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Chevron Environmental Management Company

2009 Annual Groundwater Monitoring Report

Former Unocal Edmonds Terminal

11720 Unoco Road

Edmonds, Washington

July 5, 2011

ARCADIS

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Our Ref.:
B0045362

Date:
July 5, 2011

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1. Introduction

On behalf of Chevron Environmental Management Company (Chevron), ARCADIS U.S., Inc. (ARCADIS) has prepared the 2009 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**. This report summarizes seven groundwater sampling and gauging events completed between October 2008 and October 2009 in accordance with 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* (SLR 2007a) (the Work Plan). Site layout is shown on **Figure 2**.

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. The site layout is shown on **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 detention basins (DB-1 and 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. There are currently no permanent above ground 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 non-aqueous 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 – Volume 1* (MFA 2002). Additional Interim Actions conducted in 2003 included soil excavations in the Southwest Lower Yard and Detention Basin No.1. The results of the 2003 Interim Action are summarized in *2003 Lower Yard Interim Action As-Built Report – 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 (DOE) to conduct an Interim Action in the Lower Yard. Specific objectives of the Interim Action included removal of soil with petroleum impacts in excess of the soil remediation levels (RELs) established for the Lower Yard, removal of LNAPL, extraction of groundwater that is in contact with LNAPL, and removal of soil with arsenic concentrations in excess of the cleanup levels (CULs) within the Southwest Lower Yard. The soil RELs were calculated to provide a concentration that is protective of direct contact. The RELs are believed to be protective of groundwater as well. Groundwater monitoring, to be conducted following soil remediation, is expected to provide empirical evidence that RELs are protective of groundwater. Surface water and groundwater CULs were established in the Work Plan, and are summarized in **Table 1**..

2.2 Geology

Prior to excavation, subsurface materials encountered during 2007-2008 Phase I excavation were silty sands with gravel and sandy silts with gravel. Between 8 to 15 feet below ground surface (bgs), a poorly graded sand formation of very fine to medium sand with fine gravel was encountered, which contained organic material such as beach debris, wood, and seashells. Excavation areas throughout the Lower Yard encountered a native layer approximately 6 to 12 inches thick composed of sandy silt with large amounts of peat, wood debris, and decomposing vegetation. This layer was encountered at depths of 8 to 14 feet bgs and is considered to be representative of the former marsh located at the site.

The current lithology of the Lower Yard consists primarily of backfill material from the 2007-2008 Phase I and Phase II Interim Action work. The fill was placed within excavated areas to a depth of 8 to 12 feet bgs and is composed of very fine to medium sand, trace silt, and coarse gravel. Backfill in the saturated zone (approximately 1 foot above groundwater to the bottom of each excavation) is composed of poorly graded coarse gravels.

3. Groundwater Monitoring Program

In accordance with the Agreed Order, No. DE92TC-N328, groundwater monitoring was to be conducted after remedial excavation activities to: 1) determine if the remaining soil concentrations will be a source of LNAPL; 2) to evaluate if the remaining soil concentrations will cause an exceedance of groundwater CULs at the points of compliance (POCs); 3) to determine if the remaining petroleum hydrocarbon concentrations in groundwater will naturally attenuate below the CULs at the POCs; and 4) to calculate the restoration timeframes to meet the groundwater CULs at the POCs. Groundwater sampling events were 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) (Ecology 2005).).

The locations of the wells inside the three groundwater flow paths were based on the presence 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. As a result of the 2007/2008 Interim Action, remedial excavations extended beyond the mapped flow path areas, and the resulting monitoring well arrangement was no longer suitable for use with Ecology's Natural Attenuation Analysis Tool Package A. As a result of the source removal, 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, and are no longer applicable for a spatial evaluation of natural attenuation away from the source, as required for use with Ecology's Natural Attenuation Analysis Tool Package A. This change in the site conceptual model rendered the previous sampling schedule and monitoring program obsolete with respect to the planned data evaluation, and necessitated revisions to the monitoring program that were reviewed and approved by WDOE in December 2009. The current monitoring well network is sufficient to monitor and evaluate the status of the overall dissolved-phase plume; the stability of the site plume will be evaluated on a well-by-well basis, and the monitoring program needed to support this analysis was reduced accordingly.

3.1 Monitoring Well Network

The current monitoring well network consists of 40 wells, 21 of which are considered POC wells. 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 as follows:

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**.

3.2 Groundwater Monitoring Program Revisions

In December 2009, with the approval of WDOE the following revisions were made to the groundwater monitoring program:

3.2.1 Sampling Schedule

The groundwater sampling schedule was changed from every other month to quarterly. The October 2009 sampling event constituted the final bi-monthly event, with the quarterly schedule beginning in January 2010. Therefore, the remaining sampling events will occur in April 2010, July 2010, and October 2010. The change in sampling frequency reduced the number of sampling events by two, and will result in a total of 11 events over the two year period.

3.2.2 Analytical

Based on the Indicator Hazardous Substances (IHSs) determined to be present at the site in the Work Plan, the following analytical suite was developed for the groundwater monitoring program:

- Benzene by USEPA Method 8021B;
- TPH-G by Ecology Methods NWTPH-Gx;
- Total Petroleum Hydrocarbons as diesel (TPH-D) and Total Petroleum Hydrocarbons as heavy oil-range (THP-O) by Ecology Method NWTPH-Dx (after silica gel cleanup); and
- 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 were also monitored in 2008-2009:

- 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; and
- dissolved manganese by USEPA Method 200.8.

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

As of the January 2010 event, the following analytes and parameters will be collected during the First, Second, and Third Quarter 2010 sampling events:

- 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 and geochemical parameters, including dissolved oxygen, oxidation-reduction potential, pH, conductivity, and temperature.

During the final Fourth Quarter 2010 monitoring event, the 40 site wells in the program will be sampled for the full suite of analytes (including benzene, PAHs, and natural attenuation parameters).

3.3 Groundwater Monitoring Procedures

During groundwater monitoring events from October 2008 to June 2009, 48 on-site wells and one off-site well (MW-301) were gauged. In July 2009, eight piezometers were installed in the southeast Lower Yard, and during groundwater monitoring events conducted in August 2009 and October 2009, 48 on-site wells, one off-site well and eight piezometers were gauged. During groundwater monitoring events wells are 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 is detected, a bailer is lowered into the well to visually confirm its presence. Prior to gauging, well caps are removed to allow groundwater levels to equilibrate for at least one hour prior to gauging. Headspace readings in the well casing are collected when the well caps are removed using a photo-ionization detector (PID). Six staff gauges in Willow Creek were measured at the beginning of gauging activities during the October and December 2008 and February and April 2009 events. Beginning with the June 2009 event, additional staff gauges D-1 and D-4 were installed in Willow Creek, (**Figure 3**) and all of the staff gauges were re-surveyed. Also beginning in June 2009, the staff gauges were measured prior to gauging the onsite wells and after gauging was completed, providing two sets of data for each staff gauge for every gauging event. Gauging activities were conducted as close to the time of low tide as possible. Surface water elevations at the staff gauge locations are not included on groundwater contour maps as it cannot be concluded that surface water in Willow Creek and groundwater in the Lower Yard are the same potentiometric surface. Tide tables for each gauging event are included in **Appendix A**. Monitoring well gauging times are included in **Table 2**; the 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 dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, conductivity and temperature are collected at the time of purging using a properly calibrated In-Situ 9500 Troll® groundwater quality meters with low-flow cells. Dissolved ferrous iron measurements are collected in the field using a Hach® ferrous iron measuring kit. Groundwater was purged until the geochemical parameters stabilize to within 10 percent of their value. Low-flow field sheets with groundwater parameters, as well as

laboratory analytical results reports collected during the 2008 and 2009 sampling events are provided in **Appendix B through H**.

