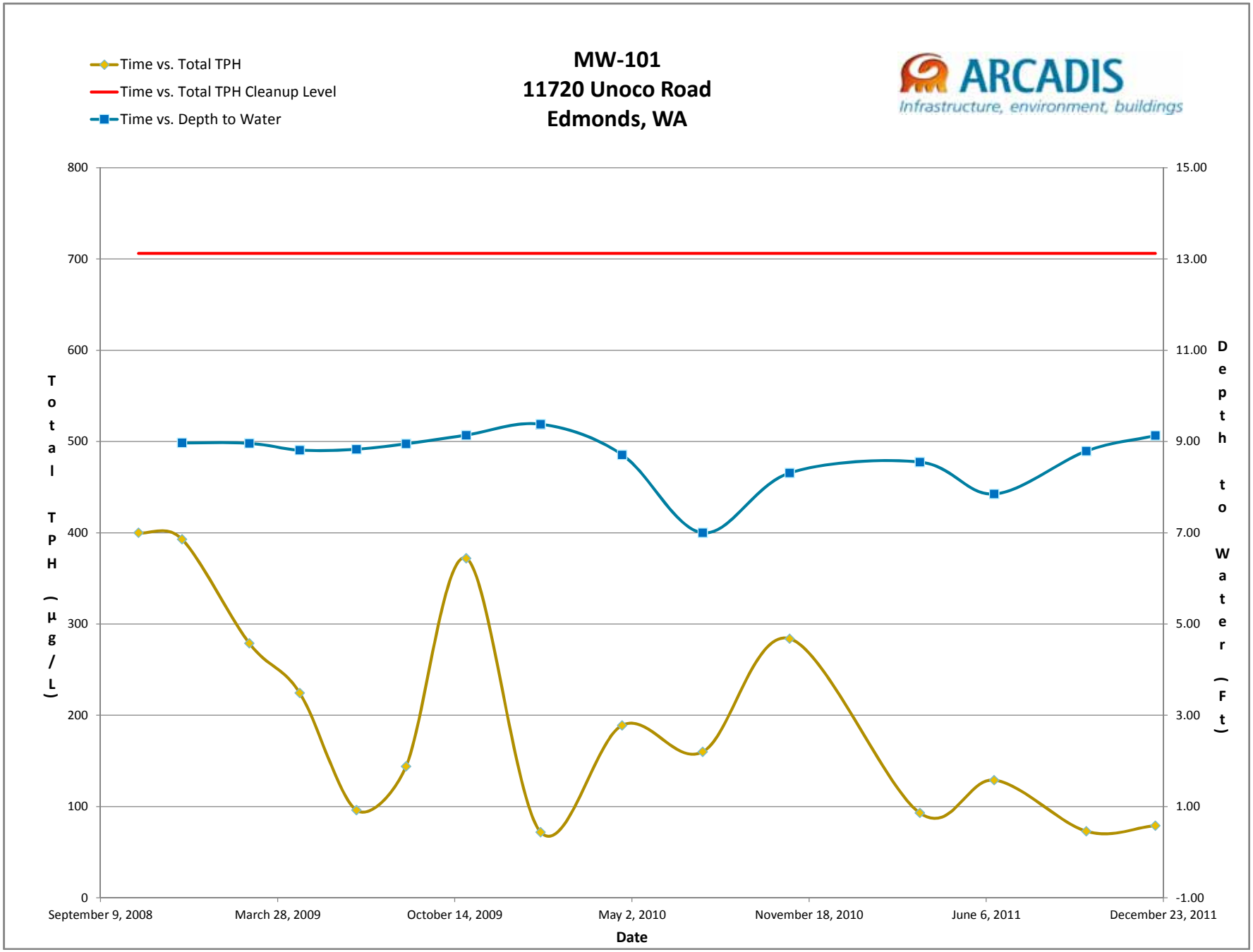
ARCADIS
Infrastructure, environment, buildings

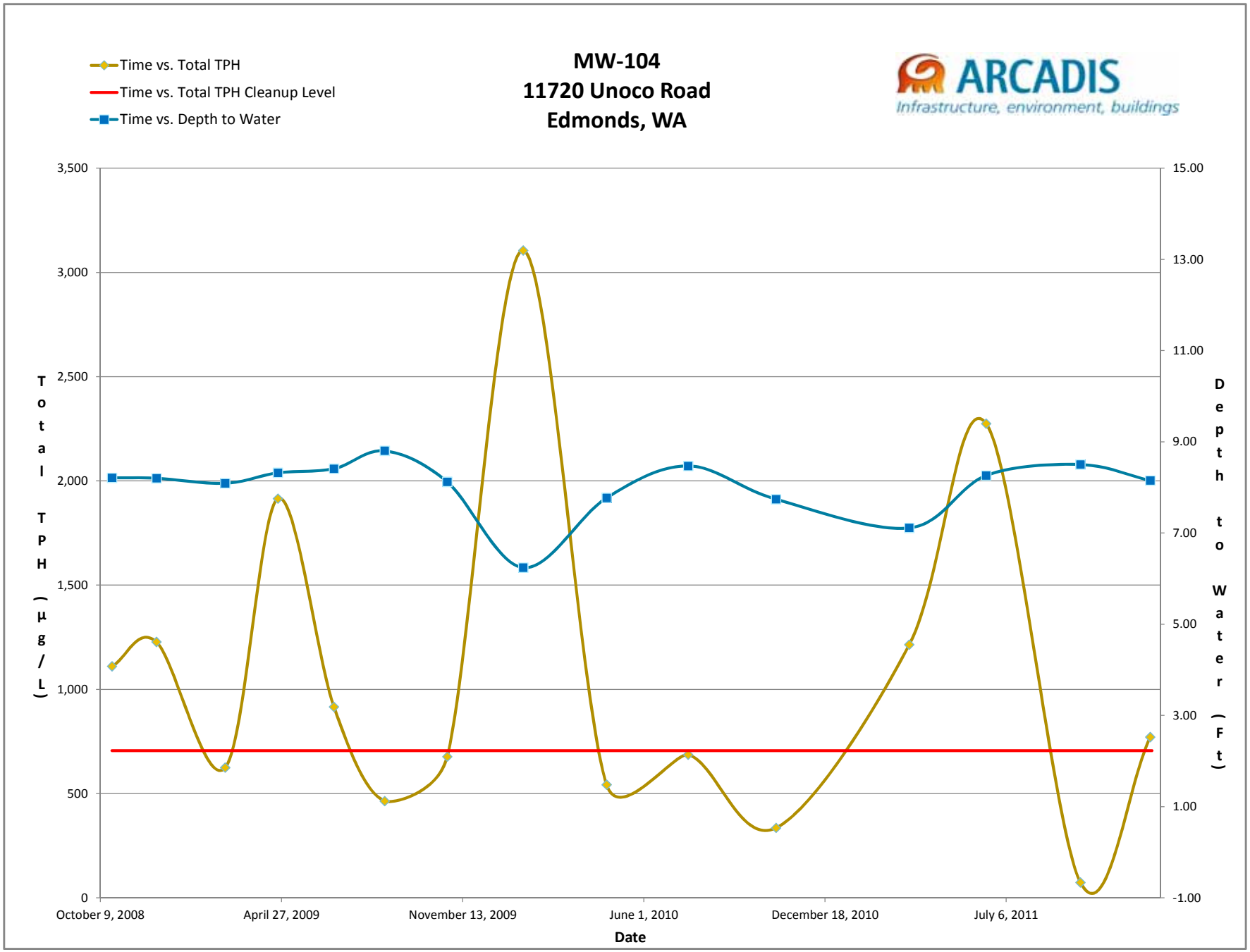
ARCADIS

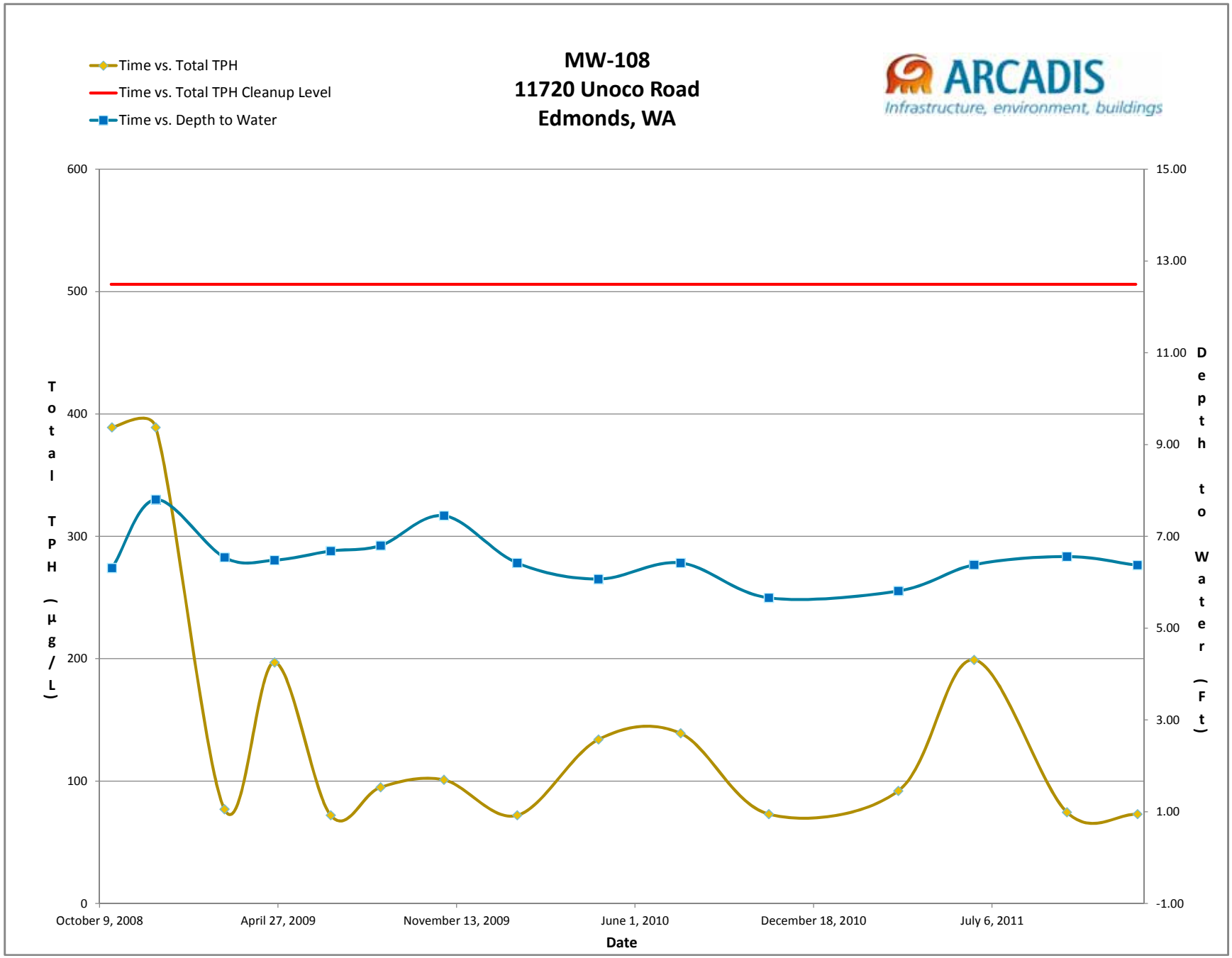
Appendix G

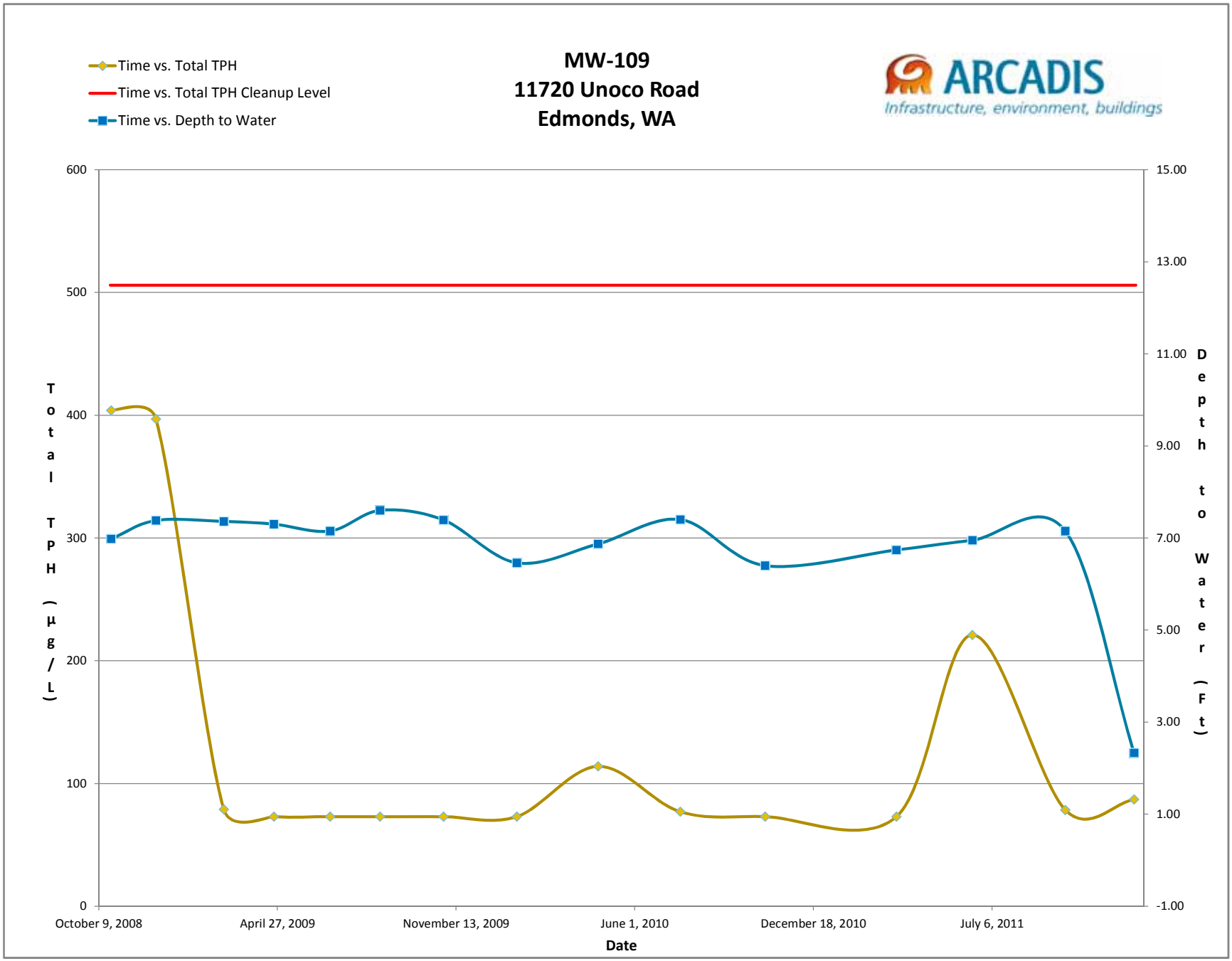
TPH vs. Depth to Water Hydrographs

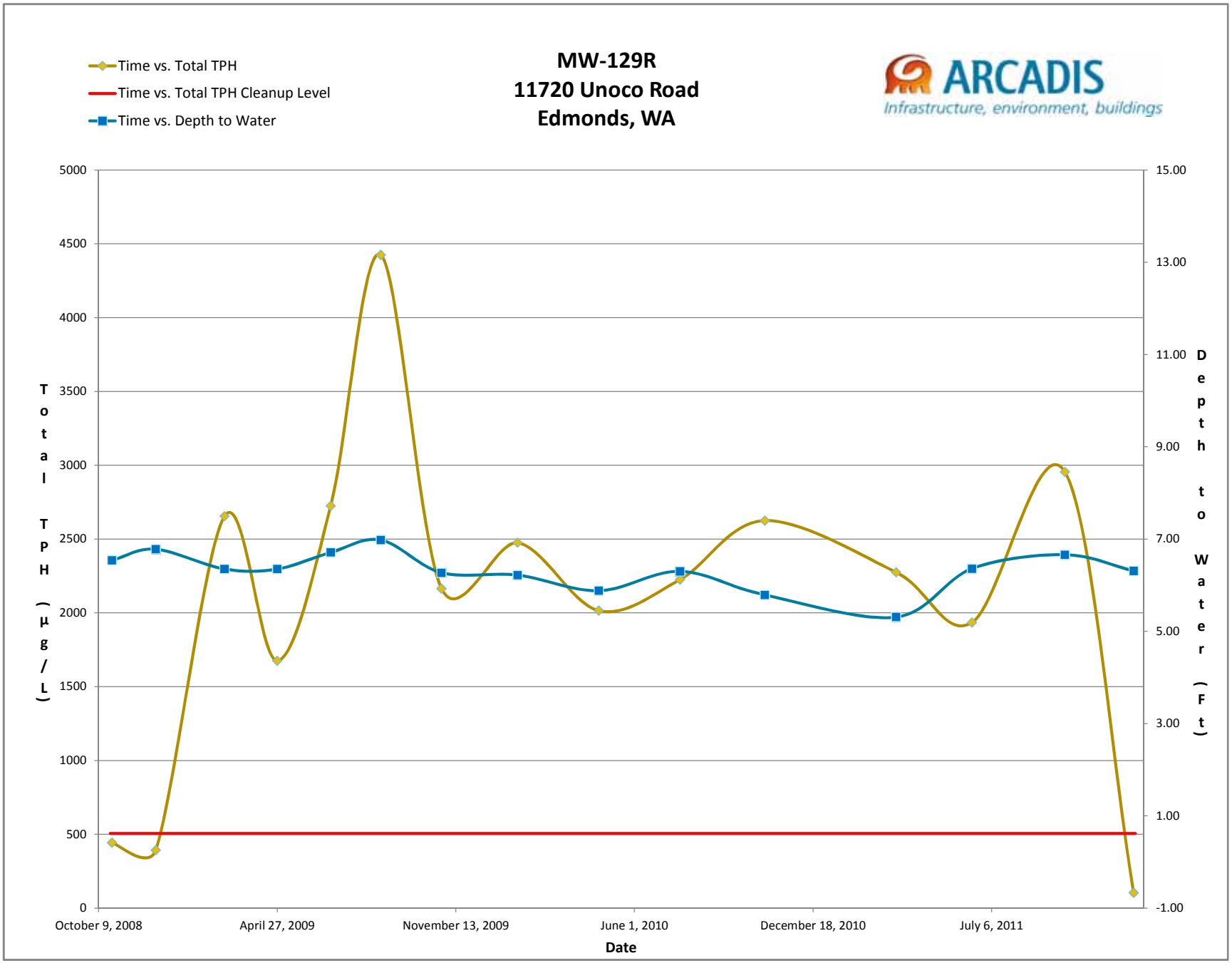

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
LM-2
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
-500
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