After stabilization parameters were reached, samples were collected into new, laboratory-supplied containers with proper preservatives and kept in iced coolers. Groundwater samples were picked up daily by a TestAmerica courier for transport to TestAmerica Laboratory, Bothell, Washington, for analysis during the October and December 2008 events. Beginning with the February 2009 event samples for laboratory analysis except for cPAHs were packed in iced coolers and shipped to Lancaster Laboratories in Lancaster, Pennsylvania for analysis. cPAHs were sent to a separate laboratory to achieve the lowest possible detection levels. Samples for cPAHs analysis were picked up daily by a TestAmerica courier for transport to TestAmerica Laboratory in Bothell, Washington. Beginning with the August 2009 event the cPAH samples were stored in a refrigerator at the ARCADIS office for pickup by a TestAmerica courier the following day for transport to TestAmerica Laboratory in Tacoma, Washington for analysis.

3.4 Groundwater Flow

Groundwater flow at the site is to the north-northwest in the central portion of the site and to the northwest in the western portion of the site. Due to gravel backfill used during the remedial excavations, groundwater across the central and southwestern portion 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. The eastern portion of the site has a groundwater mounding effect, as discussed below. The majority of the southeast Lower Yard is also comprised of gravel backfill material from the remedial excavations.

Groundwater flow in the southeast Lower Yard is dominated by a mounding effect. Groundwater gauging data generally indicates that the groundwater surfaces measured in P-3 and P-5, the two shallow piezometers completed in excavation backfill, have similar elevations to those measured in MW-500 and MW-501, which are also partially completed in excavation backfill 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. Six piezometers (including the two completed deeper as part of the nested pairs) were installed in native or undisturbed 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 older fill material show somewhat 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 older fill material as the mound decays. The silty, shallow older fill in the southeast Lower Yard (from 0 to 13 feet below ground surface) appears to have created a distinct zone in which shallow groundwater responds to recharge independently of the lower-permeability material below. The heterogeneous nature of the historical fill material found in the southeast Lower Yard has created localized pockets of lower and higher permeability which strongly affect shallow groundwater elevations.

Summaries of each groundwater gauging event from this reporting period are discussed below, including gauging information from Willow Creek.

3.4.1 October 2008

On October 20, 2008, during low tide, ARCADIS field personnel gauged 49 wells, and five staff gauges in Willow Creek. Depths to water ranged from 2.66 feet below top of casing (btoc) (5.48 feet above mean sea level [amsl]) in well LM-2 to 26.58 feet btoc (8.55 feet amsl) in well MW-134X. The presence of LNAPL was not detected in any wells. Groundwater elevations ranged from 4.21 feet amsl in well MW-524 to 8.55 feet amsl in well MW-134X. Water levels in Willow Creek ranged from below measurement markings on staff gauge D-7 to 7.10 feet amsl at staff gauge D-3. Water was present in the creek channel adjacent to staff gauge D-7, but the water level was below the base of the gauge.. Depths to water, groundwater elevations, and times of gauging are presented in **Table 2**. October 2008 groundwater elevations and contours are shown on **Figure 4.**

3.4.2 December 2008

During low tide on December 8, 2008, ARCADIS field personnel gauged 49 wells and five staff gauges in Willow Creek. Depths to water ranged from 2.89 feet btoc (5.25 feet amsl) in well LM-2 to 26.55 feet btoc (8.58 feet amsl) in well MW-134X. The presence of LNAPL was not detected in any wells. Groundwater elevations ranged

from 4.60 feet amsl in well MW-108 to 11.48 feet amsl in well MW-500. Water levels in Willow Creek ranged from below measurement markings on staff gauge D-7 to 7.20 feet amsl at staff gauge TB. Water was present in the creek channel adjacent to staff gauge D-7, but the water level was below the base of the gauge. December depths to water, groundwater elevations, and times of gauging are presented in **Table 2**. December 2008 groundwater elevations and contours are shown on **Figure 5.**

3.4.3 February 2009

During low tide on February 20, 2009, ARCADIS field personnel gauged 49 wells and five staff gauges in Willow Creek. Depths to water ranged from 2.64 feet btoc (5.50 feet amsl) in well LM-2 to 26.62 feet btoc (8.51 feet amsl) in well MW-134X. The presence of LNAPL was detected in MW-129R at a thickness of 0.01 feet, from 6.34 feet btoc to 6.35 feet btoc (6.58 to 6.57 feet amsl). Groundwater elevations ranged from 5.50 feet amsl in well LM-2 to 12.13 feet amsl in well MW-500. Water levels in Willow Creek ranged from below measurement markings on staff gauge D-7 to 6.40 feet amsl at staff gauge D-3. Water was present in the creek channel adjacent to staff gauge D-7, but the water level was below the base of the gauge. February depths to water, groundwater elevations, and times of gauging are presented in **Table 2**. February 2009 groundwater elevations and contours are shown on **Figure 6.**

3.4.4 April 2009

During low tide on April 20, 2009, ARCADIS field personnel gauged 49 onsite wells and five staff gauges in Willow Creek. Depths to water ranged from 2.46 feet btoc (5.68 feet amsl) in well LM-2 to 26.43 feet btoc (8.70 feet amsl) in well MW-134X. The presence of LNAPL was not detected in any wells. Groundwater elevations ranged from 4.71 feet amsl in offsite well MW-301 to 13.10 feet amsl in well MW-500. Water levels in Willow Creek ranged from below measurement markings on staff gauge D-7 to 6.40 feet amsl at staff gauge D-3. Water was present in the creek channel adjacent to staff gauge D-7, but the water level was below the base of the gauge. April depths to water, groundwater elevations, and times of gauging are presented in **Table 2**. April 2009 groundwater elevations and contours are shown on **Figure 7.**

3.4.5 June 2009

During low tide on June 22, 2009, ARCADIS field personnel gauged 49 onsite wells and six staff gauges in Willow Creek. Depths to water ranged from 2.84 feet btoc (5.30 feet amsl) in well LM-2 to 26.69 feet btoc (8.44 feet amsl) in well MW-134X. The presence of LNAPL was initially reported in well MW-104; however, the measurement was determined to be in error. The measurement was not confirmed with a bailer at the time it was collected. The measurement was re-collected on June 23, 2009 and there was no indication of LNAPL or LNAPL film. A bailer was also used to check for the presence of LNAPL on June 23, 2009 and there were no signs of LNAPL, hydrocarbon sheen or hydrocarbon-like odor in MW-104. LNAPL has not been reported in well MW-104 in subsequent gauging events.

Groundwater elevations on June 22, 2009 ranged from 4.90 feet amsl in offsite well MW-301 to 11.46 feet amsl in well MW-500. Water levels were collected in Willow Creek prior to gauging the site and again after completion of site gauging. Water elevations in Willow Creek prior to site gauging ranged from 6.20 feet amsl at staff gauge D-3 to 6.43 feet amsl at staff gauge D-4. Water elevations in Willow Creek after site gauging ranged from 6.03 feet amsl at staff gauge D-1 to 6.58 feet amsl at staff gauge D-4. June depths to water, groundwater elevations, and times of gauging are presented in **Table 2**. June 2009 groundwater elevations and contours are shown on **Figure 8.**

3.4.6 July 2009

3.4.6.1 Piezometer Installation

On July 30th and 31st, 2009, eight piezometers were installed in the southeast Lower Yard, in the vicinity of monitoring wells MW-500 and MW-501 to investigate the apparent groundwater mound in the area. The piezometers were installed in pairs (P-1 and P-8, P-2 and P-3, P-4 and P-5, and P-6 and P-7) with one installed as a shallow point and one installed as a deep point. The following table is a summary of the installation details of the piezometers:

Piezometer	Total Depth (ft bgs)	Well Screen (feet bgs)	Material at Screened Interval
P-1	13	3 - 13	Undisturbed historical fill
P-2	22	17 - 22	Native silt and clay below 2007/2008 gravel backfill
P-3	12	3 - 12	2007/2008 gravel backfill
P-4	22.5	17.5 - 22.5	Native silt and clay below 2007/2008 gravel backfill
P-5	12.5	3 - 12.5	2007/2008 gravel backfill
P-6	13	3 - 13	Undisturbed historical fill
P-7	25	20 - 25	Native silt and clay
P-8	25	20 - 25	Native silt and clay

The piezometers are constructed of 1-inch schedule 40 PVC pipe with 0.01-inch slotted screen. Sand packs are constructed of 2/12 silica sand and extend from one foot above the screened interval to the total depth of the well. Each of the piezometers was completed with hydrated bentonite chips to one foot bgs, with flush-mount well monuments set in concrete at ground surface. Upon completion, the eight piezometers were surveyed, and a full round of groundwater gauging was conducted on August 3, 2009.

3.4.7 August 2009

Two groundwater gauging events were completed in August 2009. A complete gauging round was completed on August 3, 2009 after the installation and development of eight piezometers which were installed in the southeast lower yard, and again on August 17, 2009, as part of the bi-monthly gauging event. This summary describes the August 17, 2009 gauging event associated with the August site sampling.

During low tide on August 17, 2009, ARCADIS field personnel gauged 49 monitoring wells, eight piezometers and five staff gauges in Willow Creek. Depths to water ranged from 3.09 feet btoc (5.05 feet amsl) in well LM-2 to 26.79 feet btoc (8.34 feet amsl) in well MW-134X. On August 17, 2009, groundwater elevations ranged from 3.31 feet amsl in well MW-509 to 11.36 feet amsl in piezometer P-6. Water elevations in Willow Creek prior to site gauging ranged from 5.97 feet amsl at staff gauge D-5 to 6.53 feet amsl at staff gauge TB. Water elevations in Willow Creek after site gauging ranged from 5.92 feet amsl at staff gauge D-5 to 6.58 feet amsl at staff gauge TB.

An LNAPL film was present in well MW-510 during both of the August gauging events. The detections were confirmed with a bailer; however, the LNAPL layer was less than 0.01 feet thick. Depth to water measurements, groundwater elevations, and times of gauging for both of the August gauging events are presented in **Table 2**. August 3, 2009 and August 17, 2009 groundwater elevations and contours are shown on **Figures 9 and 10**, respectively.

3.4.8 October 2009

During low tide on October 29, 2009, ARCADIS field personnel gauged 49 monitoring wells, eight piezometers and six staff gauges in Willow Creek. Depths to water ranged from 2.56 feet btoc (5.58 feet amsl) in well LM-2 to 26.34 feet btoc (8.79 feet amsl) in well MW-134X. Groundwater elevations ranged from 4.89 feet amsl in offsite well MW-301 to 12.75 feet amsl in piezometer P-6. Water levels in Willow Creek prior to site gauging ranged from 6.10 feet amsl at staff gauge D-5 to 6.65 feet amsl at staff gauge D-4. Water elevations in Willow Creek after site gauging ranged from 6.21 feet amsl at staff gauge D-5 to 6.80 feet amsl at staff gauge D-4.

LNAPL was present in monitoring well MW-510 during the October 2009 sampling event. LNAPL was measured at a thickness of 0.01 foot from an elevation of 6.71 feet amsl to 6.72 feet amsl. This measurement was confirmed using a bailer. October 2009 depths to water, groundwater elevations, and times of gauging are presented in **Table 2**. October 2009 groundwater elevations and contours are shown on **Figure 11.**

3.5 Laboratory Analyses

Groundwater samples were collected using clean, laboratory-supplied containers. In accordance with the Work Plan, groundwater samples were analyzed for the following hydrocarbon constituents:

- benzene by US Environmental Protection Agency (USEPA) Method 8021B;
- gasoline-range hydrocarbons (TPH-G) by Ecology Methods NWTPH-Gx;
- diesel-range hydrocarbons (TPH-D) and heavy oil-range hydrocarbons (TPH-O) by Ecology Method NWTPH-Dx (after silica gel cleanup); and

- total carcinogenic polynuclear aromatic hydrocarbons (cPAHs), including naphthalene, by USEPA Method 8270C.

In addition to the hydrocarbon constituents monitored at the site, geochemical indicator parameters were monitored to assess the prevailing groundwater geochemical environment and degradation processes within the plume. The following groundwater geochemical indicator parameters were monitored to further evaluate natural attenuation of the hydrocarbon constituents:

- 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; and
- dissolved manganese by USEPA Method 200.8.

During the October and December 2008 events groundwater samples were picked up daily by a TestAmerica courier for transport to TestAmerica, Bothell, Washington, for analysis. Beginning with the January 2009 event, samples for all analysis except for cPAHs were packed in iced coolers and shipped to Lancaster Laboratories, Lancaster, Pennsylvania for analysis. Samples for cPAH analysis were picked up daily by a TestAmerica courier for transport to TestAmerica, Bothell, Washington. Beginning with the August 2009 event PAH samples were stored in a refrigerator at the ARCADIS office for pickup by a TestAmerica courier the following day for transport to TestAmerica, Tacoma, Washington for analysis. Benzene, Total TPH and cPAH result data are presented in **Table 3**.

Geochemical parameter monitoring was conducted during the first year of groundwater sampling events to assess the potential for natural attenuation at the site. In addition to the analytical samples collected, field parameter data including pH, conductivity, temperature, DO, ORP and ferrous iron were measured in the field. While decreasing IHS concentration trends could be the result of physical processes such as plume migration or dilution/dispersion, evaluation of the site geochemistry in addition to IHS

concentration trends can be used to indicate the prevailing groundwater geochemical environment and potential mechanisms of hydrocarbon biodegradation within the plume. Geochemical parameter results data are presented in **Table 4**.