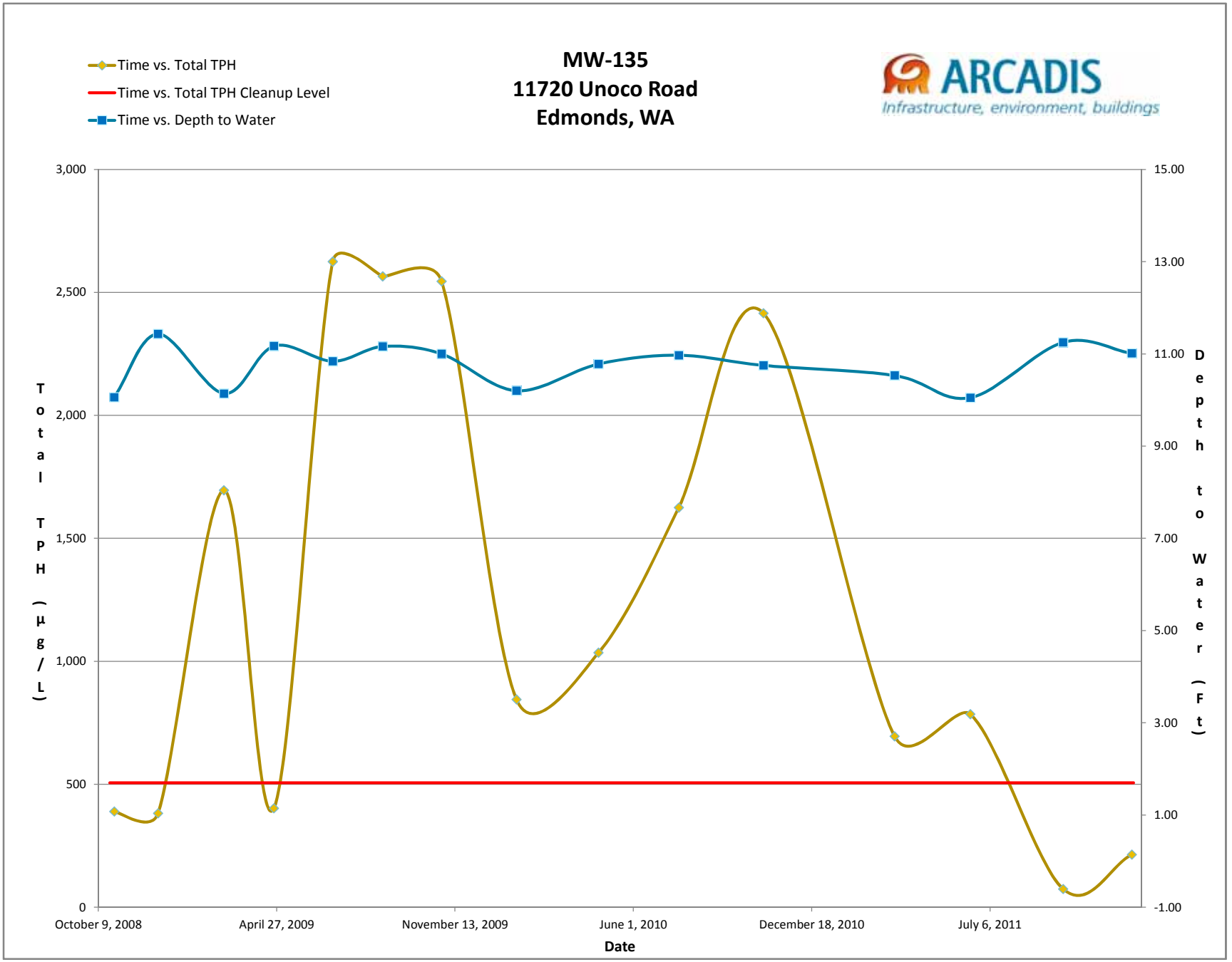

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-101
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
September 9, 2008
March 28, 2009
October 14, 2009
May 2, 2010
November 18, 2010
June 6, 2011
December 23, 2011
Date

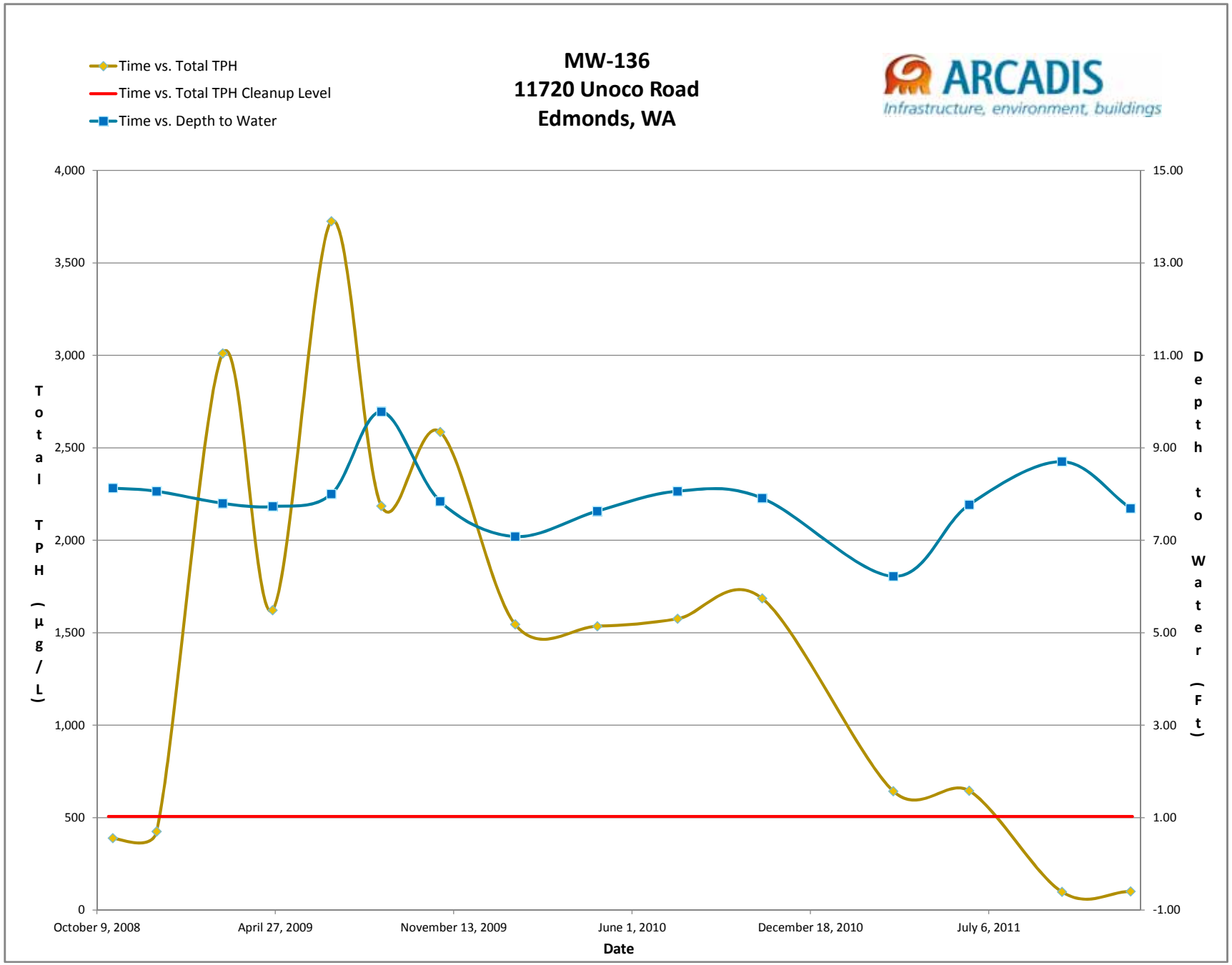

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-104
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

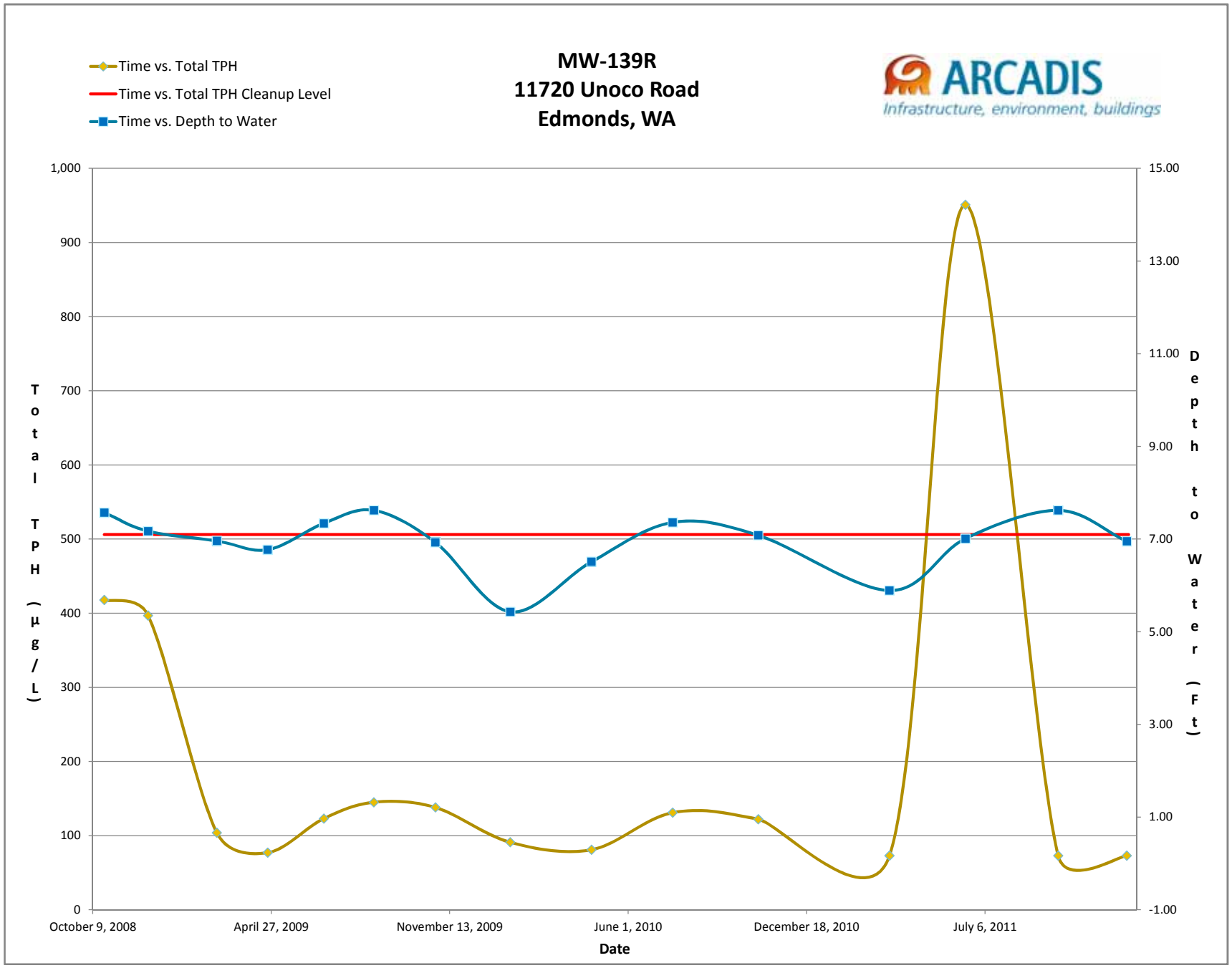

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-108
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

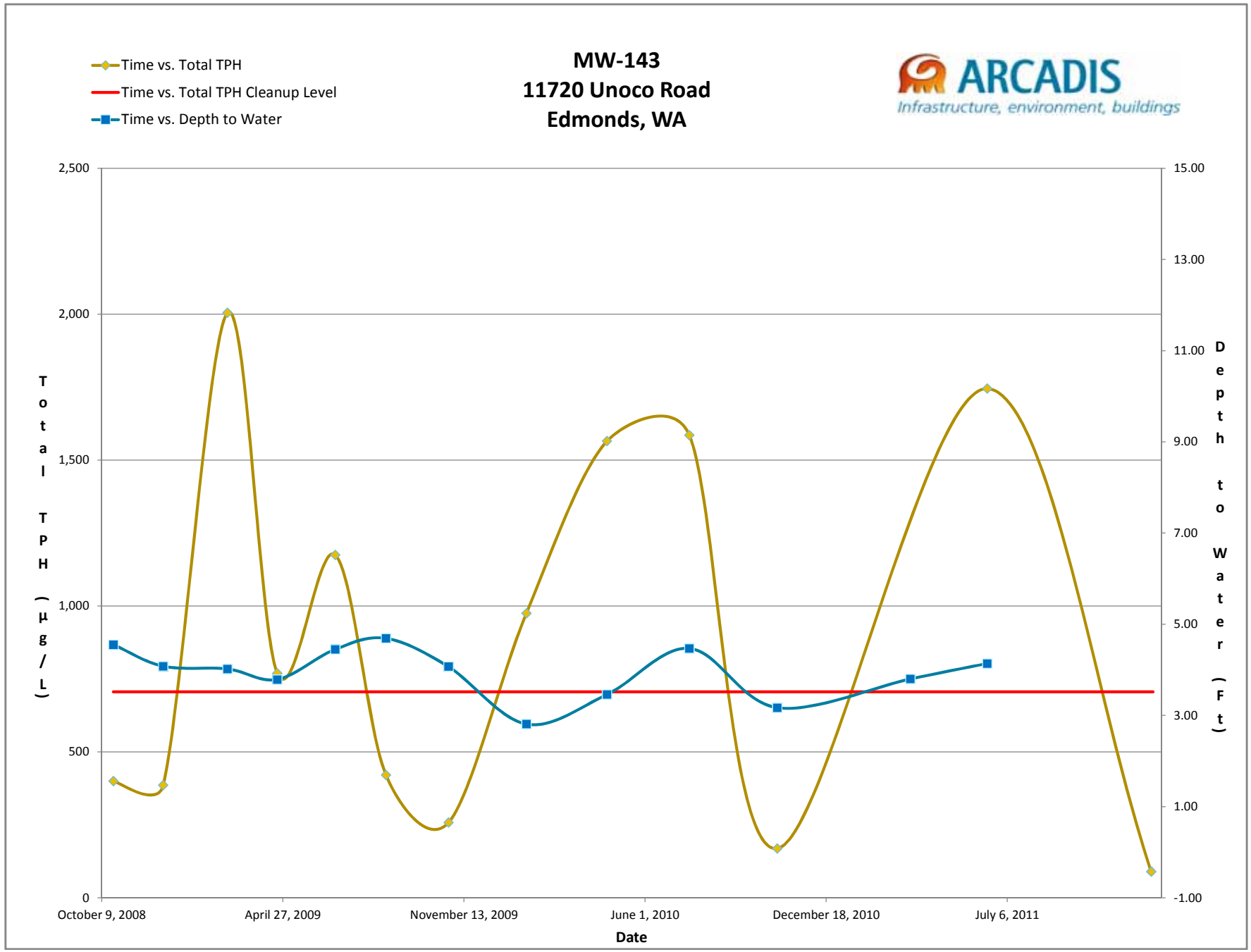

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-109
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

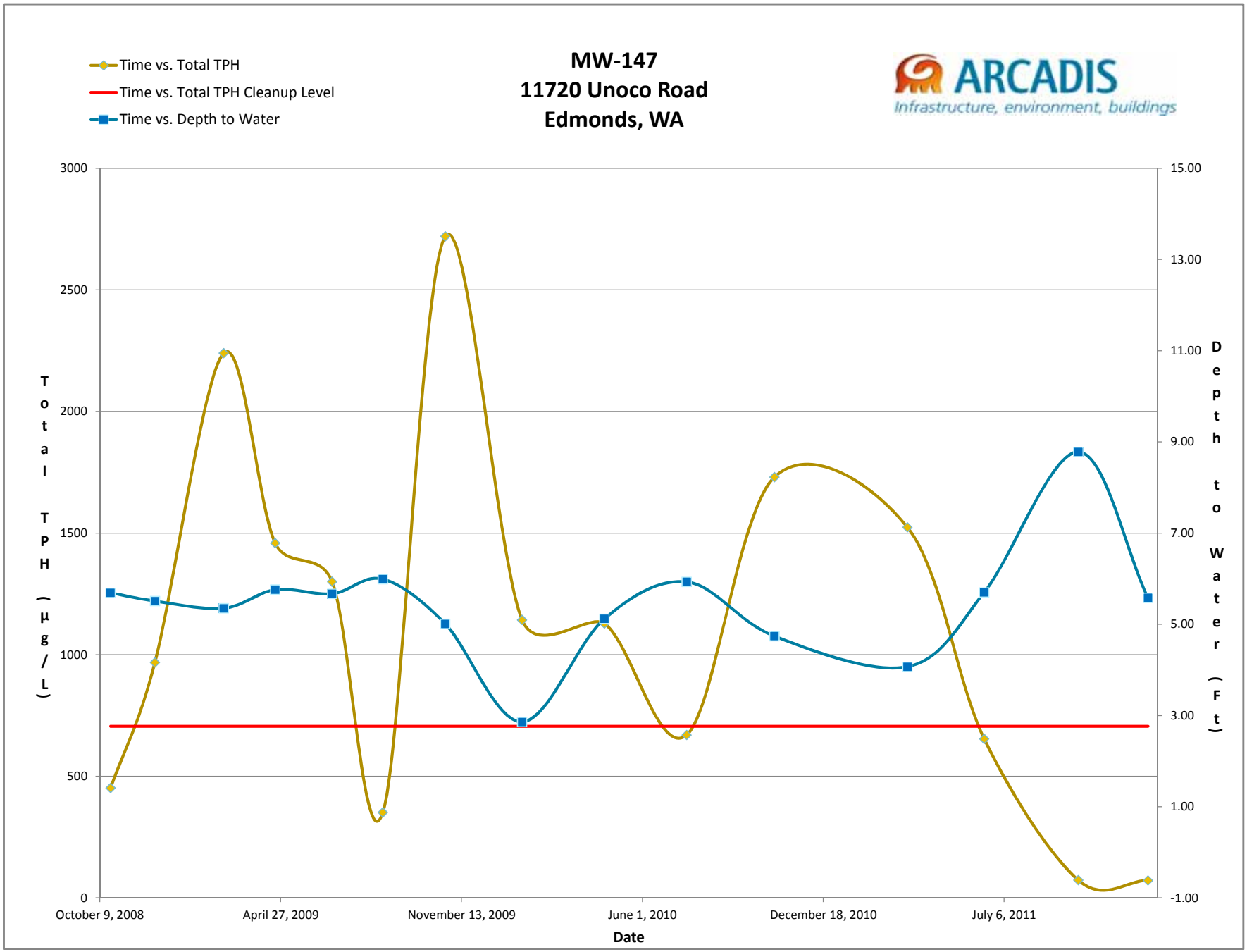

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-129R
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