3.6 Groundwater 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 **Figure 2 through 18**. Total TPH concentrations were calculated by summing the concentrations of gasoline, diesel, and heavy oil. If one or more of the constituents did not exceed the laboratory detection limit, 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 H.**

3.6.1 October 2008 Analytical Results

From October 21 to October 27, 2008, groundwater samples were collected from 40 on-site monitoring wells. Twenty-four of these samples contained concentrations of TPH greater than the laboratory detection limit. Fifteen of these samples exceeded applicable TPH CULs. Of the 24 samples with detectable concentrations of TPH, 19 were detected for TPH-G only, and only five samples contained TPH-D. October 2008 analytical data are presented in **Table 3** and total TPH data are presented on **Figure 12**.

Concentrations of cPAHs were not detected greater than the laboratory detection limit in any of the samples collected during this sampling event. However, due to elevated laboratory detection limits during cPAH analysis of samples collected from monitoring wells MW-510 and MW-522, the detection levels are greater than the cPAH CUL.

Benzene was detected in samples from 16 wells throughout the site. No samples contained benzene concentrations exceeding the site CUL.

3.6.1.1 Point of Compliance Wells

During the October 2008 monitoring event, samples from six of the 21 POC wells contained concentrations of TPH that exceeded their applicable CULs (MW-104, MW-500, MW-501, MW-510, MW-518 and MW-522). Concentrations in these samples ranged from 909 micrograms per liter (µg/L) in the sample collected from monitoring well MW-522 to 8,330 µg/L in the sample collected from monitoring well MW-501.

Samples collected from six POC wells contained TPH concentrations that exceeded the laboratory detection limit, but did not exceed applicable CULs. Concentrations in these samples ranged from 418 µg/L in the sample collected from MW-139R to 597 µg/L in the sample collected from MW-20R. Nine POC wells did not contain concentrations of TPH greater than the laboratory detection limit.

Benzene was detected in seven POC wells during this event, with concentrations ranging from 0.503 µg/L in the sample collected from monitoring well MW-518 to 6.89 µg/L in the sample collected from monitoring well MW-510. No samples exceeded the benzene CUL of 51 µg/L.

3.6.1.2 Interior Monitoring Wells

Samples collected from nine of the 19 groundwater flow path wells contained concentrations of TPH which exceeded applicable TPH CULs. Concentrations in these samples ranged from 701 µg/L in the sample collected from monitoring well MW-504 to 1,697 µg/L in the sample collected from monitoring well MW-502.

Samples collected from three interior monitoring wells contained concentrations of TPH that exceeded the laboratory detection limits but did not exceed site CULs. Concentrations in these samples ranged from 425 µg/L in the sample collected from monitoring well MW-521 to 647 µg/L in the sample collected from monitoring well MW-517. Seven interior monitoring wells did not contain detectable concentrations of TPH.

Benzene was detected in samples from nine interior monitoring wells. Concentrations ranged from 0.702 µg/L in the sample collected from monitoring well MW-513 to 7.03 µg/L in the sample collected from monitoring well MW-504. No samples contained benzene concentrations exceeding the benzene CUL.

3.6.2 December 2008 Analytical Results

From December 9 to December 16, 2008, groundwater samples were collected from 40 on-site monitoring wells. Nineteen samples contained TPH concentrations greater than laboratory detection limits. Nine of these samples contained concentrations greater than applicable TPH CULs. Of the 19 samples with detectable concentrations of TPH, 16 were detected for TPH-G only, and three samples contained TPH-D. December 2008 analytical data are presented in **Table 3** and total TPH data are presented on **Figure 13**.

The sample collected from monitoring well LM-2 was the only sample that contained a cPAH constituent that was greater than the laboratory detection limit. The total adjusted concentration of cPAHs in the sample collected from LM-2 was 0.00772 µg/L. No samples contained cPAH concentrations exceeding the site CUL of 0.018 µg/L. However, due to elevated laboratory detection limits during cPAH analysis of the sample collected from monitoring well MW-510, the detection level is greater than the site cPAH CUL.

Benzene was detected at concentrations exceeding the laboratory detection limit in samples from 10 wells throughout the site. No samples contained benzene concentrations exceeding the site REL.

3.6.2.1 Point of Compliance Wells

During the December 2008 monitoring event, groundwater samples from four of the 21 POC wells contained concentrations of TPH that exceeded their respective TPH CULs (MW-104, MW-147, MW-510, and MW-518). Concentrations in these samples ranged from 968 µg/L (MW-147) to 5,410 µg/L (MW-510).

Samples collected from four POC wells contained TPH concentrations greater than the laboratory detection limit, but less than their respective CULs (MW-136, MW-20R, MW-522 and MW-8R). Concentrations in these samples ranged from 425 µg/L (MW-136) to 697 µg/L (MW-20R). Thirteen POC wells did not contain concentrations of TPH above the laboratory detection limit.

Benzene was detected in five POC wells at concentrations greater than the laboratory detection limits (MW-104, MW-20R, MW-510, MW-522 and MW-8R). Concentrations ranged from 0.510 µg/L (MW-8R) to 22.2 µg/L (MW-20R). No samples contained benzene concentrations that exceeded the applicable CUL.

3.6.2.2 Interior Monitoring Wells

Samples collected from five of the 19 interior monitoring wells exceeded applicable TPH CULs (MW-502, MW-507, MW-512, MW-513 and MW-514). Concentrations in these samples ranged from 562 µg/L (MW-507) to 1,438 µg/L (MW-502).

Samples collected from six interior monitoring wells contained concentrations of TPH that exceeded laboratory detection limits but did not exceed site CULs. Concentrations in these samples ranged from 439 µg/L in the sample collected from monitoring well MW-519 to 491 µg/L in the sample collected from monitoring well MW-517. Eight interior monitoring wells did not contain concentrations of TPH greater than the laboratory detection limits.

Benzene was detected at concentrations greater than laboratory detection limits in samples from five interior monitoring wells (MW-520, MW-507, MW-512, MW-513 and MW-514). Concentrations in these samples ranged from 0.605 µg/L (MW-507) to 3.77 µg/L (MW-520). No samples contained concentrations of benzene that exceeded the benzene CUL of 51 µg/L.

3.6.3 February 2009 Analytical Results

Groundwater samples were collected from 40 onsite wells from February 23, 2009 to March 2, 2009. Samples collected from 33 monitoring wells contained concentrations of TPH which exceeded the laboratory detection limit. Of those 33 samples, 16 samples exceeded their respective TPH CUL. Twelve samples were detected for TPH-D only, while 21 samples contained a combination of TPH-D, TPH-G and/or TPH-O. February 2009 analytical data are presented in **Table 3** and total TPH data are presented on **Figure 14**.

No samples collected from site monitoring wells contained concentrations of cPAH constituents which exceeded the laboratory detection limits, however, due to raised

detection limits during the analysis of cPAH samples collected from monitoring wells MW-135 and MW-510, the calculated total adjusted cPAH values were greater than the site CUL for cPAHs.

Benzene was detected in eight samples collected from site monitoring wells at concentrations exceeding the laboratory detection limits, only one of which exceeded the site CUL for benzene.

3.6.3.1 Point of Compliance Wells

During the February 2009 sampling event samples collected from 10 of the 21 POC wells contained concentrations of TPH which exceeded applicable CULs. Concentrations in the these samples ranged from 595 µg/L in the sample collected from monitoring well MW-500 to 16,380 µg/L in the sample collected from monitoring well MW-510.

Samples collected from eight of the 21 POC wells contained concentrations of TPH greater than the laboratory detection limits but less than applicable TPH CULs. Concentrations in these samples ranged from 91 µg/L in the sample collected from monitoring well MW-523 to 624 µg/L in the sample collected from monitoring well MW-104. Three POC wells did not contain concentrations of TPH above the laboratory detection limits.

Benzene was detected in samples collected from four POC wells during this sampling event (MW-101, MW-20R, MW-136 and MW-510). Concentrations of benzene in these samples ranged from 1.4 µg/L (MW-104) to 55 µg/L (MW-20R). The sample collected from monitoring well MW-20R exceeded the site CUL of 51 µg/L.

3.6.3.2 Interior Monitoring Wells

Samples collected from six of the 19 interior monitoring wells contained concentrations of TPH which exceeded applicable TPH CULs. Concentrations in these samples ranged from 748 µg/L in the sample collected from monitoring well MW-512, to 2,005 µg/L in the sample collected from monitoring well MW-143.

Samples collected from nine interior monitoring wells contained concentrations of TPH greater than the laboratory detection limit but less than applicable TPH CULs. Concentrations in these samples ranged from 97 µg/L in the sample collected from monitoring well MW-506 to 308 µg/L in the sample collected from monitoring well MW-520.

Benzene was detected in samples collected from four interior monitoring wells (MW-512, MW-514, MW-520, and MW-521) at concentrations ranging from 1.5 µg/L (MW-512) to 2.9 µg/L (MW-514). No samples collected from interior monitoring wells exceeded the benzene CUL.

3.6.4 April 2009 Analytical Results

Groundwater samples were collected from 40 onsite wells from April 21, to April 27, 2009. Samples collected from 31 monitoring wells contained concentrations of TPH which exceeded the laboratory detection limit. Of those 31 samples, 15 samples exceeded their respective TPH CUL. All 31 samples with detectable concentrations of TPH contained TPH-D. Fifteen of the 31 samples were detected for TPH-D only, while 16 samples contained a combination of TPH-D, TPH-G and/or TPH-O. April 2009 analytical data are presented in **Table 3** and total TPH data are presented on **Figure 15**.

No samples collected from site monitoring wells contained concentrations of cPAH constituents which exceeded the laboratory detection limits, however, due to raised detection limits during the cPAH analysis of the sample collected from interior monitoring well MW-502, the calculated total adjusted cPAH value was greater than the site CUL for cPAHs.

Benzene was detected in eight samples collected from site monitoring wells at concentrations exceeding the laboratory detection limits. No samples contained benzene concentrations greater than the site CUL of 51 µg/L.

3.6.4.1 Point of Compliance Wells

During the April 2009 monitoring event nine of the 21 POC wells contained concentrations of TPH exceeding applicable TPH CULs. Concentrations in these

samples ranged from 779 µg/L in the sample collected from monitoring well MW-522 to 22,930 µg/L in the sample collected from monitoring well MW-510.

Samples collected from eight POC wells contained concentrations of TPH greater than the laboratory detection limits but less than their applicable CULs. Concentrations in these samples ranged from 88 µg/L in the sample collected from monitoring well MW-8R to 442 µg/L in the sample collected from monitoring well MW-501. Four POC wells did not contain concentrations of TPH above the laboratory detection limits.

Benzene was detected at concentrations greater than the laboratory detection limit in samples collected from five POC wells (MW-108, MW-136, MW-147, MW-20R and MW-510). Concentrations in these samples ranged from 1.7 µg/L (MW-147) to 47 µg/L (MW-20R). No samples collected from POC wells exceeded the site CUL for benzene.

3.6.4.2 Interior Monitoring Wells

During the April 2009 monitoring event samples from six interior monitoring wells exceeded their respective TPH CULs. Concentrations in these wells ranged from 534 µg/L in the sample collected from MW-512 to 1,503 µg/L in the sample collected from monitoring well MW-502.

Eight interior monitoring wells contained concentrations of TPH which were greater than the laboratory detection limits but less than applicable TPH CULs. Concentrations in these samples ranged from 104 µg/L in the sample collected from monitoring well MW-504 to 212 µg/L in the sample collected from monitoring well MW-519.

Benzene concentrations were greater than the laboratory detection limits in samples collected from three interior monitoring wells (MW-512, MW-514 and MW-520). Concentrations in these samples ranged from 3.5 µg/L (MW-514) to 7.6 µg/L (MW-520). No samples collected from interior monitoring wells contained concentrations of benzene greater than the site CUL.

3.6.5 June 2009 Analytical Results

Groundwater samples were collected from 40 onsite wells from June 23 to June 29, 2009. Thirty six of the monitoring wells sampled during this event contained

concentrations of TPH greater than laboratory detection limits. Fourteen of the 36 samples contained concentrations of TPH greater than applicable TPH CULs. All of the 36 samples with detectable concentrations of TPH contained TPH-D. Eleven samples were detected for TPH-D only, while 24 samples contained a combination of TPH-D, TPH-G and/or TPH-O. June 2009 analytical data are presented in **Table 3** and total TPH data are presented on **Figure 16**.

cPAH constituents were detected greater than the laboratory detection limits in the sample collected from POC monitoring well MW-510. The concentration of total cPAHs adjusted for toxicity in this sample was 0.014868 µg/L. This sample did not exceed the cPAH site CUL of 0.018 µg/L.

Benzene was detected greater than the laboratory detection limit in six samples collected during this event, however, no samples contained benzene greater than the benzene CUL of 51 µg/L.

3.6.5.1 Point of Compliance Wells

During the June 2009 sampling event samples collected from nine of the 21 POC wells contained concentrations of TPH that exceeded their respective TPH CULs. Concentrations in these samples ranged from 915 µg/L in the sample collected from monitoring well LM-2 to 25,090 µg/L in the sample collected from monitoring well MW-510.

Nine POC wells contained concentrations of TPH greater than the laboratory detection limit but less than site CULs. Concentrations in these samples ranged from 108 µg/L in the sample collected from monitoring well MW-8R to 675 µg/L in the sample collected from monitoring well MW-518.

Benzene was detected in samples collected from three POC wells (MW-104, MW-136 and MW-510) with concentrations ranging from 0.8 µg/L (MW-136) to 2.9 µg/L (MW-104). No samples contained benzene concentrations greater than the benzene.