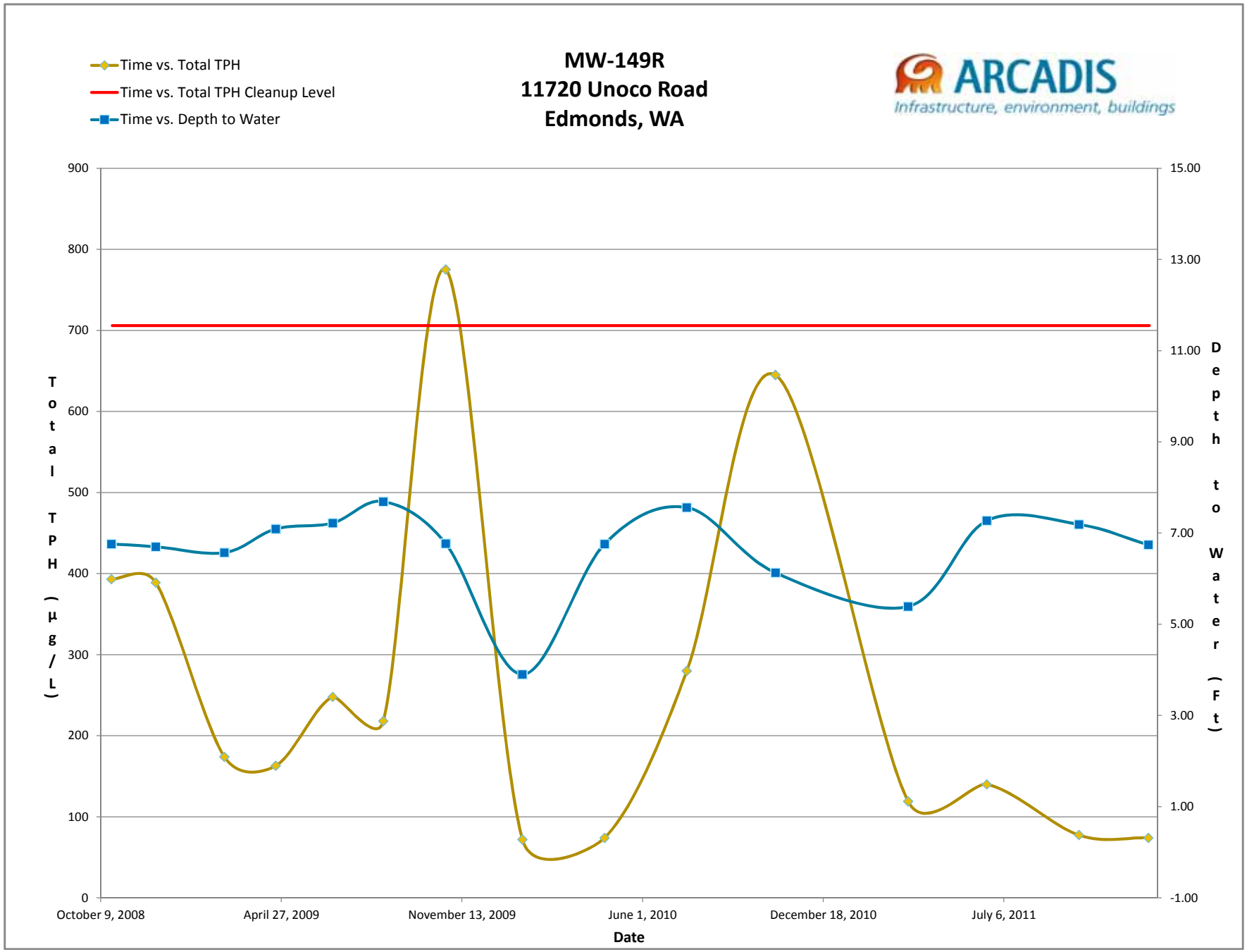

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-135
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
3,000
2,500
2,000
1,500
1,000
500
0
Total TPH (µg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

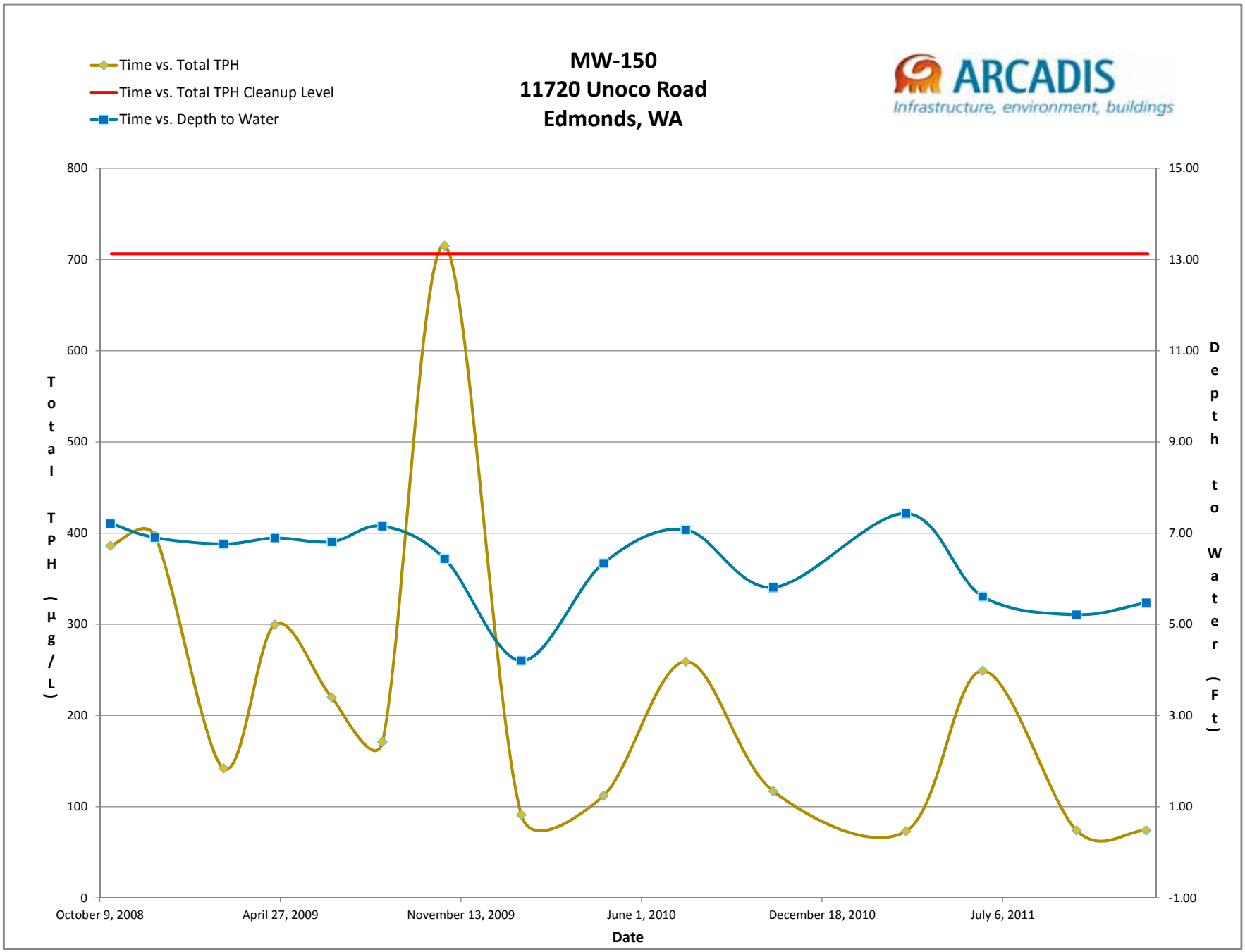

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-136
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Total TPH (µg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

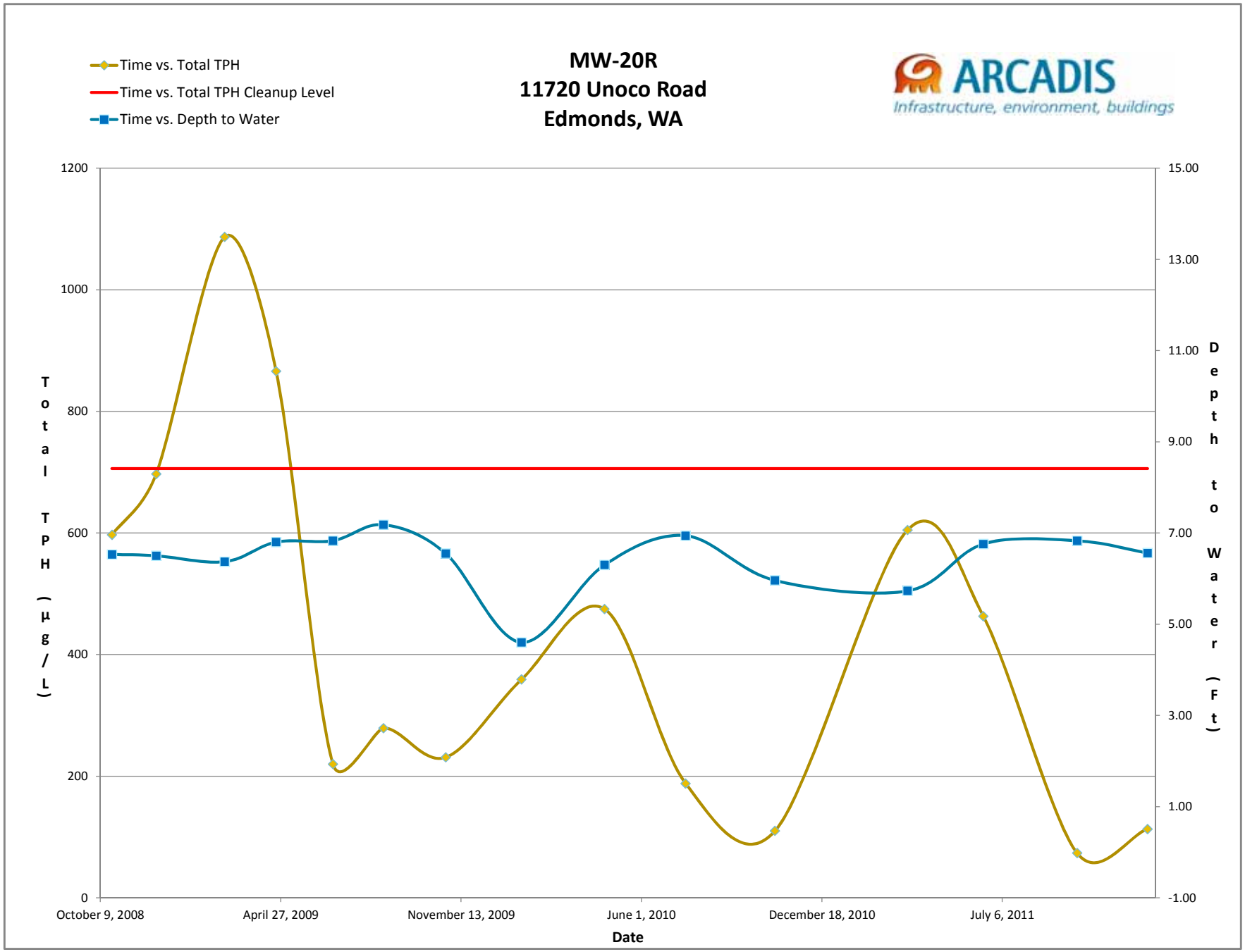

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-139R
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
1,000
900
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

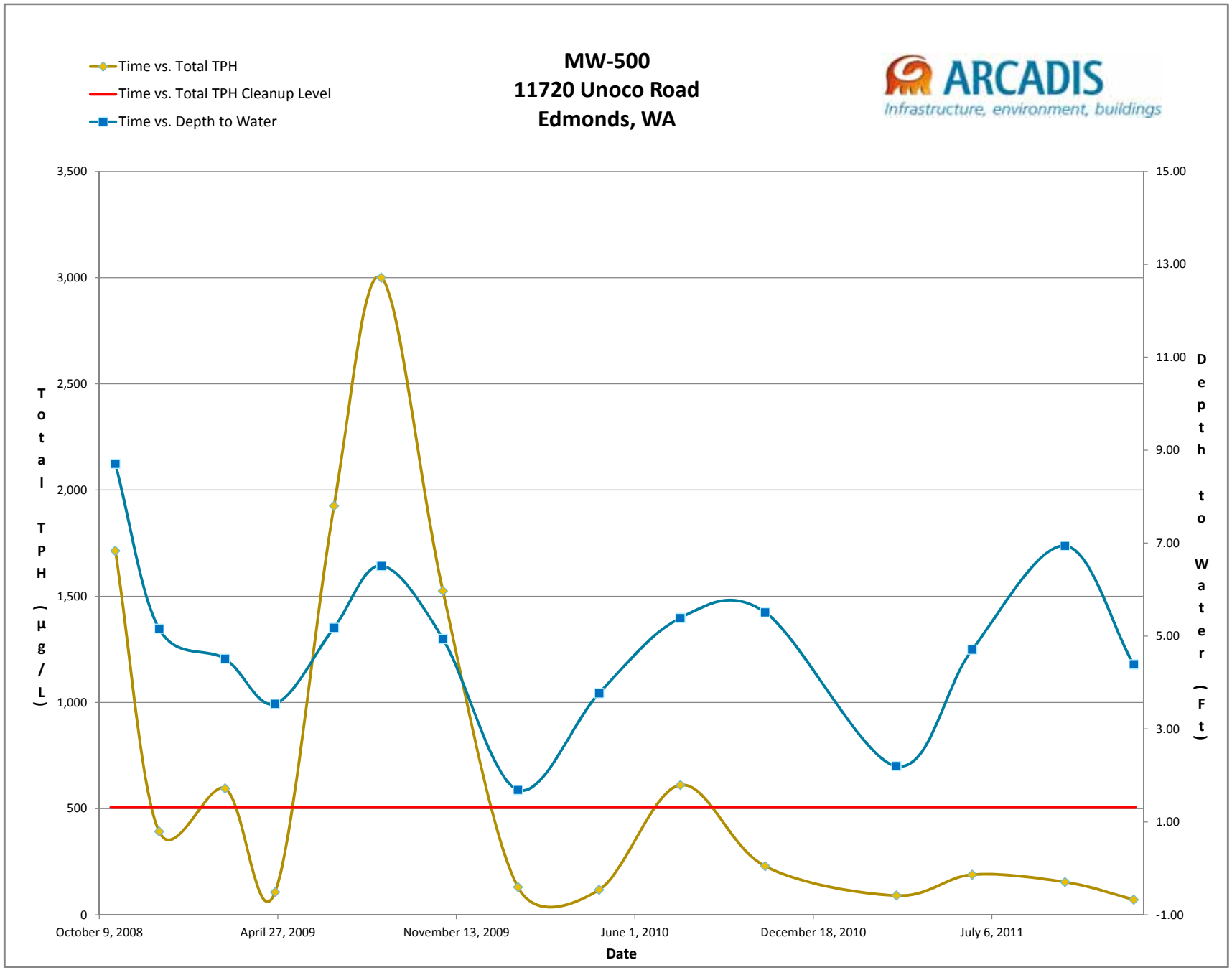

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-143
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
2,500
2,000
1,500
1,000
500
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

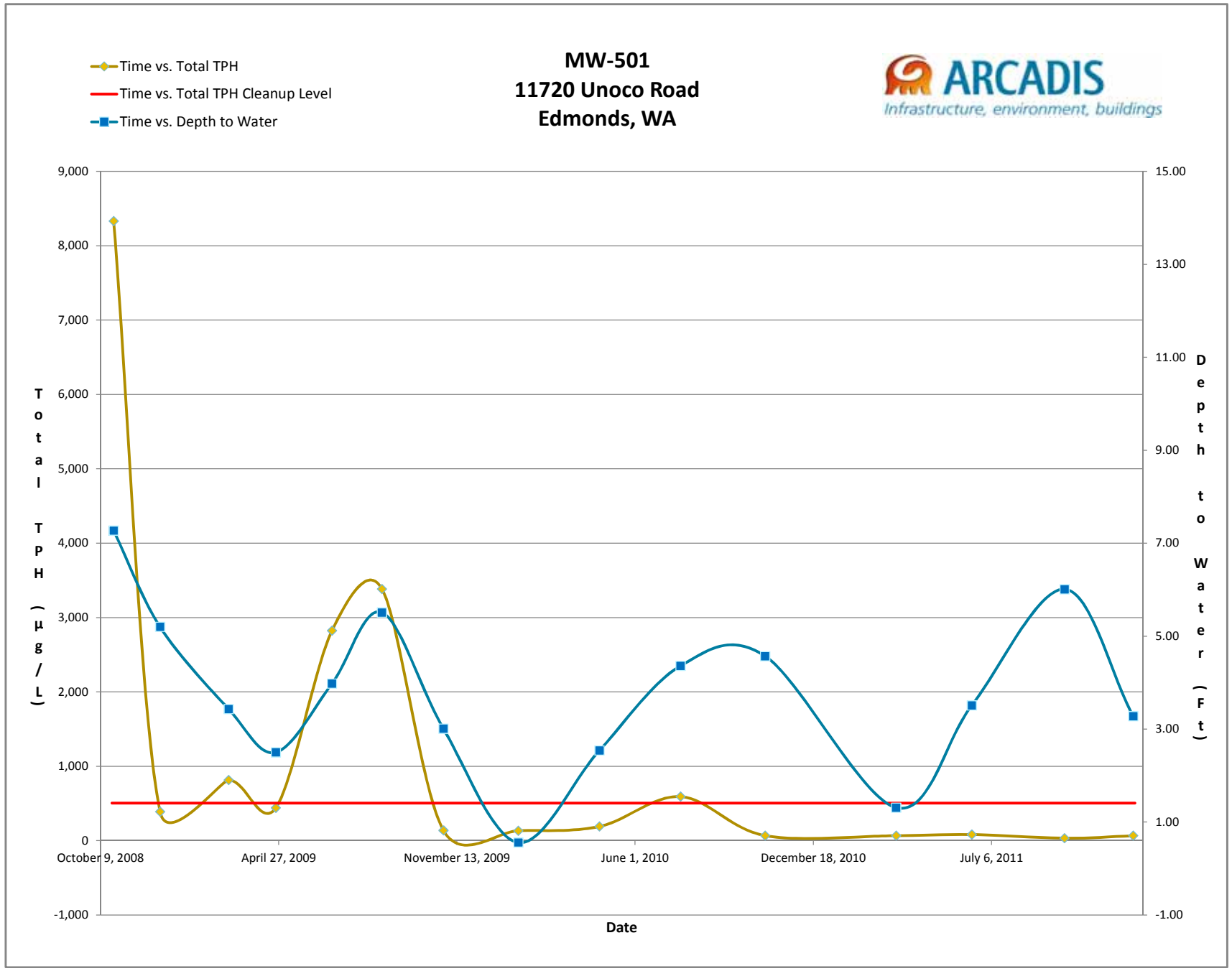

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-147
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
3000
2500
2000
1500
1000
500
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