3.6.5.2 Interior Monitoring Wells

Concentrations in samples collected from five of the 19 interior monitoring wells contained concentrations of TPH that exceeded their respective TPH CULS (MW-143, MW-502, MW-507, MW-508 and MW-514). Concentrations in these samples ranged from 512 µg/L (MW-502) to 1,175 µg/L (MW-143).

Samples from thirteen of the 19 interior monitoring wells contained concentrations of TPH greater than laboratory detection limits but less than site CULs, with concentrations ranging from 88 µg/L in the sample collected from MW-509, to 571 µg/L in the sample collected from MW-517.

Concentrations of benzene were detected in samples collected from three interior monitoring wells (MW-512, MW-514 and MW-520). Concentrations in these samples ranged from 0.5 µg/L (MW-520) to 2.0 µg/L (MW-514), not exceeding the site specific benzene CUL.

3.6.6 August 2009 Analytical Results

Groundwater samples from 40 onsite wells were collected from August 18 to August 24, 2009. During this event samples from 38 wells contained concentrations of TPH greater than the laboratory detection limit. Ten of the 38 samples contained concentrations of TPH that exceeded applicable TPH CULs. All of the 38 samples with detectable concentrations of TPH contained TPH-D. Twenty two samples contained TPH-D only, while 16 samples contained detectable concentrations of a combination of TPH-D, TPH-G and/or TPH-O. August 2009 analytical data are presented in **Table 3** and total TPH data are presented on **Figure 17**.

Concentrations of benzene greater than the laboratory detection limit were detected in samples from seven onsite wells, none of which exceeded the benzene CUL of 51 µg/L.

Concentrations of cPAH constituents were not detected greater than the laboratory detection limits in samples collected from any site wells.

3.6.6.1 Point of Compliance Wells

During the August 2009 sampling event samples collected from seven of the 21 POC wells contained concentrations of TPH greater than their respective TPH CULs. Concentrations in these samples ranged from 1,066 µg/L in the sample collected from MW-518, to 18,080 µg/L in the sample collected from MW-510.

Samples collected from twelve of the 21 POC wells contained concentrations of TPH greater than laboratory detection limits but less than site CULs. TPH concentrations in these samples ranged from 95 µg/L in the sample collected from MW-108, to 464 µg/L in the sample collected from MW-104. Two POC wells did not contain concentrations of TPH above the laboratory detection limits.

Concentrations of benzene were detected greater than laboratory detection limits in samples collected from five POC wells (MW-104, MW-136, MW-20R, MW-500 and MW-510). Concentrations ranged from 0.6 µg/L (MW-136 and MW-500), to 8.4 µg/L (MW-20R and MW-510). No samples contained concentrations of benzene greater than the site CUL.

cPAH constituents were not detected greater than laboratory detection limits in any samples collected from POC wells during this event.

3.6.6.2 Interior Monitoring Wells

During the August 2009 event TPH was detected at concentrations greater than applicable TPH CULs from three interior monitoring wells (MW-507, MW-513 and MW-514). Concentrations in these samples ranged from 561 µg/L in the duplicate sample collected from MW-507 to 847 µg/L in the sample collected from MW-514.

Samples from 16 interior monitoring wells contained concentrations of TPH which were greater than laboratory detection limits but less than TPH CULs. Concentrations in these samples ranged from 94 µg/L in the sample collected from MW-511 to 488 µg/L in the duplicate sample collected from MW-515.

Benzene was detected in samples collected from monitoring wells MW-512 (1.3 µg/L) and MW-514 (3.2 µg/L). No samples collected from interior monitoring wells contained concentrations of benzene greater than site CULs.

No cPAH constituents were detected at concentrations greater than the laboratory detection limits from any of the interior monitoring wells during this event.

3.6.7 October 2009 Analytical Results

Groundwater samples were collected from 39 onsite wells from October 26 to October 30, 2009. No samples were collected from MW-510 due to the presence of LNAPL. Of the 39 samples collected, 37 contained concentrations of TPH greater than the laboratory detection limit, and 14 samples exceeded applicable TPH CULs. All of the 37 samples with detectable concentrations of TPH contained TPH-D, 19 samples contained TPH-D only and 11 contained TPH-O. October 2009 analytical data are presented in **Table 3** and total TPH data are presented on **Figure 18**.

Samples collected from three onsite wells contained concentrations of benzene greater than the laboratory detection limit, none of which exceeded the benzene site CUL.

cPAH constituents were not detected greater than laboratory detection limits in any samples collected during this sampling event.

3.6.7.1 Point of Compliance Wells

During the October 2009 sampling event samples collected from 10 of the 20 sampled POC wells contained concentrations of TPH which exceeded applicable TPH CULs. Concentrations in these samples ranged from 715 µg/L in the sample collected from MW-150 to 2,720 µg/L in the sample collected from MW-147. In addition, NAPL was observed in MW-510. This well was not sampled due to the presence of NAPL. The TPH concentration in the August 2009 round was 18,180 µg/L, and had been higher in the two previous rounds.

TPH concentrations in nine samples collected from POC wells were above the laboratory detection limit but below applicable CULs. Concentrations ranged from 101

µg/L in the sample collected from MW-108 to 677 µg/L in the sample collected from MW-104.

Benzene concentrations were detected greater than laboratory detection limits from POC wells MW-104 and MW-20R with concentrations of 2.0 µg/L and 4.9 µg/L, respectively. No samples collected from POC wells contained benzene concentrations greater than the benzene CUL.

3.6.7.2 Interior Monitoring Wells

Samples from four interior monitoring wells contained concentrations of TPH greater than their applicable TPH CULs (MW-502, MW-507, MW-513 and MW-514). Concentrations in these samples ranged from 594 µg/L in the duplicate sample collected from MW-513 to 1,013 µg/L in the sample collected from MW-507.

Samples collected from 14 interior monitoring wells contained concentrations of TPH greater than laboratory detection limits but less than applicable CULs. Concentrations in these samples ranged from 111 µg/L in the sample collected from MW-509 to 316 µg/L in the sample collected from MW-512.

Concentrations of benzene were greater than the laboratory detection limit in the samples collected from MW-512 and MW-514 with concentrations of 0.6 µg/L and 2.2 µg/L, respectively. No samples collected from interior monitoring wells contained concentrations of benzene greater than the site CUL of 51 µg/L.

3.7 QA QC Samples and Laboratory Control Samples

As part of the quality assurance project plan as described in Sampling and Analysis Plan (SAP) of the Work Plan, quality assurance procedures are followed during each sampling event. This includes duplicate samples being collected at a frequency of 10 percent of the total number of samples. This equates to four duplicate samples collected per sampling event. Duplicates are submitted blindly to the laboratory and documentation of parent and duplicate samples are 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 are collected at a frequency of 5 percent of the total number of samples, or two per sampling event. One equipment

rinsate sample is collected per sampling event. Equipment blank samples are collected by rinsing decontaminated field equipment with distilled water. Duplicate samples, MS/MSD samples and equipment rinsate samples are collected and analyzed for hydrocarbon analysis only (NWTPH-Gx, NWTPH-Dx, cPAHs by 8270 and benzene by 8021B) as per the SAP.

4. Hydrovac Multi-phase Extraction (MPE) Events

Two hydrovac MPE events were conducted on monitoring well MW-510 on November 11, 2009 and December 8, 2009. An Emerald Services vacuum truck was used to extract water and air from monitoring well MW-510 using a down-hole PVC stinger and manifold fitted on the well casing. Extraction continued for approximately 6 hours per event. Approximately 611 gallons of water were removed from the well per event. Prior to and during each extraction event the water levels were measured, no measurable amounts of LNAPL were detected prior to or during either extraction event.

5. Analysis of Groundwater IHS Concentration Trends

Groundwater IHS concentration trends over time were evaluated at wells across the site as the primary line of evidence to determine the overall plume status, i.e., shrinking, stable, or expanding (Ecology 2005). In general, if the groundwater IHS concentrations are determined to be stable or decreasing in at least 80% of the wells within the plume, then the plume should be considered stable or shrinking (Ecology 2005). To assess the significance of the observed trends in the groundwater IHS (i.e., benzene, total cPAH, and TPH) concentrations over time and to calculate degradation rates and projected year to CUL at wells with statistically significant decreasing IHS concentration trends, a statistical evaluation of the bi-monthly groundwater monitoring data from October 2008 through October 2009 (seven data points) was completed using a linear regression trend test and the data provided in **Table 3**. The linear regression analysis was performed only for those monitoring locations where benzene, total cPAH, and/or TPH concentrations have exceeded the applicable CULs at least once during the monitoring period (25 monitoring locations).

Linear regression analyses using natural log-normalized concentration data were conducted to estimate increasing or decreasing concentration trends, and attenuation rates (USEPA, 2002). The analyses are presented in **Appendix I**. **Table 1a** of

Appendix I summarizes the results and includes the R^2 values and p-values from the analyses.. .

R^2 is a measure of the linear regression's "fit" to the site data; it is the proportion of variability in the data (here, concentrations) which can be explained with the resulting model. Values of R^2 are bounded by zero and one, with values closer to one indicating a better fit of the regression to the data; conversely, $R^2 = 0$ would indicate that the regression has no predictive value. The p-value of the regression model is used to determine the statistical significance of the linear regression, i.e., the level of significance of the null hypothesis: the slope of the regression line is equal to zero, or there is no significant trend in the data. For p-values greater than 0.10, the null hypothesis is accepted, and the slope of the regression line is considered not to be different than zero at a 90% confidence level. For p-values less than 0.10, the null hypothesis is rejected, and the slope of the line is considered to be significantly different from zero; the data demonstrate a statistically significant trend.

Ten wells on the western side of the site have indicated at least one groundwater CUL exceedance since October 2008 (**Table 1a**). Seven of these wells, however, either have 1) decreasing groundwater IHS concentration trends overall or 2) recent concentrations less than the CULs. Wells MW-20R and MW-520 indicate statistically significant decreasing concentration trends with respect to TPH concentrations in groundwater, with concentrations less than CULs for at least three sampling events. The concentration trends observed at wells MW-104, MW-143, MW-516, MW-518, and MW-522 are not statistically significant; however, the IHS concentrations at these locations have generally decreasing trends and been less than CULs for at least two, and up to six, sampling events. Three wells (MW-147, MW-149R, and MW-150) may have increasing trends in groundwater IHS concentrations for TPH, but these regressions are not statistically significant at a 90% confidence level and, therefore, inconclusive. Furthermore, the most recent TPH measurements for two of these wells (775 µg/L and 715 µg/L for MW-149R and MW-150, respectively) were only slightly greater than the CUL for TPH (706 µg/L).

Fifteen wells on the eastern side of the site have indicated at least one groundwater CUL exceedance since October 2008 (**Table 1a**). Of these 15 locations, eight locations (MW-501, MW-502, MW-504, MW-508, MW-512, MW-513, MW-514, and MW-515) either have 1) decreasing groundwater IHS concentration trends overall or 2)

recent concentrations less than the CULs. Three wells (LM-2, MW-500, and MW-507) may have increasing trends in groundwater IHS concentration for TPH, but these regressions are not statistically significant at a 90% confidence level and, therefore, inconclusive. Regressions for three other wells – MW-129R, MW-135, and MW-136 – have statistically significant increasing trends for TPH over the entire period of record; however, concentrations of the IHSs in these wells have appeared to have stabilized over the past three monitoring events. In the last of these 15 wells, MW-510, groundwater has a statistically significant increasing trend in TPH, and has consistently exceeded the CUL. LNAPL was observed in this well during the October 2009 monitoring event. Elevated concentrations of TPH in this well may be due to the presence of residual LNAPL in the vicinity of this monitoring location: TPH concentrations in an upgradient monitoring well (MW-509) have consistently remained below the CUL since October 2008.

Based on the linear regression analysis of data collected at wells where IHS concentrations have exceeded the applicable CULs at least once during the monitoring period, 21 of the 25 locations indicate stable or decreasing groundwater IHS concentration trends, while only four of the 25 locations (**Table 1a**) indicate a statistically significant increasing groundwater IHS concentration trend. Even the 15 site wells where IHS concentrations have not exceeded CULs indicate decreasing trends (**Appendix I**), although only four of these (MW-108, MW-109, MW-505, and MW-511) are statistically significant.

Overall, analysis of the groundwater data collected thus far suggests that the groundwater plume at the site is generally stable or shrinking. The long-term significance of the groundwater IHS concentration trends observed at the site will be further evaluated at the completion of the full two-year monitoring period.

6. Geochemical Indicator Parameters

In addition to the ongoing collection of hydrocarbon IHS groundwater data, geochemical indicator parameters have been monitored at the site on a bi-monthly basis to further characterize the groundwater environment and evaluate natural attenuation of remaining hydrocarbon impacts. While trends in the hydrocarbon IHS constituent concentrations represent the primary line of evidence for natural attenuation in groundwater at the site, geochemical indicator parameters are monitored

as a secondary line of evidence to evaluate the suitability of the groundwater geochemical environment for biodegradation of the IHS constituents and to demonstrate that biodegradation is occurring (Ecology 2005).

Degradation of hydrocarbon constituents in groundwater can proceed via aerobic or anaerobic microbial processes. Bacteria present in soil and groundwater obtain energy for cell production and maintenance by facilitating thermodynamically advantageous reduction-oxidation (redox) reactions involving the transfer of electrons from electron donors to available electron acceptors. When sufficient dissolved oxygen is present in groundwater, aerobic biodegradation of hydrocarbons dominates. As oxygen becomes less available, anaerobic microorganisms consume electron acceptors in the following order of preference: nitrate, manganese oxides, ferric iron hydroxides, sulfate, and carbon dioxide. Anaerobic biodegradation is thus associated with decreased concentrations of nitrate and sulfate, increased concentrations of ferrous iron and dissolved manganese, consumption of carbon dioxide, and production of methane within the plume (Wiedemeier et al. 1999).

Table 4 provides a summary of the geochemical indicator parameters collected at the site and discussed below.