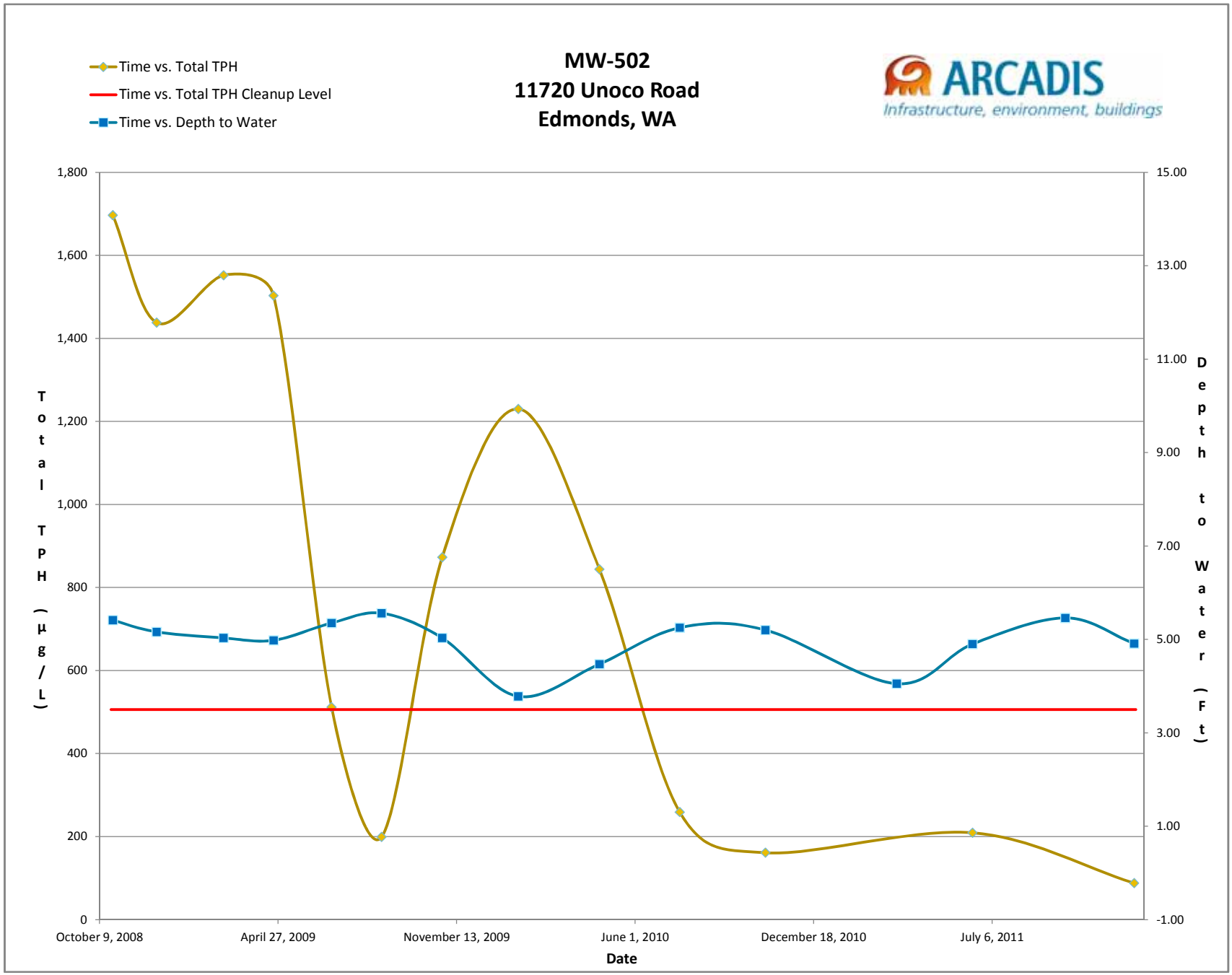

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-149R
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
900
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

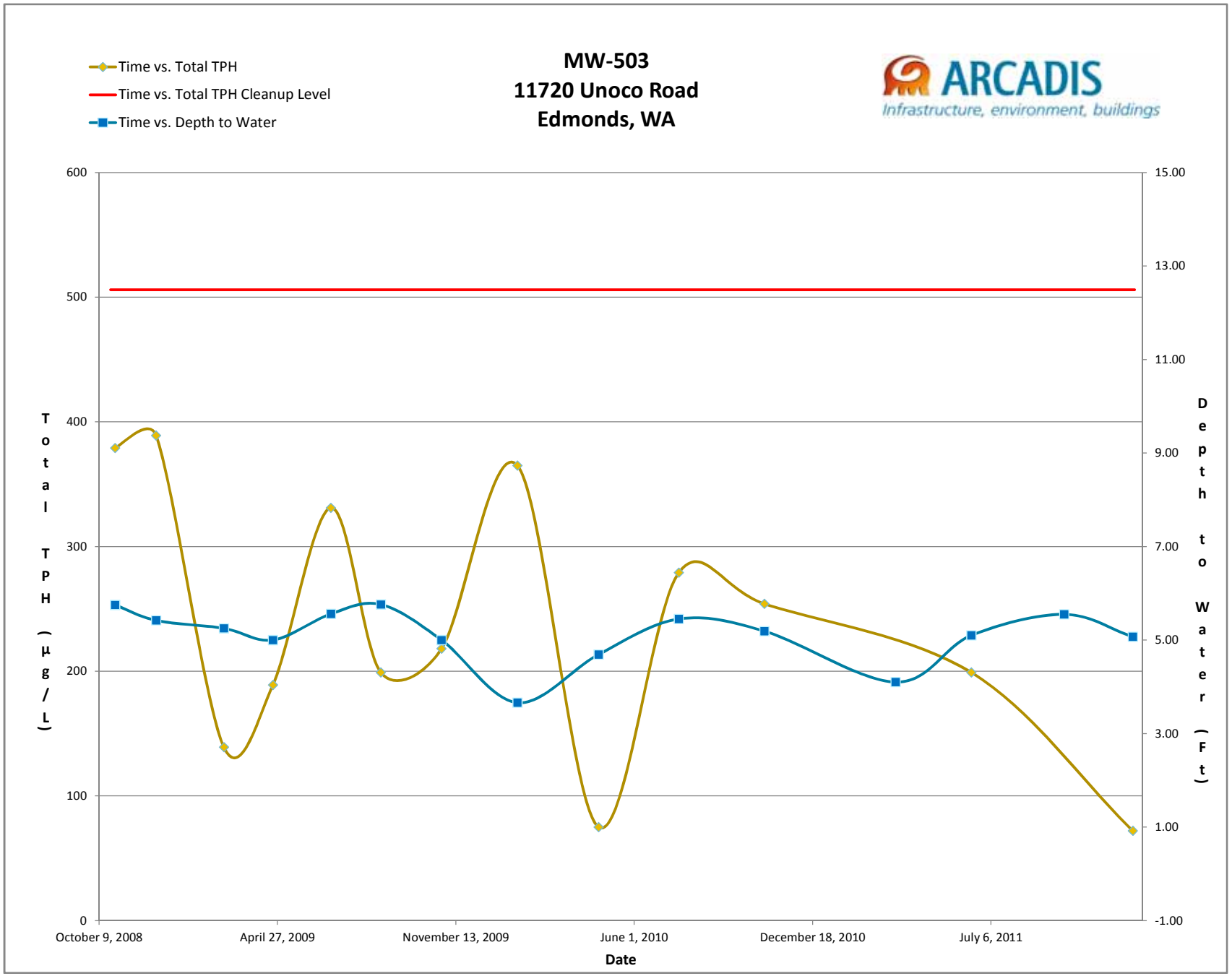

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-150
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

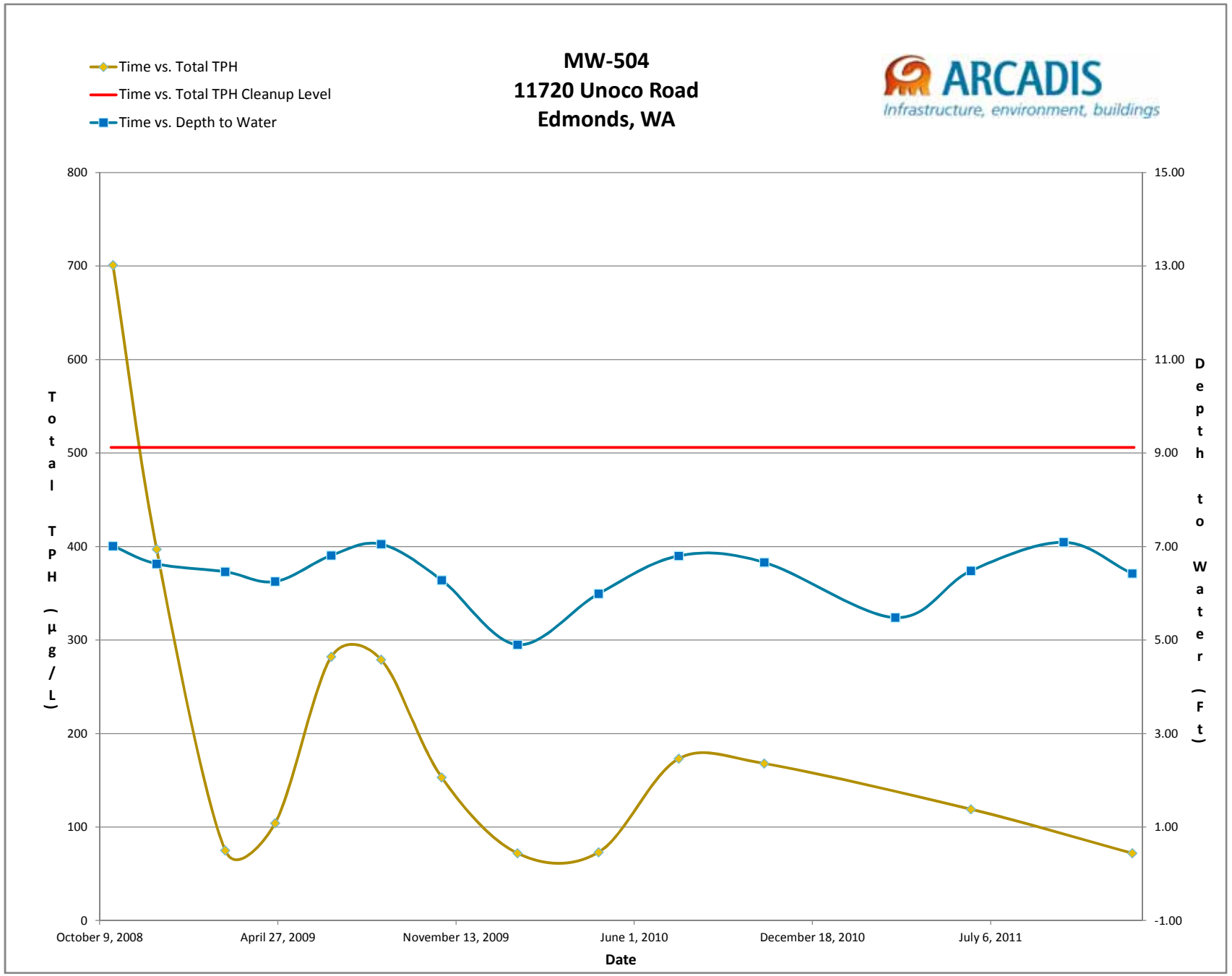

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-20R
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
1200
1000
800
600
400
200
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

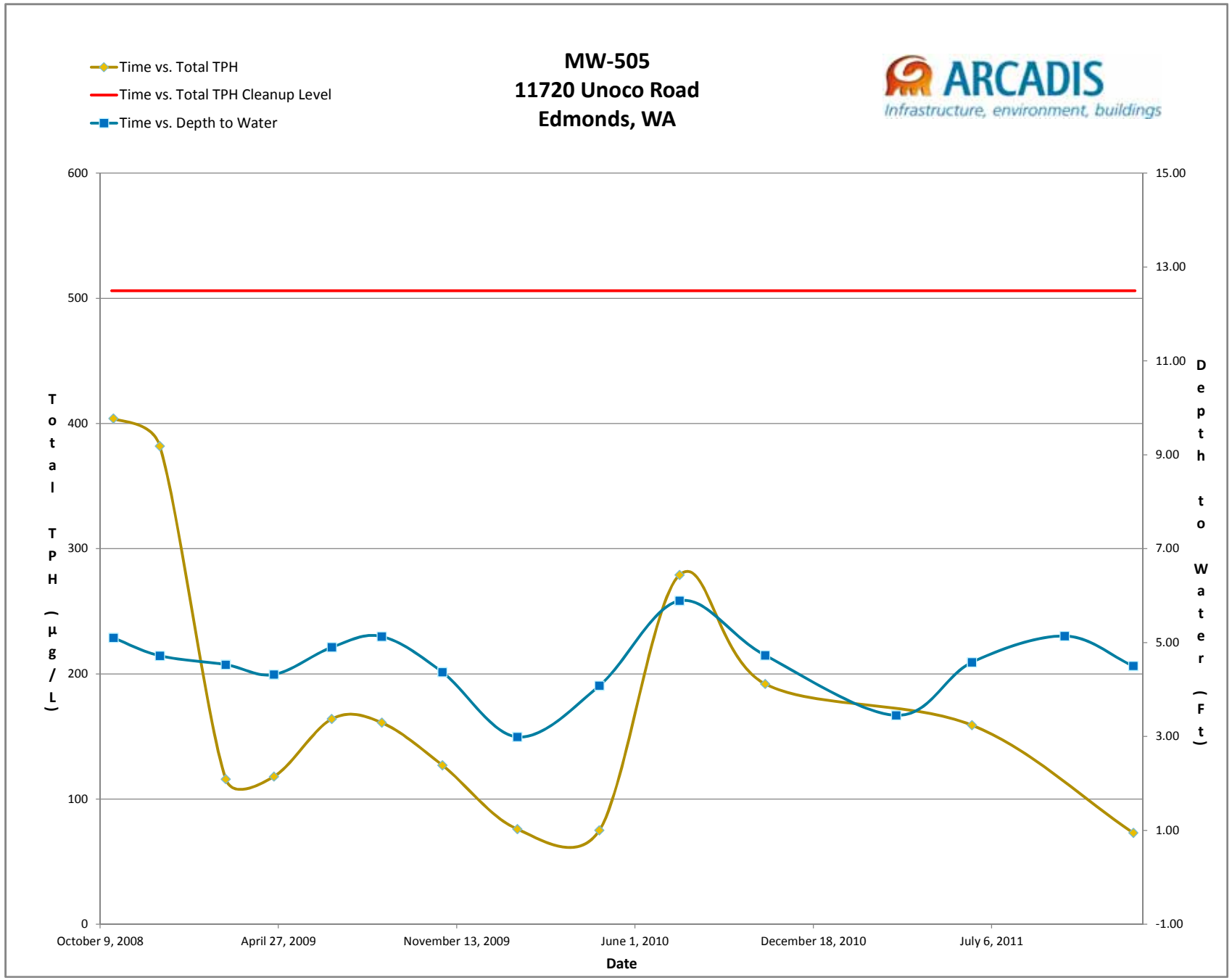

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-500
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

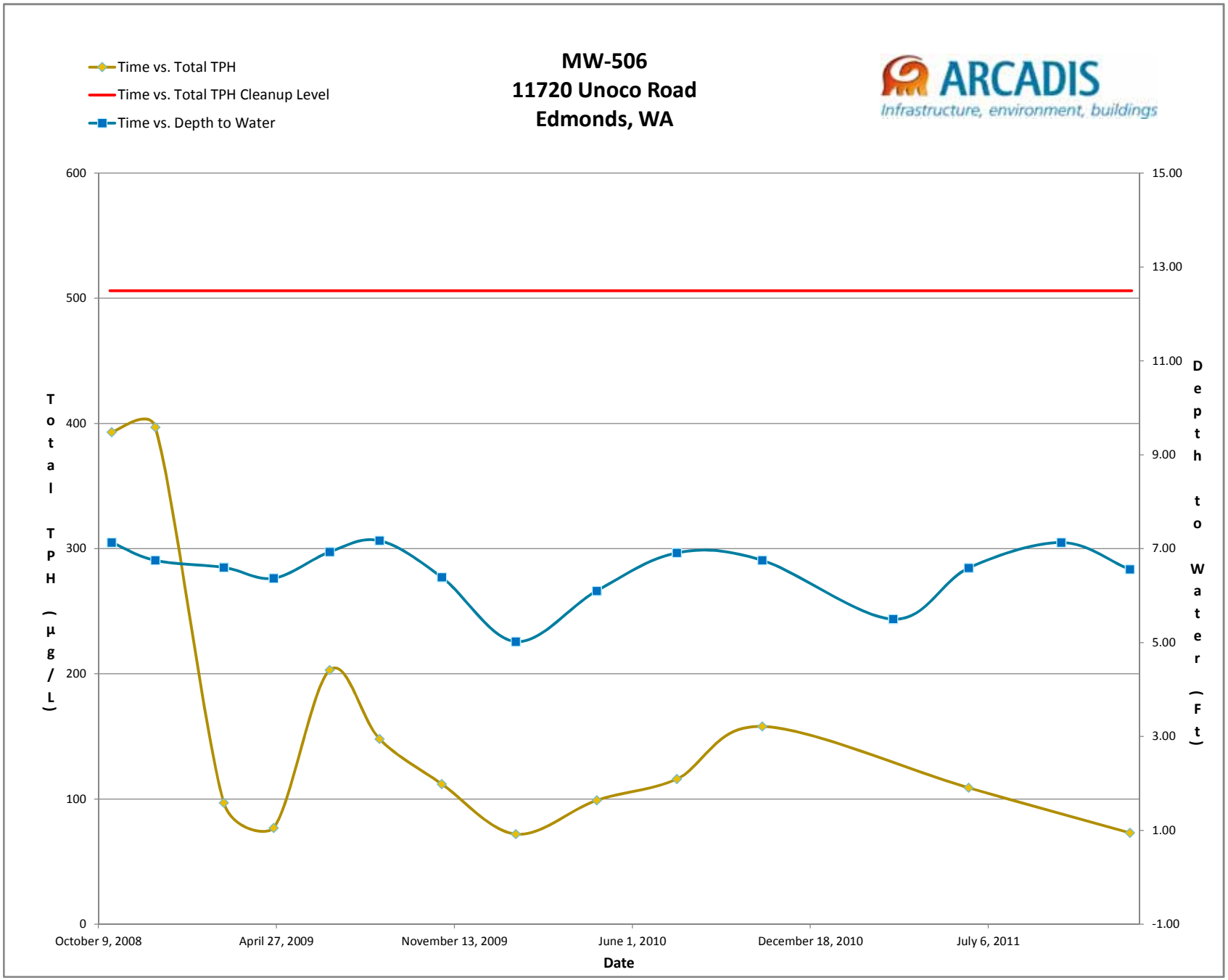

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-501
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
-1,000
Total TPH (µg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

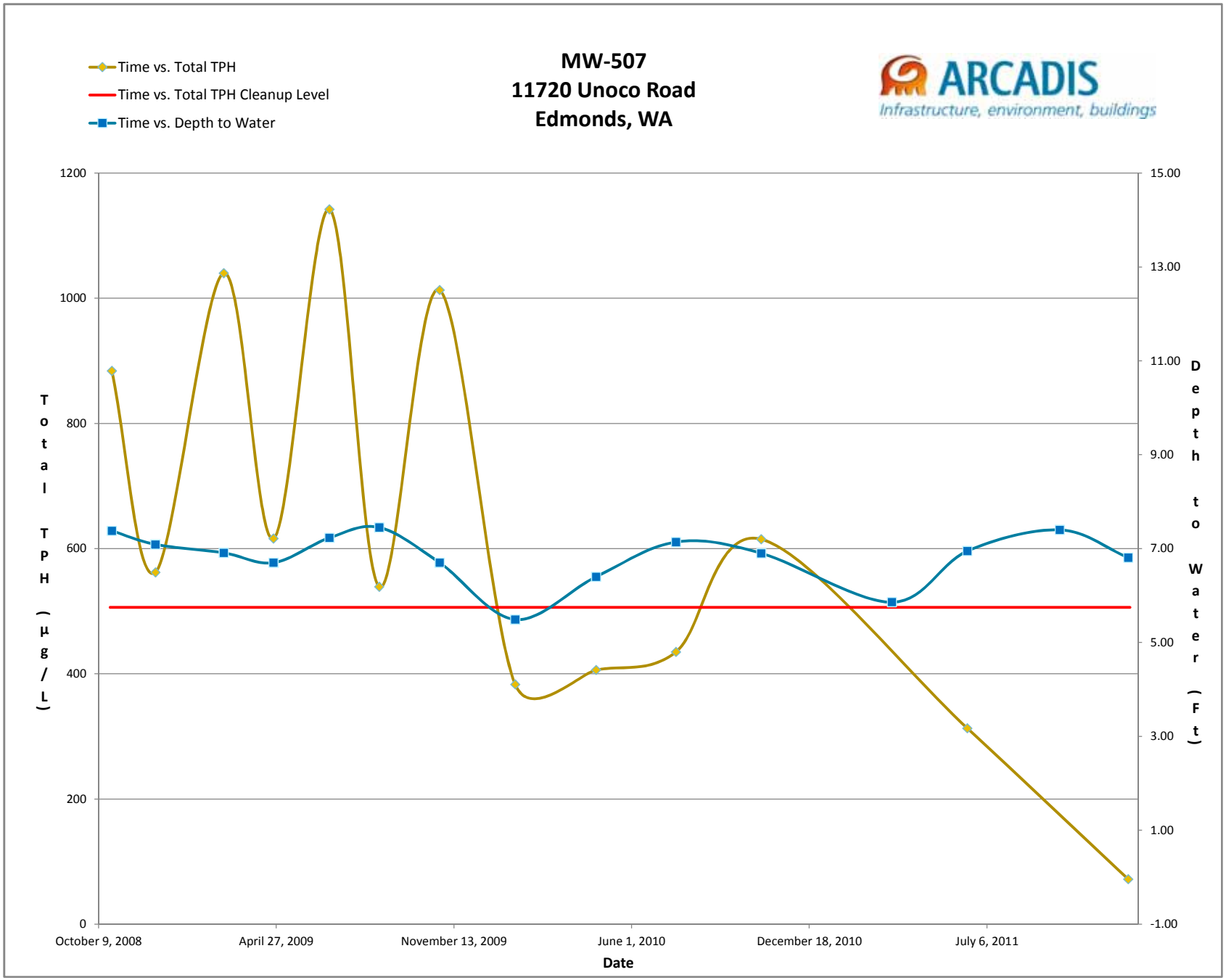

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-502
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

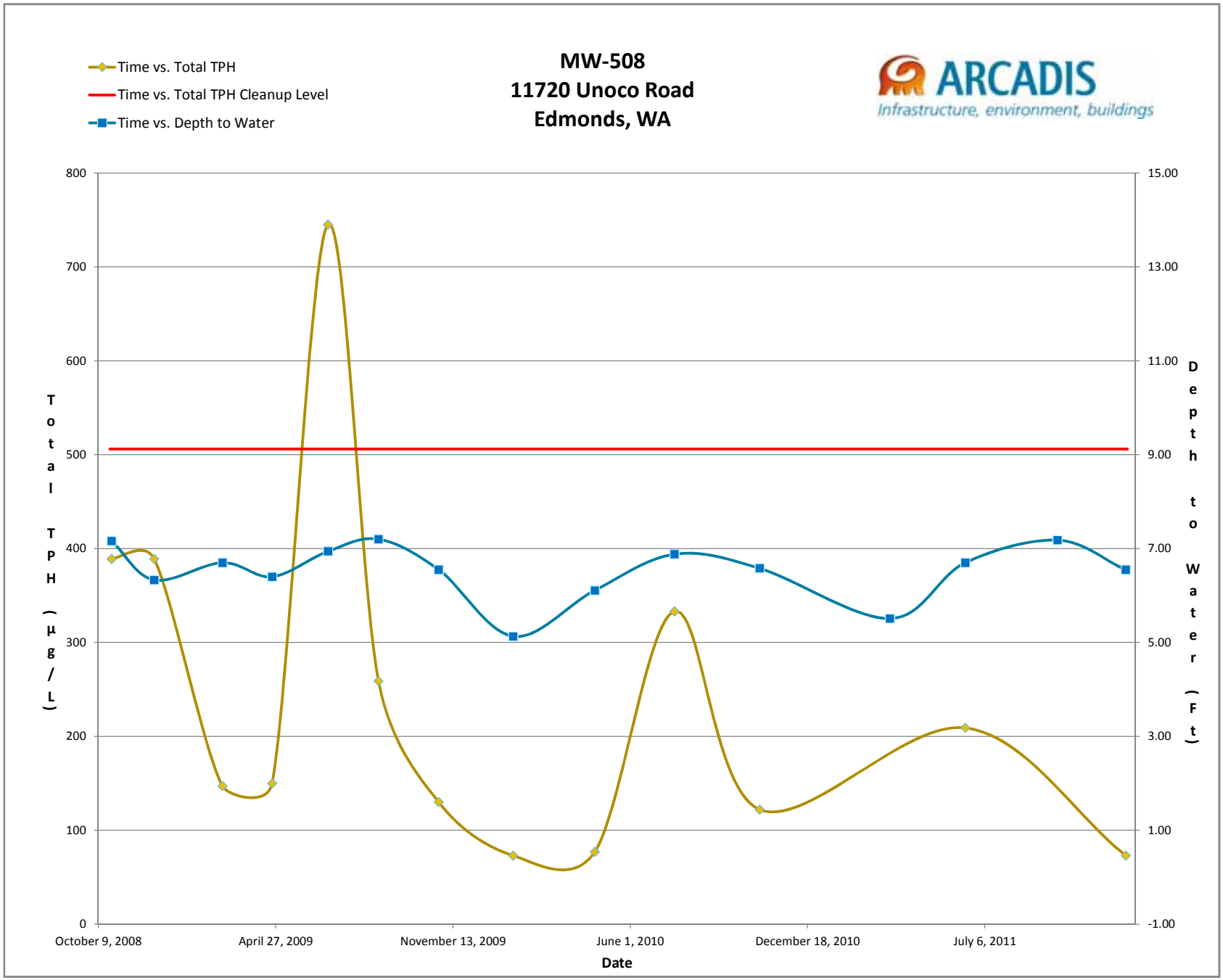

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-503
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

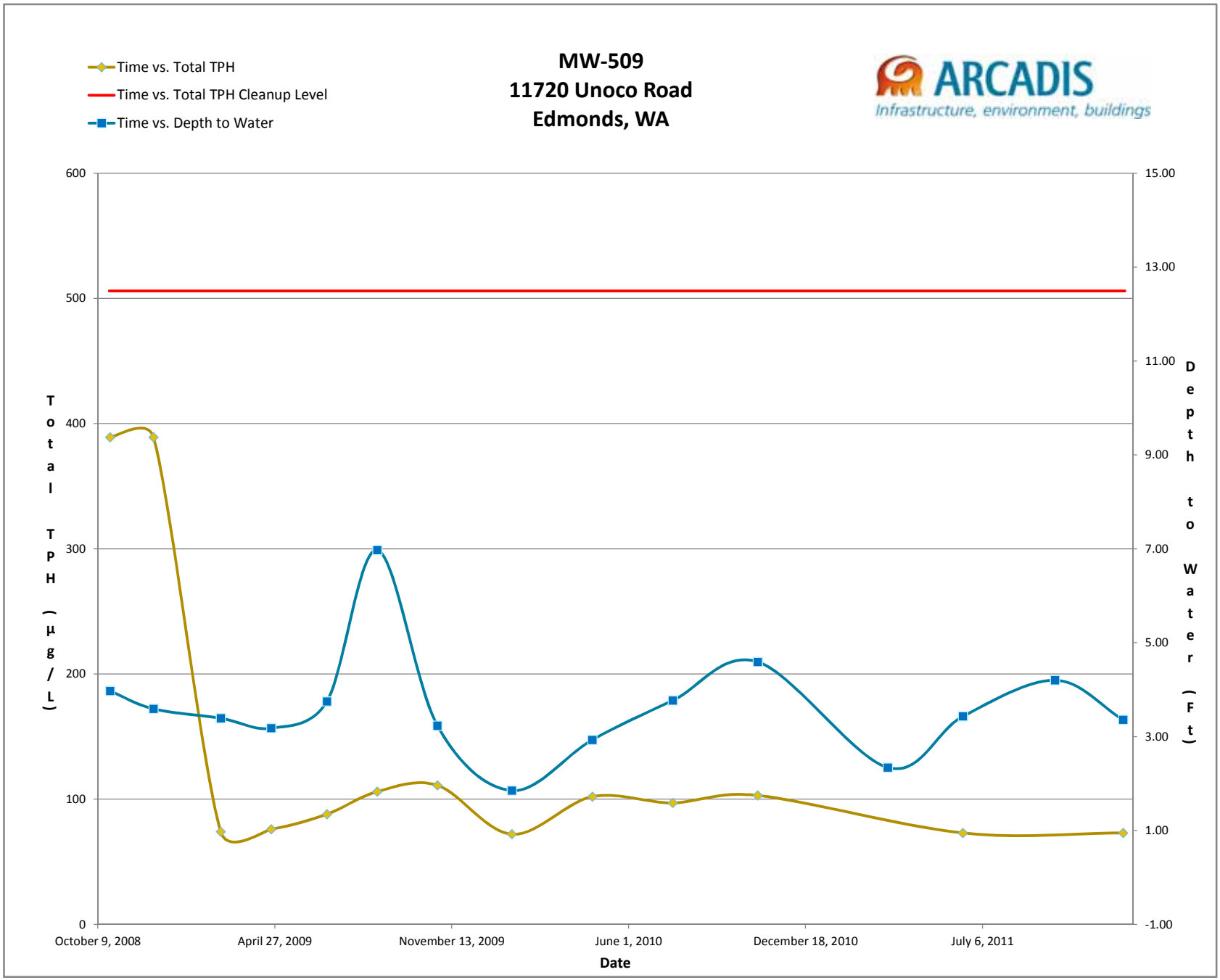

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-504
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

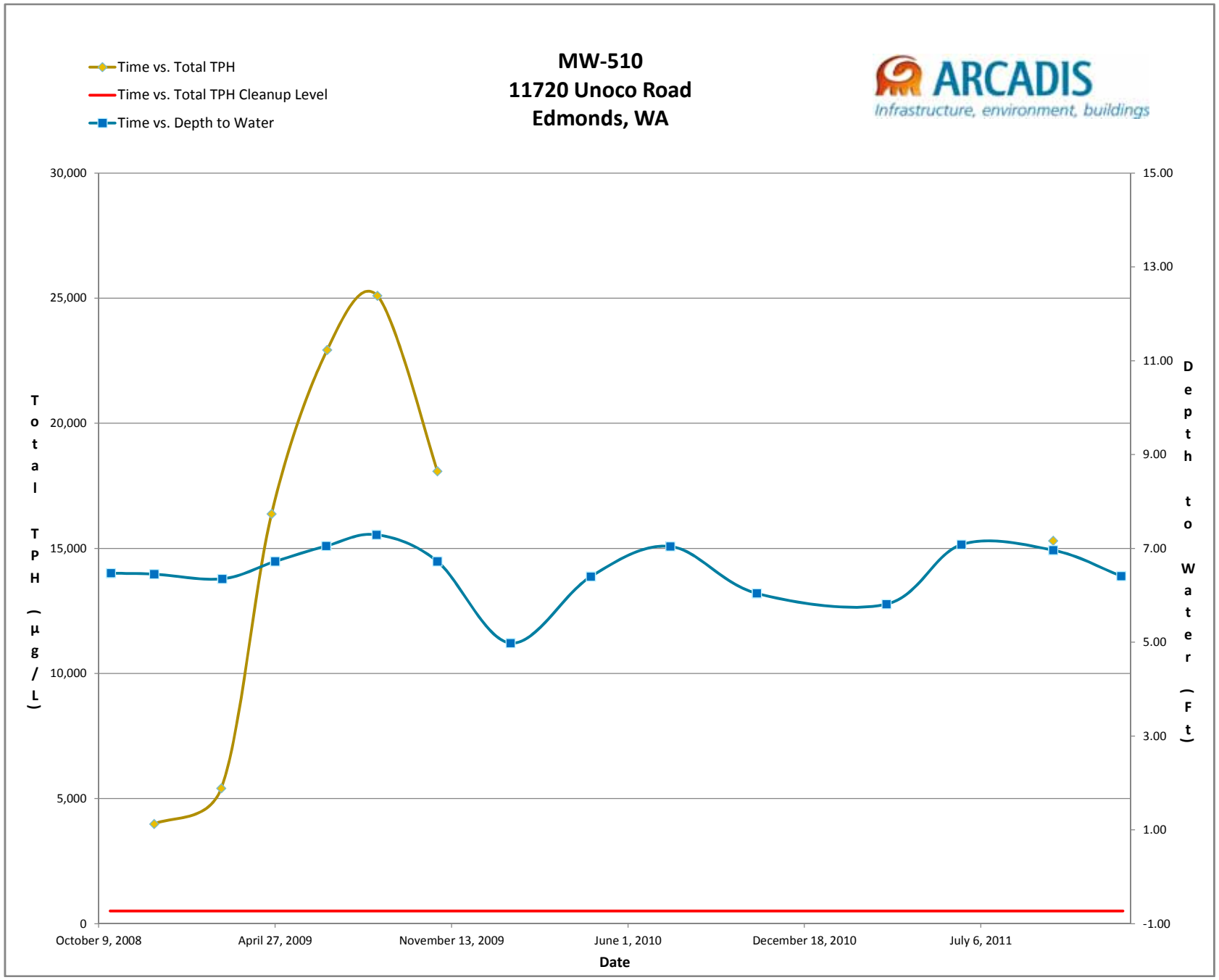

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-505
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

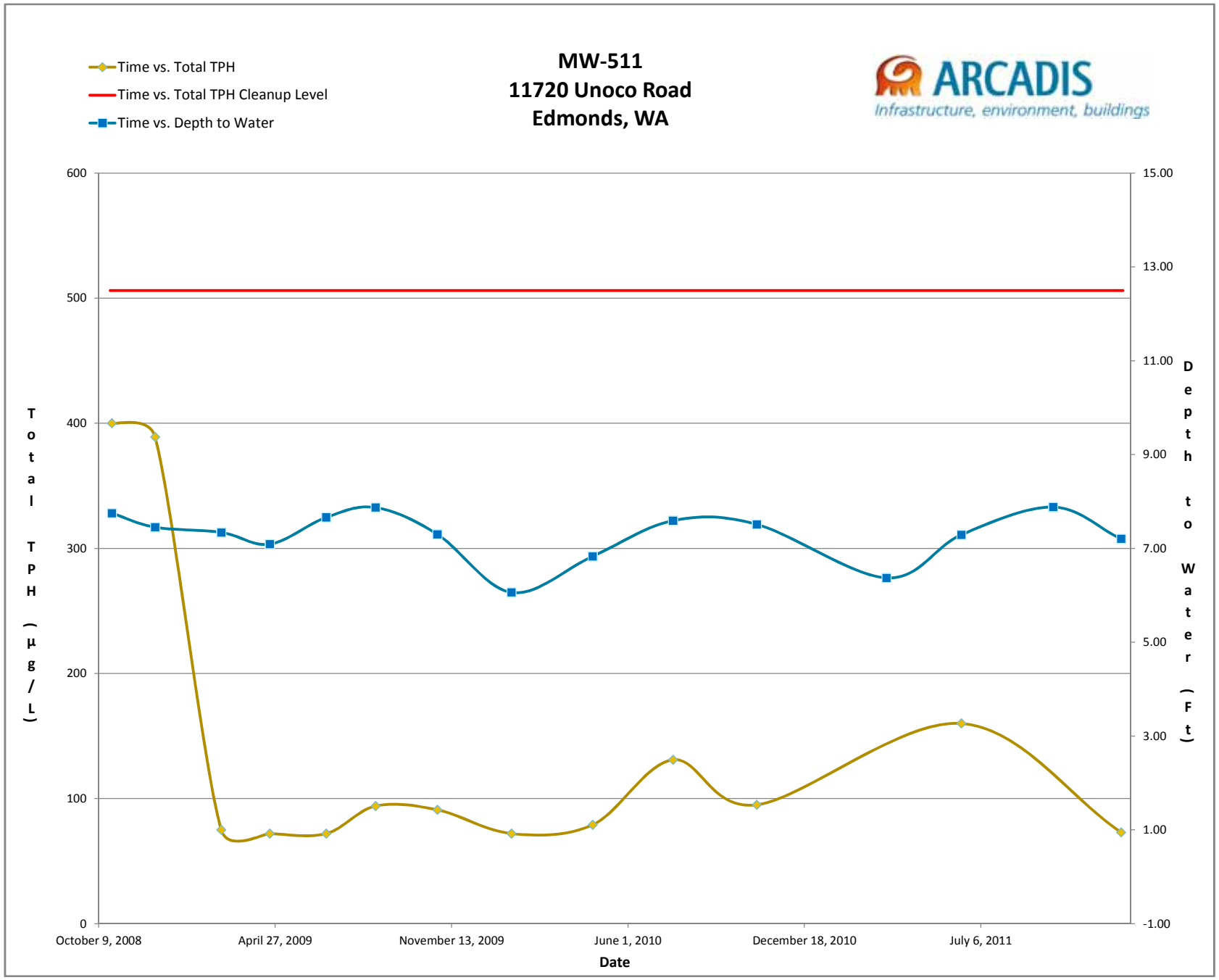

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-506
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
600
500
400
300
200
100
0
Total TPH (µg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

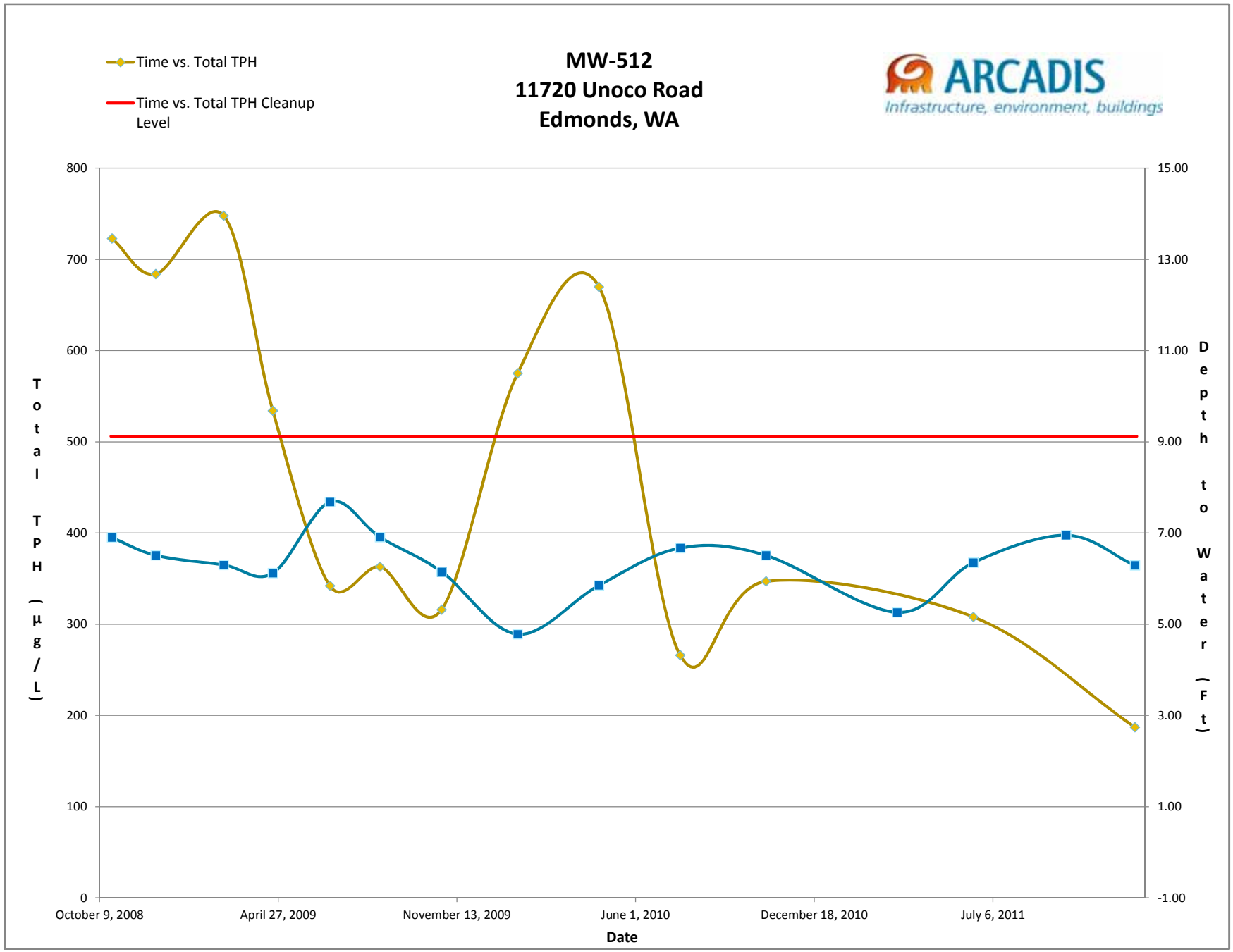

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-507
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
1200
1000
800
600
400
200
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

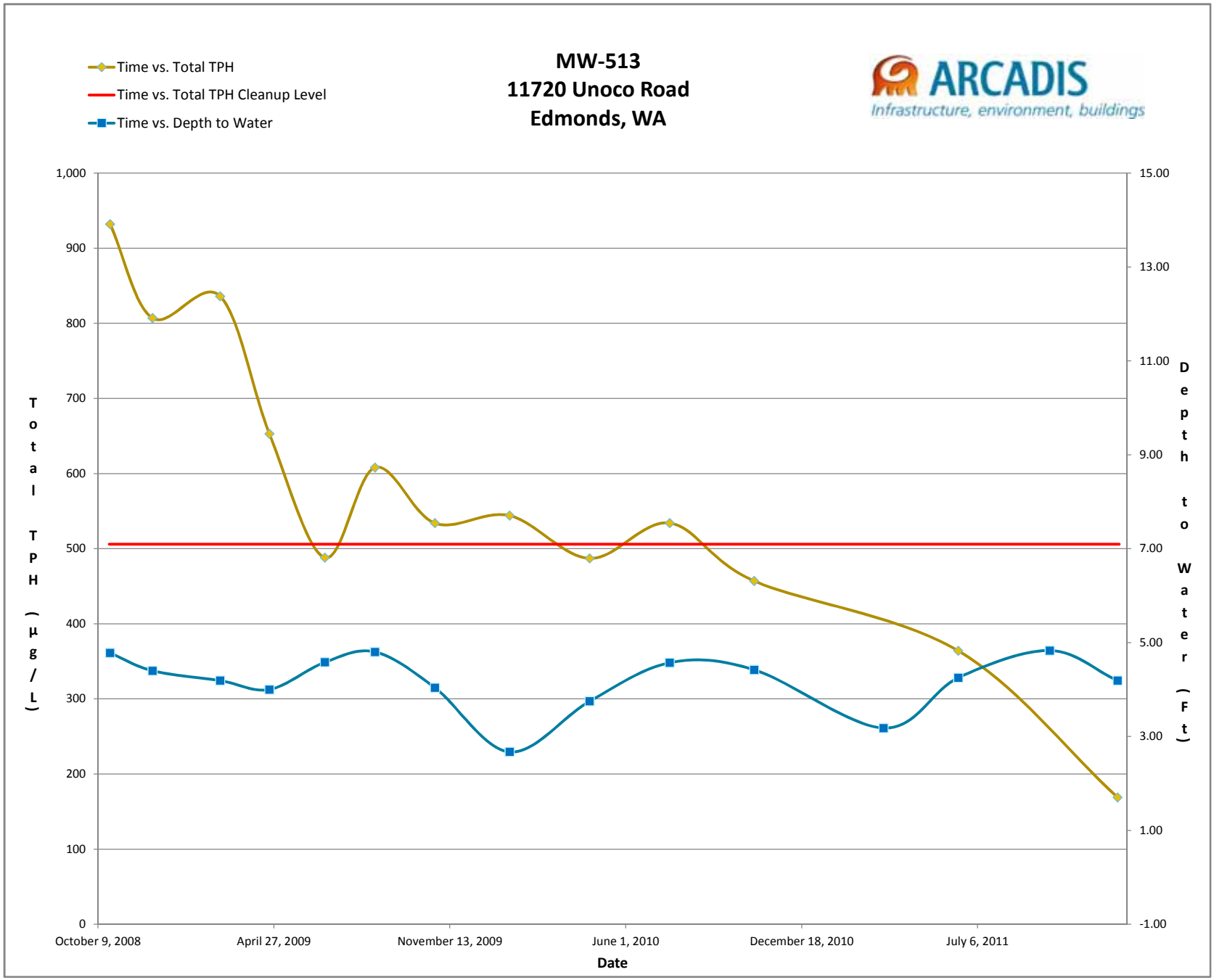

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-508
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

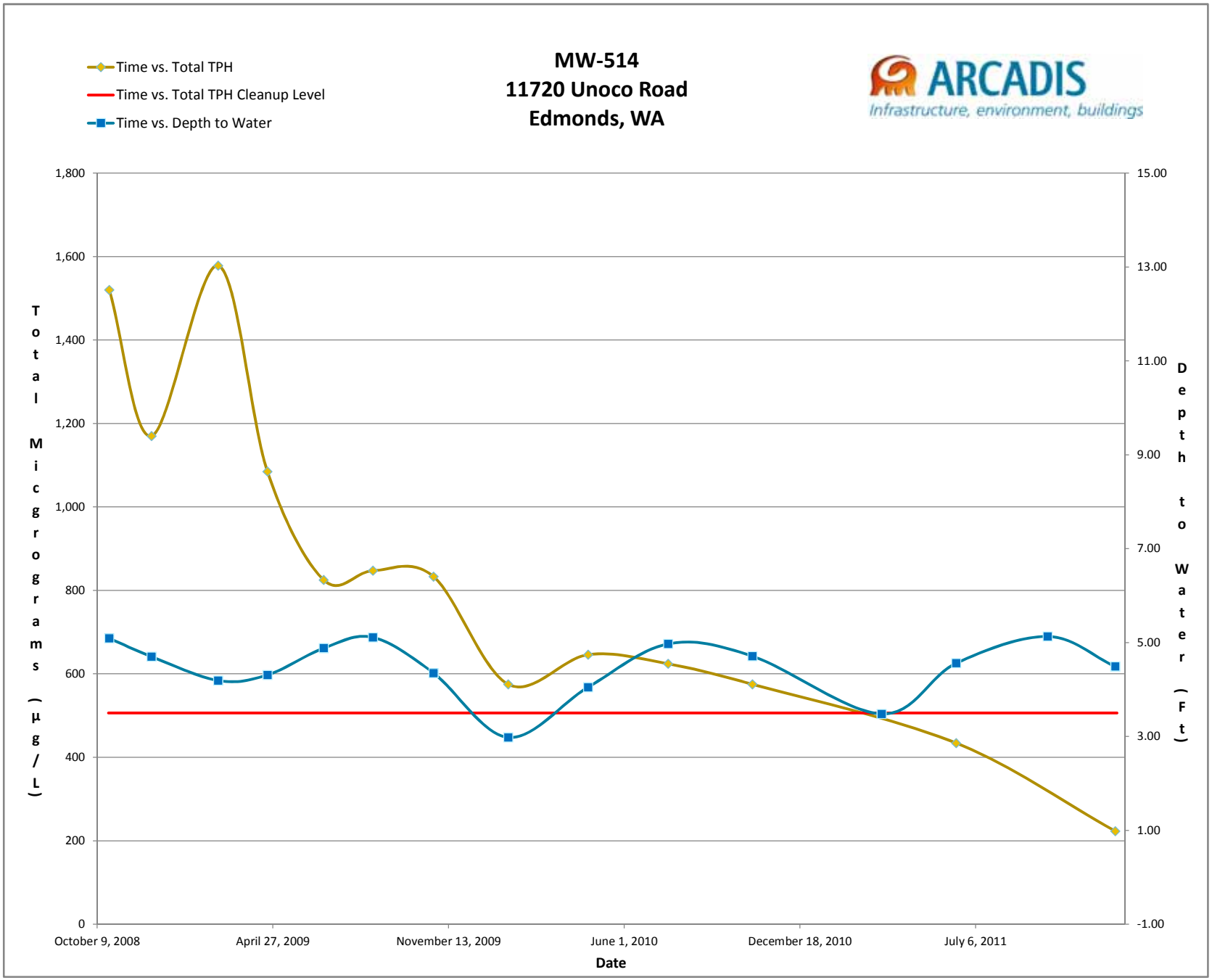

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-509
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

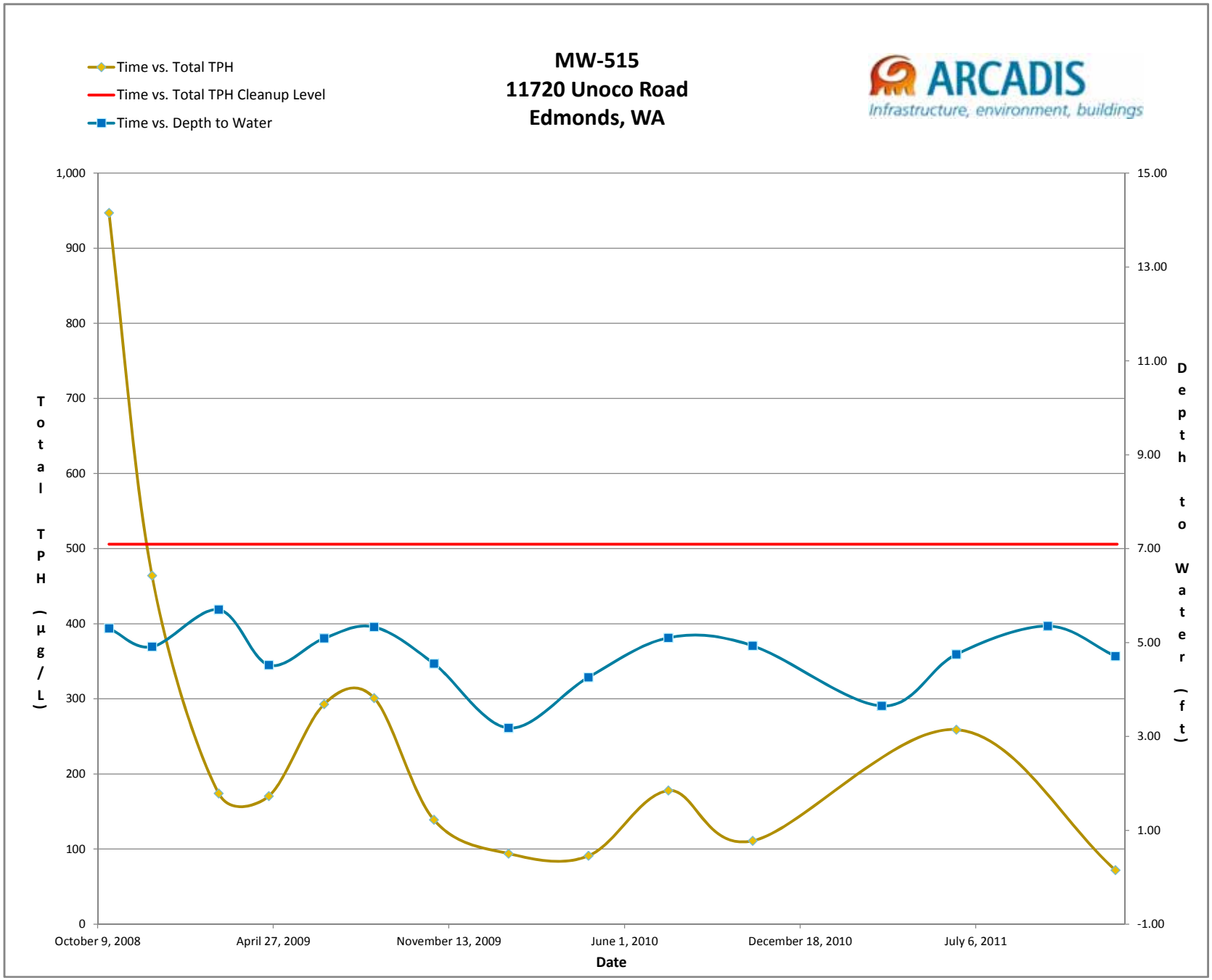

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-510
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
30,000
25,000
20,000
15,000
10,000
5,000
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

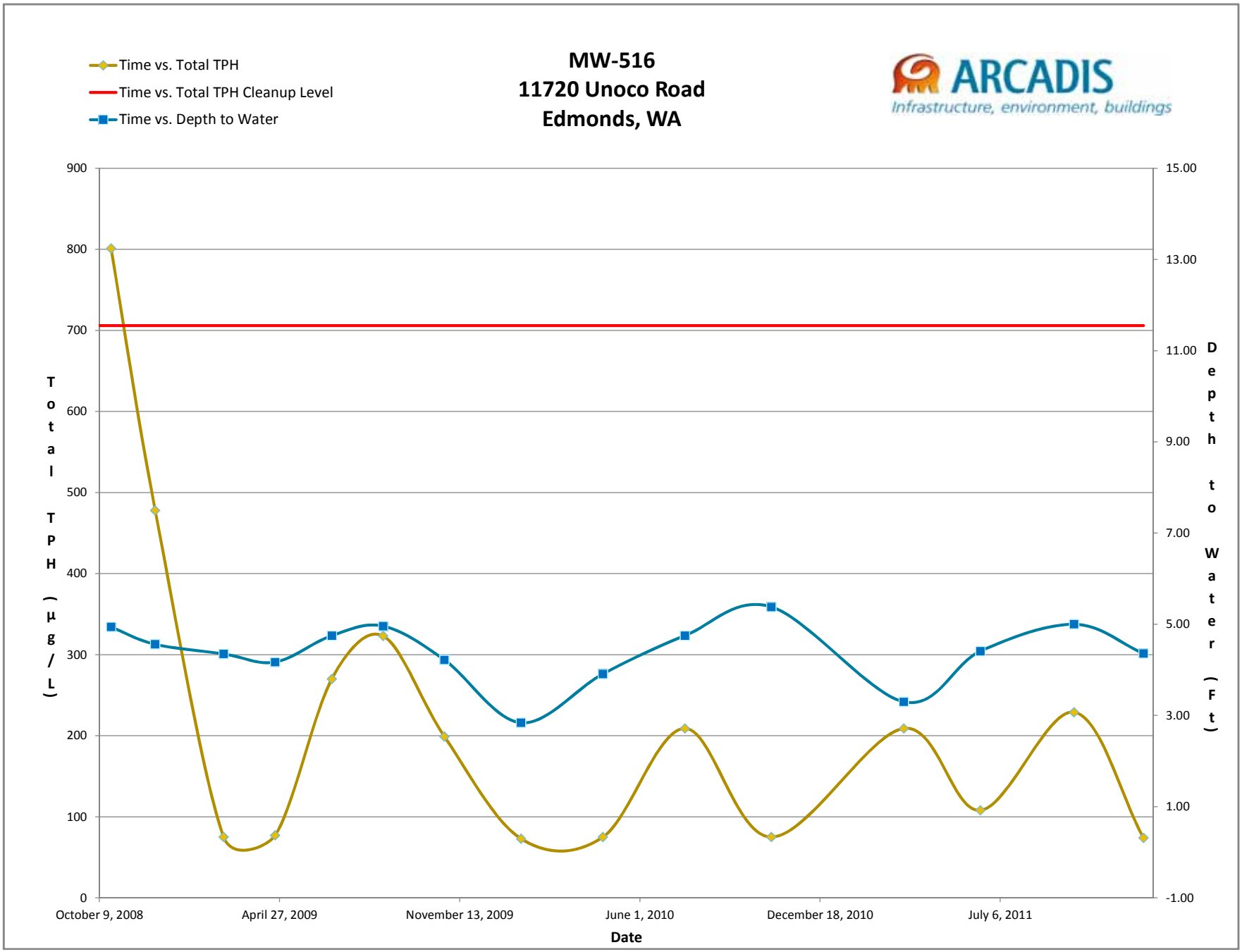

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-511
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

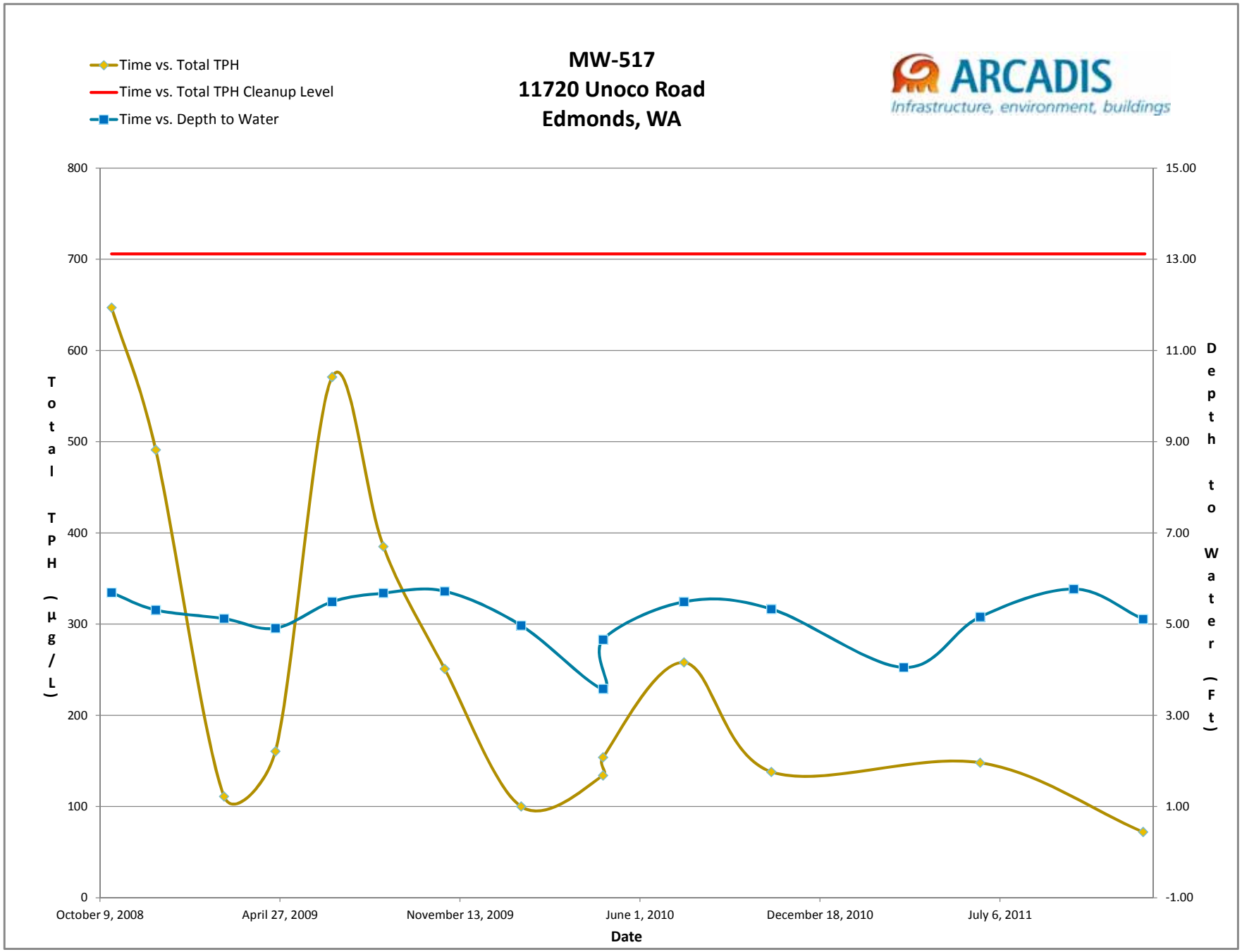

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
MW-512
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

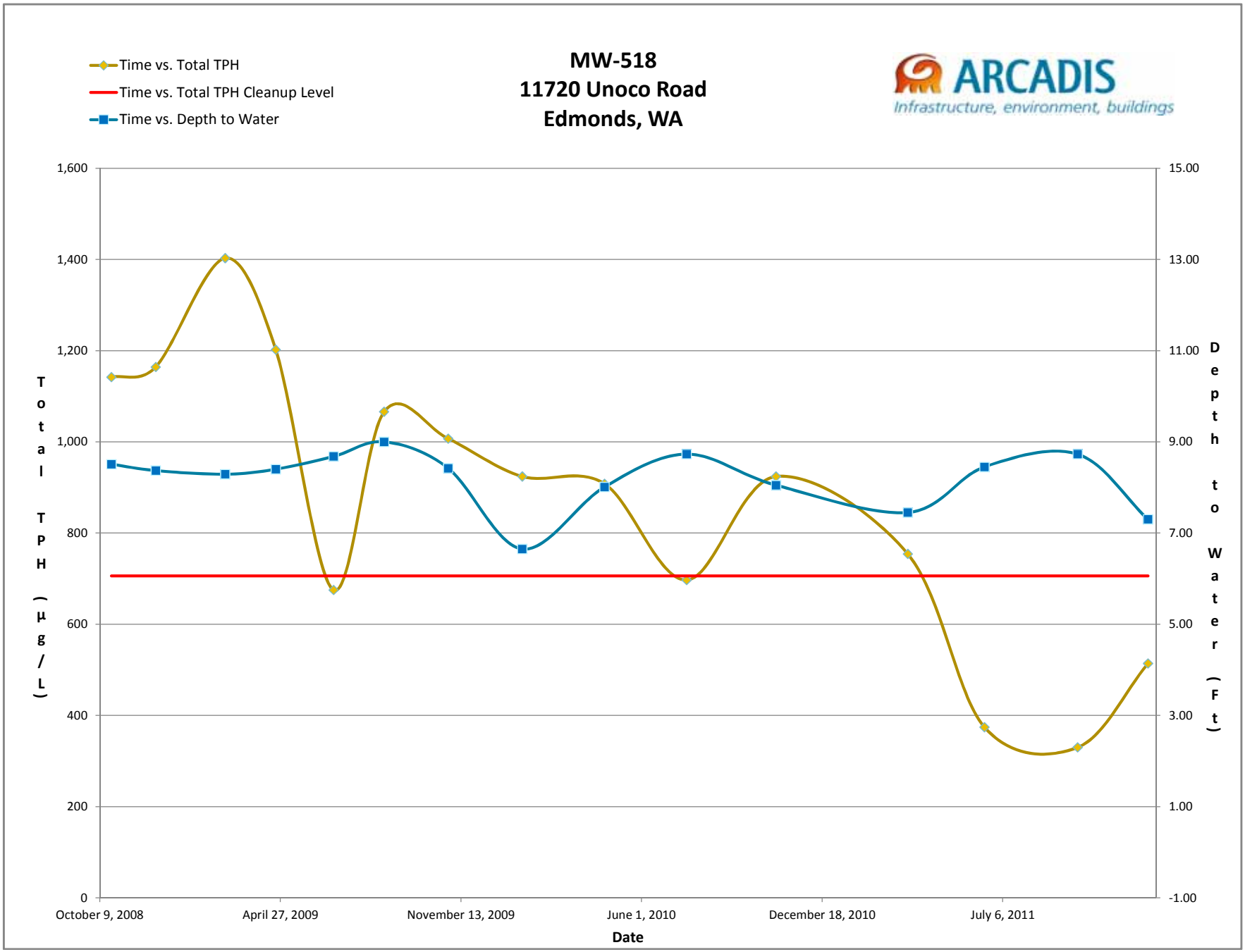

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-513
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (Ft)
1,000
900
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

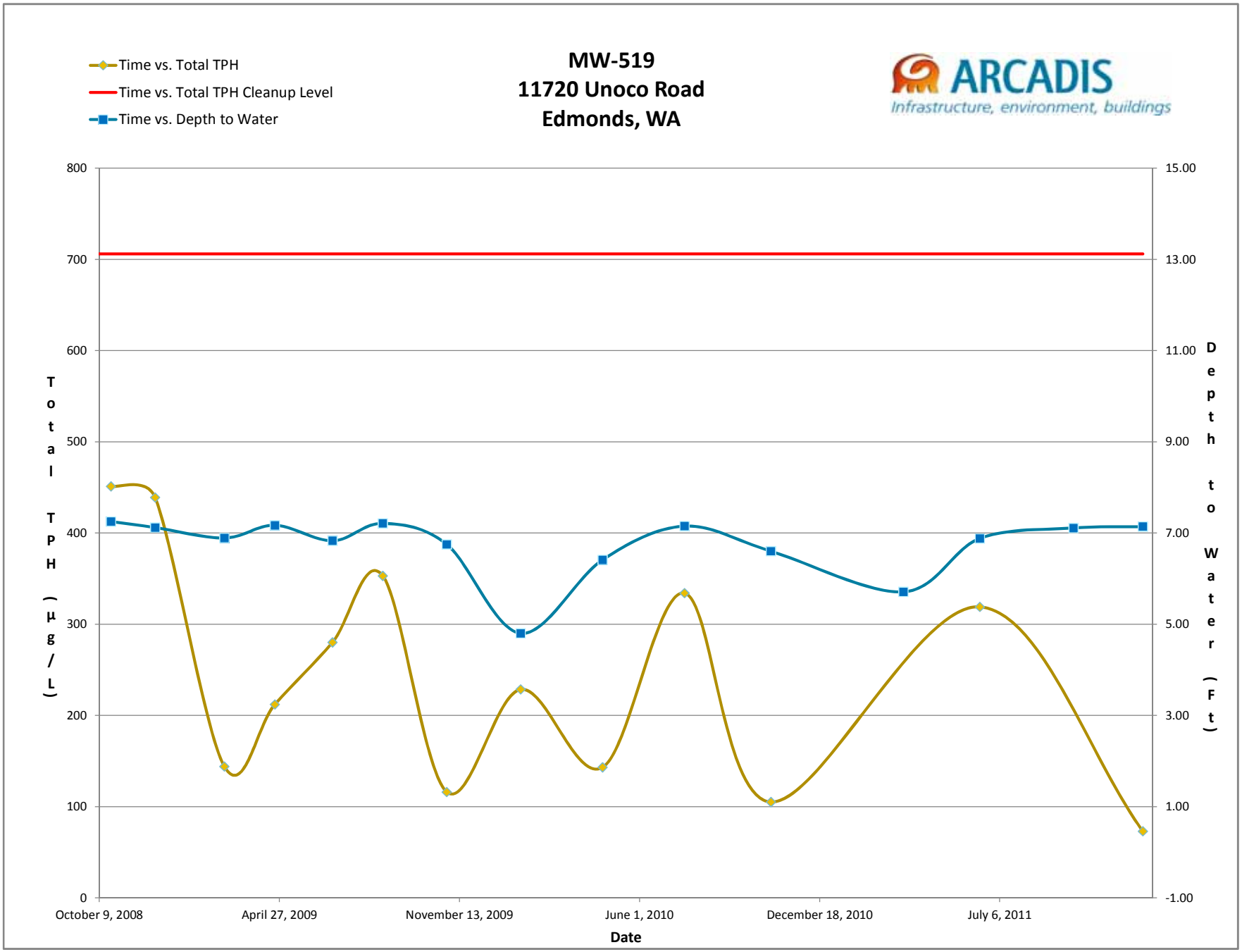

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-514
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total Micrograms (µg/L)
Depth to Water (Ft)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

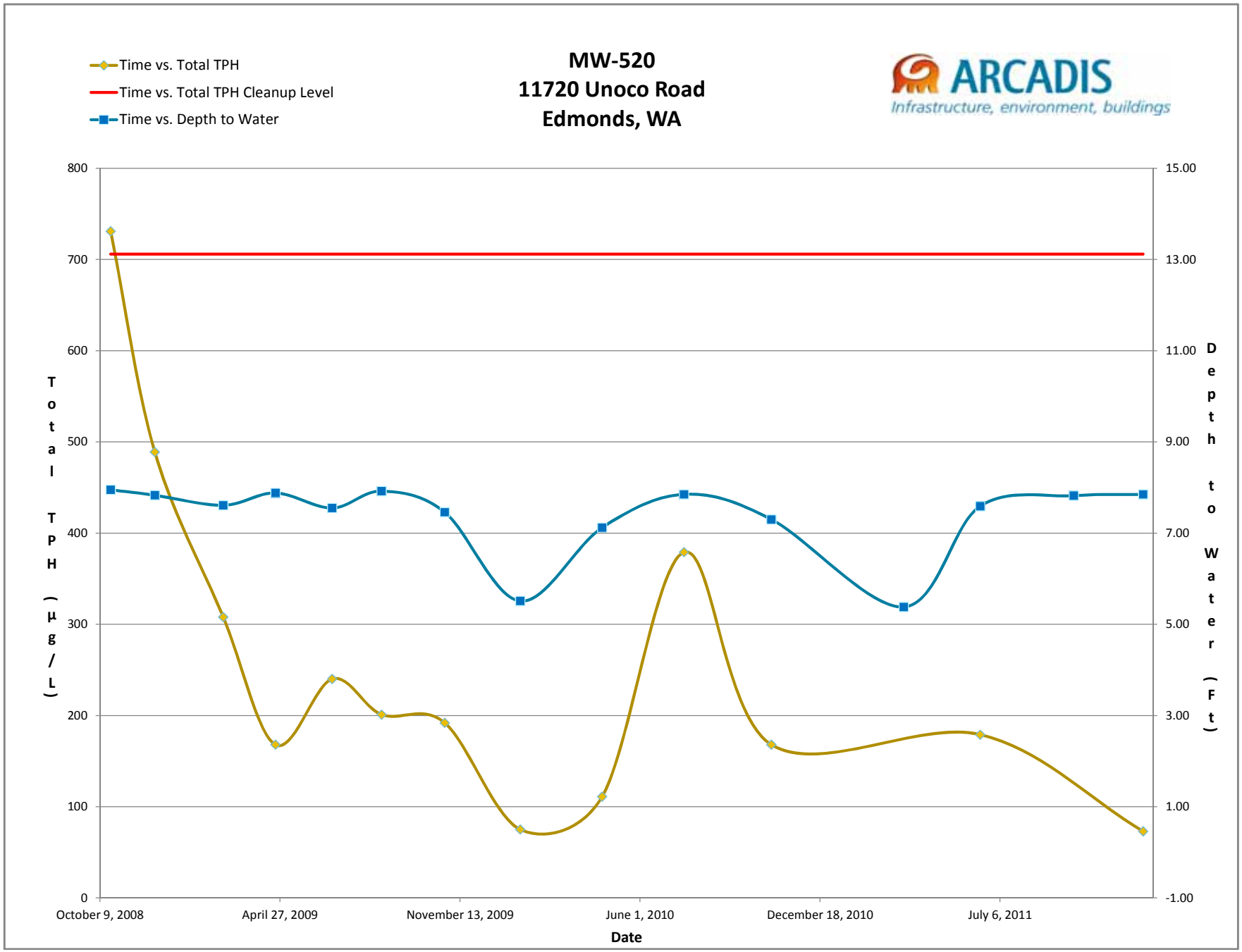

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-515
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
Total TPH (µg/L)
Depth to Water (ft)
1,000
900
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

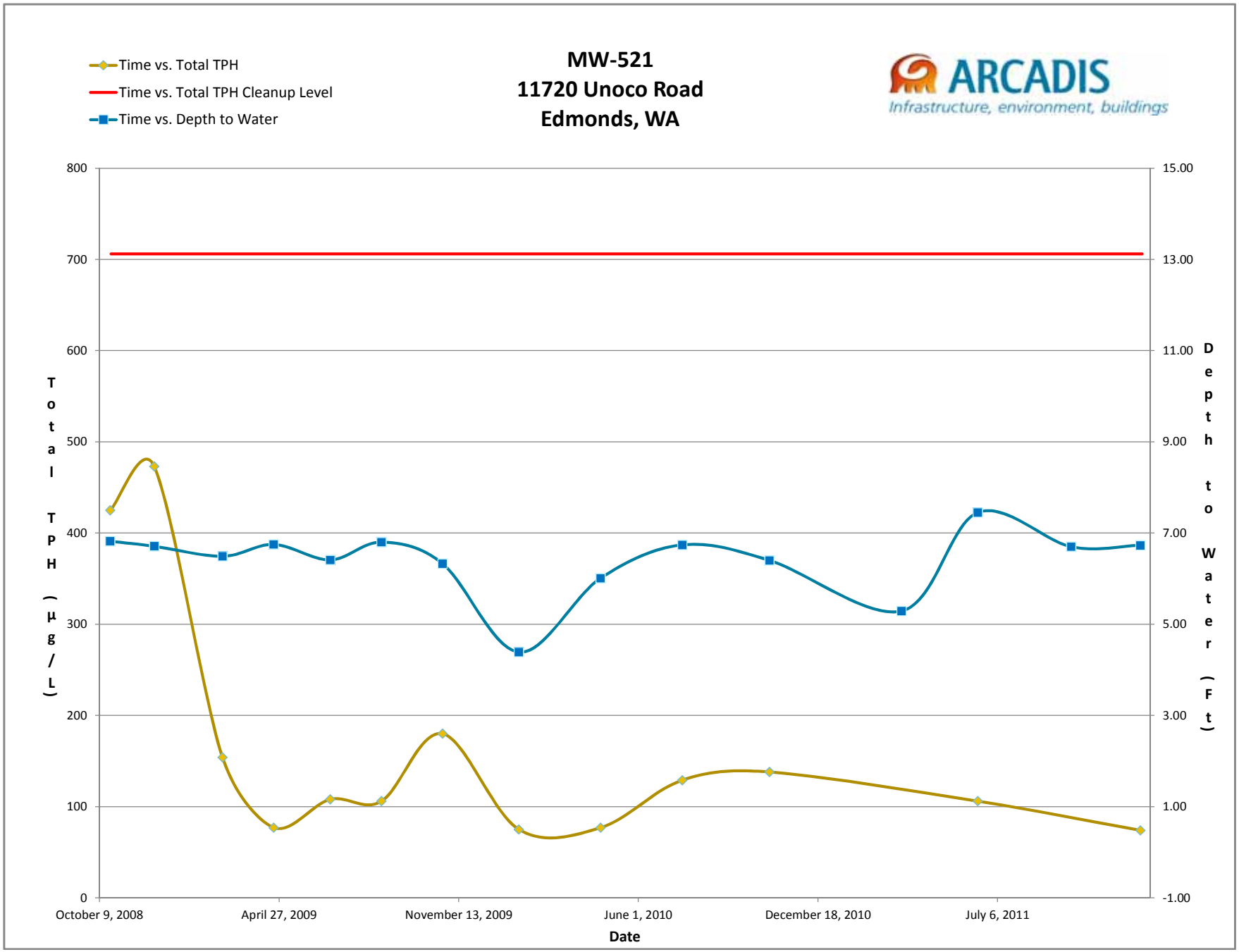

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-516
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
900
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

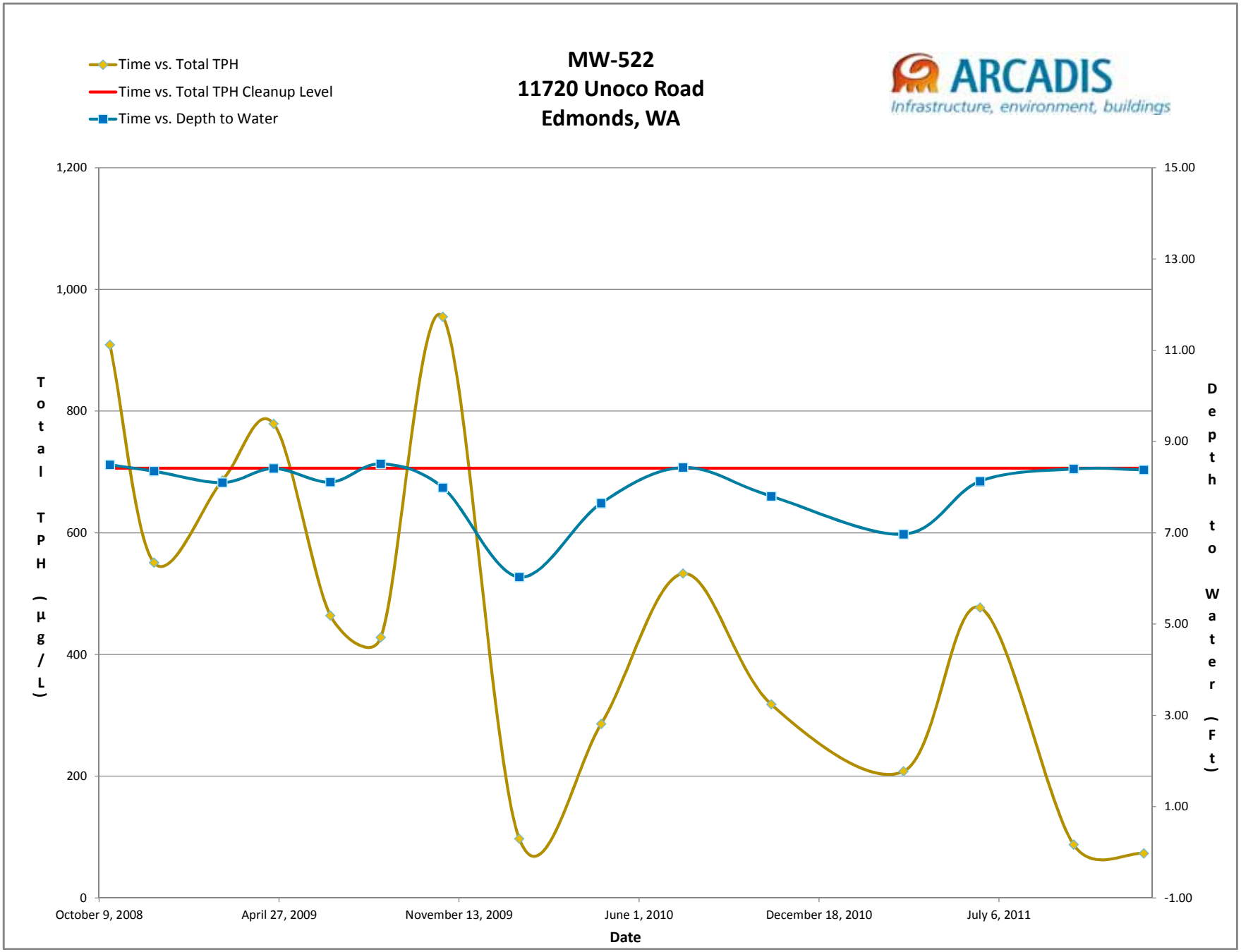

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-517
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

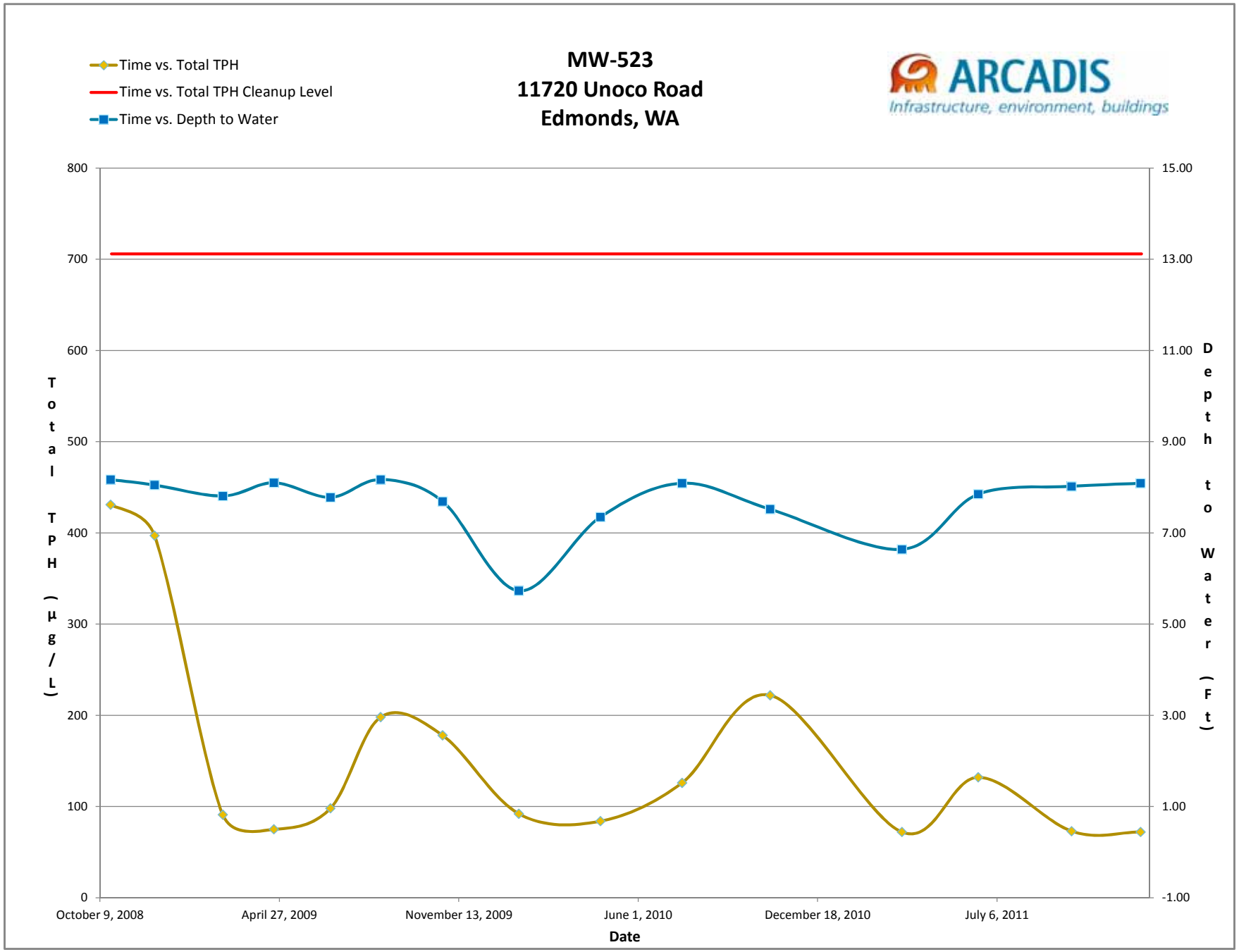

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-518
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
1,600
1,400
1,200
1,000
800
600
400
200
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

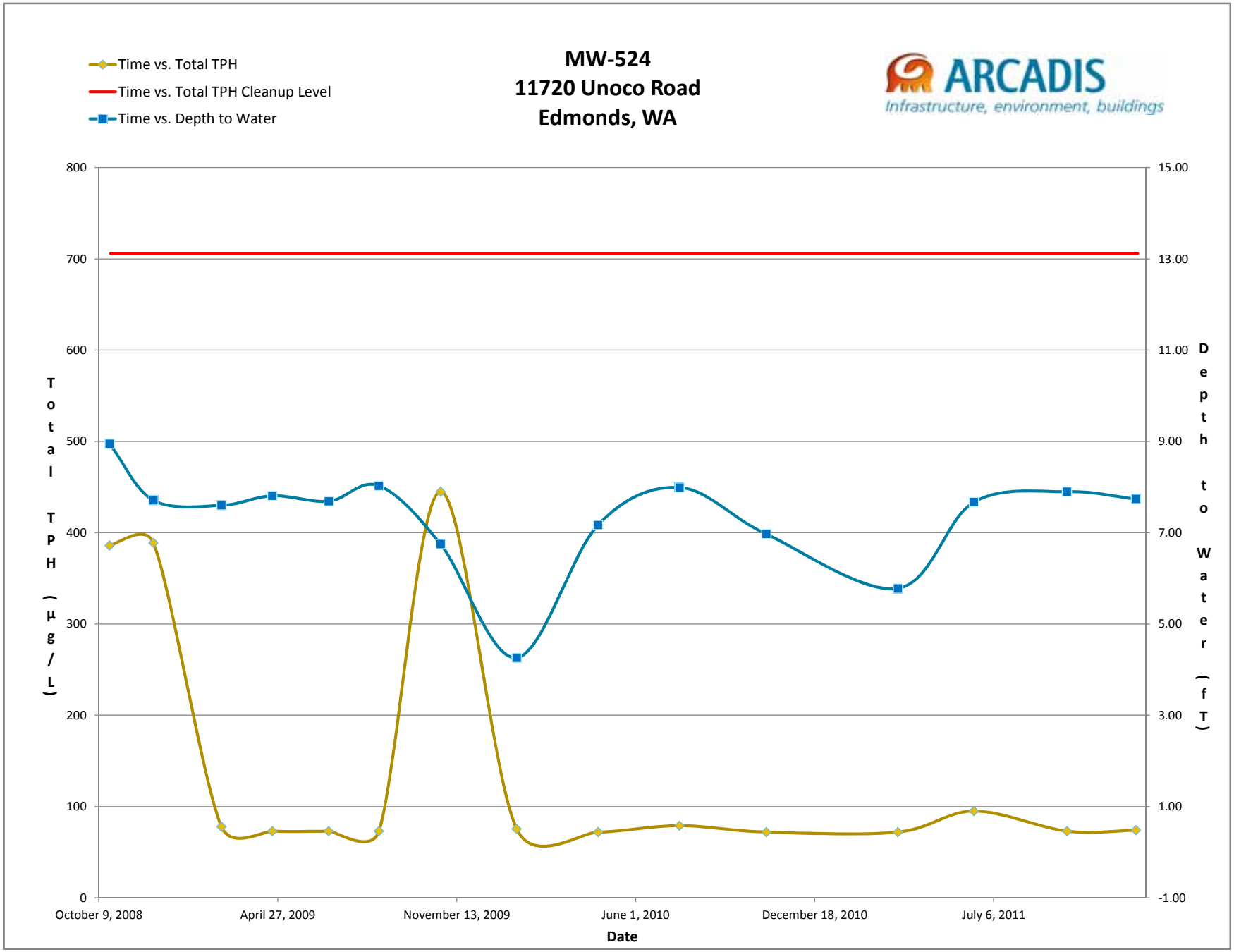

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-519
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

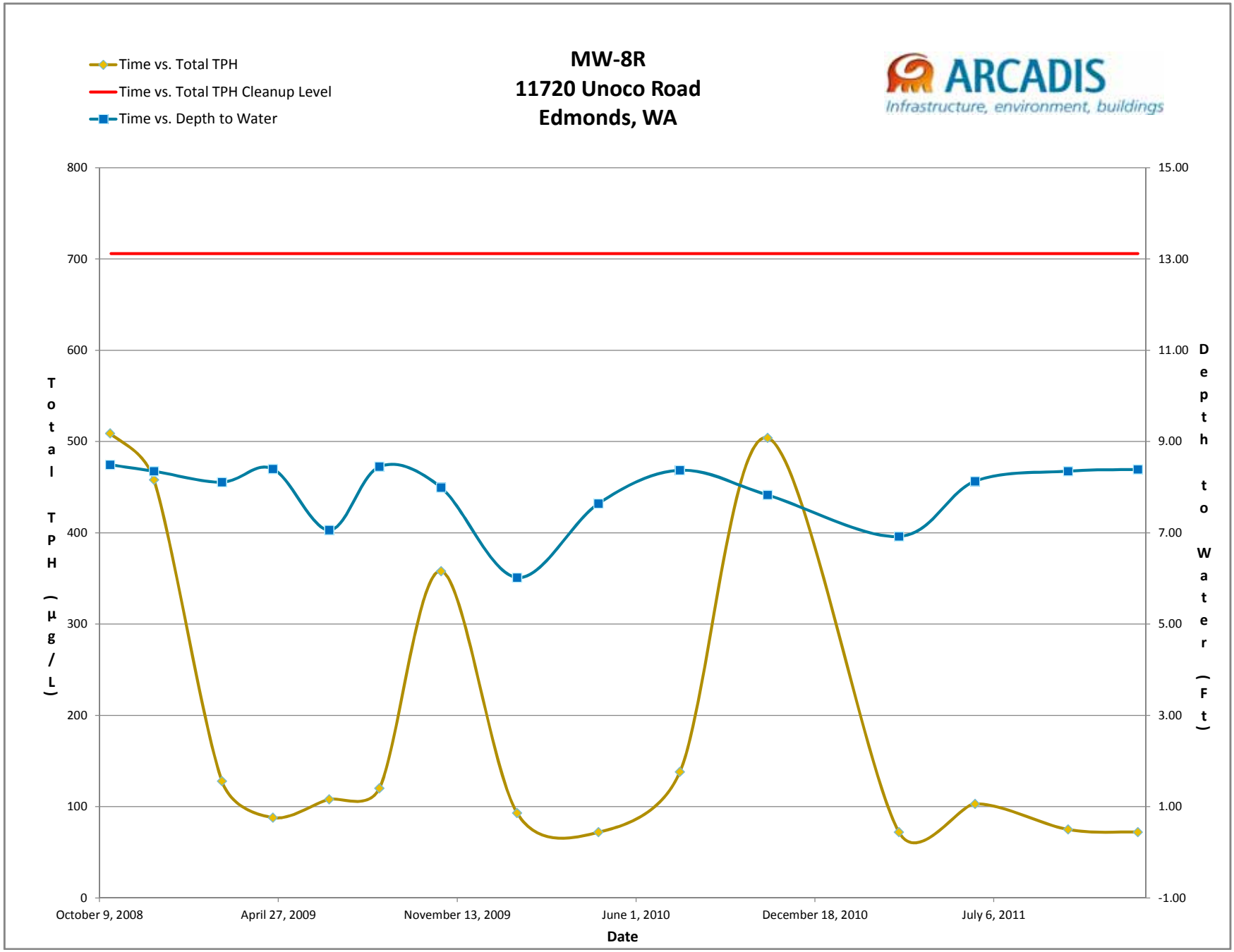

Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-520
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date


Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-521
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date


Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-522
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
1,200
1,000
800
600
400
200
0
Total TPH (µg/L)
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date


Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-523
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date


Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-524
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date


Time vs. Total TPH
Time vs. Total TPH Cleanup Level
Time vs. Depth to Water
MW-8R
11720 Unoco Road
Edmonds, WA
ARCADIS
Infrastructure, environment, buildings
800
700
600
500
400
300
200
100
0
15.00
13.00
11.00
9.00
7.00
5.00
3.00
1.00
-1.00
Total TPH (µg/L)
Depth to Water (Ft)
October 9, 2008
April 27, 2009
November 13, 2009
June 1, 2010
December 18, 2010
July 6, 2011
Date

ARCADIS

Appendix H

SoakEase™ Product Data Sheet

SoakEase™

Absorbent material for immediate response or minimal product.

Application

- **Passive LNAPL Recovery.**

Description

- 36 in Canister
- Absorbent Socks for 2 and 4 in Canisters

SoakEase™ is a product-selective absorbent sock housed inside a stainless steel canister. It is used as a passive collection system for free phase product such as jet fuel, gasoline or diesel fuel from 2 in and larger recovery wells, monitoring wells and recovery trenches.

The SoakEase™ can be used as a bailer for periodic product removal or as a dedicated system for a more continuous method of recovery. Prior to dedicating the SoakEase™, it is recommended that excess free product be removed by bailing with the SoakEase™.

To use SoakEase™ as a bailer, an absorbent sock is placed in the stainless steel canister; a cord is attached to the support loop and then lowered through the product layer. The full length of the sock should come into contact with the product for greater recovery. Immediately, the SoakEase™ will begin absorbing product at a rate of approximately 0.1 gallon per second, depending on the product viscosity. After some time, the SoakEase™ should be raised from the well; the sock removed from the canister and disposed of in accordance with regulations.

To use the SoakEase™ as a dedicated system, determine the amount of product present and the water table fluctuation using the PWI interface meter (TR-921). When these have been determined, the SoakEase™ may be installed to accommodate level changes up to 36 in.

Tech Tip: *The product absorption rate is determined by the viscosity of the product and can vary depending on site conditions. The SoakEase™ is designed to be used with hydrocarbon-based products. The user must determine the necessary replacement schedule by gauging site conditions. The socks can be squeezed out and reused. Approximately 80% of the original absorption can be recovered.*

SPECIFICATIONS		
Size Designation	**2 in**	**4 in**
Outside Diameter	1.7 in	3.5 in
Length	3 ft 3 in	
Weight (Net)	3.0 lb	6.0 lb
Canister Material	Stainless Steel Type 304, perforated	
Absorbent Sock Material	Polypropylene fibrous material contained in a white fabric sock	
Rated Absorption		
2 in Socks	3 US gal per case (1 qt per 2" sock)	
4 in Socks	9 US gal per case (3 qt per 4" sock)	
Incompatibility	Slight degradation may occur if exposed to strong oxidizing agents	
Warning	Not recommended for use with aggressive fluids, including strong acids, strong bases, oxidizers and hazardous materials	
Reaction time	Immediate	

ORDERING INFORMATION		
TB2-101	2 in Canister	2 lb
TB2-110	2 in SoakEase™ Refill (case of 12)	4 lb
TB4-101	4 in Canister	3 lb
TB4-110	4 in SoakEase™ Refill (case of 12)	7 lb