6.1 Discussion of Geochemical Data

6.1.1 Oxidation-reduction potential (ORP)

The field ORP data collected at monitoring wells across the site vary, but consist primarily of negative values, which are generally indicative of reducing conditions, consistent with the occurrence of anaerobic biodegradation processes. Well MW-511 represents a generally upgradient, un-impacted monitoring location at the site; in contrast to many of the impacted monitoring locations, ORP data collected at this location have remained positive throughout the monitoring period.

6.1.2 Dissolved oxygen (DO) and nitrate (NO_3^-)

Dissolved oxygen and nitrate concentrations measured in groundwater across the site are typically less than 1 milligram per liter (mg/L), indicating that they have been preferentially consumed as electron acceptors to support natural biodegradation of the petroleum hydrocarbon constituents, and that groundwater conditions across the site

are at least mildly reducing. Dissolved oxygen has occasionally been observed at concentrations exceeding 1 mg/L at monitoring wells LM-2, MW-8R, MW-101, MW-104, MW-109, MW-135, MW-139R, MW-149R, MW-501, MW-505, MW-509, MW-511, MW-512, MW-515, MW-516, MW-517, MW-523, and MW-524. Nitrate concentrations measured across the site are nearly all less than 1 mg/L and have typically been below the reporting limit. Well MW-511 indicates DO concentrations up to approximately 4 mg/L and slightly higher nitrate concentrations (approximately 1 mg/L) than those observed at other site wells, potentially indicating slightly less reducing conditions at this upgradient un-impacted location.

6.1.3 Dissolved manganese (Mn^{2+}) and ferrous iron (Fe^{2+})

When manganese oxides (Mn^{4+}) are used as electron acceptors during anaerobic microbial respiration, soluble manganese (Mn^{2+}) is produced; similarly, when ferric iron (Fe^{3+}) is used as an electron acceptor during anaerobic microbial respiration, it is reduced to soluble ferrous iron (Fe^{2+}). Dissolved (i.e., reduced) manganese and ferrous iron concentrations greater than 1 mg/L have been detected in groundwater at many of the wells across the site (i.e., MW-20R, MW-101, MW-129R, MW-135, MW-136, MW-139R, MW-143, MW-147, MW-501, MW-504, MW-505, MW-507, MW-512, MW-513, MW-514, MW-515, MW-516, MW-517, MW-518, and MW-523), particularly at wells located on the western portion of the site. In contrast, dissolved manganese and ferrous iron concentrations measured at MW-511 have remained less than 0.5 mg/L. These data indicate that iron and manganese reduction processes are likely occurring in impacted areas at the site.

6.1.4 Sulfate (SO_4^{2-})

The highest groundwater sulfate concentrations at the site (greater than 200 mg/L and up to 2,220 mg/L) have been observed at MW-108, MW-109, LM-2, MW-507, MW-508, and MW-20R. The sulfate concentrations observed at these locations are not indicative of a lack of sulfate reduction, as methane is detected at these locations, indicating methanogenic activity and strongly reducing groundwater conditions. Rather, the higher sulfate concentrations at these locations are likely indicative of a sulfate source, possibly due to saltwater intrusion. Sulfate concentrations across the rest of the site are generally less than 100 mg/L, potentially indicative of sulfate-reducing conditions.

6.1.5 Methane (CH_4)

Methane concentrations measured at the site have ranged from less than 0.5 mg/L to as high as 21 mg/L (MW-136). Methane concentrations greater than 1 mg/L have been detected at MW-20R (3.3 mg/L), MW-101 (3.0 mg/L), MW-104 (2.2 mg/L), MW-108 (3.5 mg/L), MW-129R (15 mg/L), MW-135 (12 mg/L), MW-136 (21 mg/L), MW-143 (18 mg/L), MW-147 (1.5 mg/L), MW-149R (1.61 mg/L), MW-500 (16 mg/L), MW-501 (16 mg/L), MW-504 (1.97 mg/L), MW-506 (2.82 mg/L), MW-507 (2.3 mg/L), MW-508 (6.1 mg/L), MW-510 (15 mg/L), MW-512 (2.1 mg/L), MW-517 (4.4 mg/L), MW-518 (4.5 mg/L), MW-519 (14 mg/L), MW-520 (4.9 mg/L), MW-521 (3.1 mg/L), and MW-523 (1.94 mg/L). These methane concentrations are indicative of strongly reducing groundwater conditions and were measured across the site. The majority of locations with elevated methane concentrations have historically exceeded the applicable CULs for TPH, indicating ongoing degradation of the TPH impacts at the site.

In general, the geochemical parameters monitored across the entire site indicate anaerobic groundwater conditions, with DO, nitrate, manganese oxides, ferric iron, and sulfate consumed as electron acceptors to support biodegradation of the petroleum hydrocarbon constituents in groundwater across the site. The geochemical data indicate that moderately to strongly reducing groundwater conditions prevail, indicative of the ongoing biodegradation of the hydrocarbon constituents across the site.

7. Conclusions

Groundwater flow in the southeast Lower Yard is dominated by a mounding effect. Groundwater gauging data generally indicates that the groundwater surfaces measured in P-3 and P-5, the two shallow piezometers completed in excavation backfill, have similar elevations to those measured in MW-500 and MW-501, which are also partially completed in excavation backfill 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. Six piezometers (including the two completed deeper as part of the nested pairs) were installed in native or undisturbed 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 older fill material show somewhat higher groundwater elevations than their deeper counterparts. There is

lateral outward migration of shallow groundwater from the groundwater mound in the excavation backfill into the surrounding older fill material as the mound decays. The silty, shallow older fill in the southeast Lower Yard (from 0 to 13 feet below ground surface) appears to have created a distinct zone in which shallow groundwater responds to recharge independently of the lower-permeability material below. The heterogeneous nature of the historical fill material found in the southeast Lower Yard has created localized pockets of lower and higher permeability which strongly affect shallow groundwater elevations.

The CUL for benzene has not been exceeded at any site monitoring location during the seven bi-monthly groundwater monitoring events, with the exception of one exceedance observed at MW-20R in February 2009, which has not been repeated.

The CUL for total cPAHs was exceeded once at POC monitoring well MW-135, once at monitoring well MW-502, three times at monitoring well MW- 510 (LNAPL was observed at this location during the October 2009 monitoring event), and once at monitoring well MW-522 during the monitoring period. However, the cPAH concentrations have since remained below the CUL at MW-135, MW-502, and MW-522 for at least three monitoring events.

Of the 40 wells monitored at the site, ten wells on the western side of the site have indicated historical exceedances of the CUL established for TPH; only five of these locations (MW-147, MW-149R, MW-150, MW-518, and MW-522) have shown exceedances during the October 2009 monitoring event. Fifteen wells on the eastern side of the site have indicated historical exceedances of the CUL established for TPH; ten of these locations (LM-2, MW-129R, MW-135, MW-136, MW-500, MW-502, MW-507, MW-510, MW-513, and MW-514) have shown exceedances during the October 2009 monitoring event. Ongoing monitoring is required to verify that these concentrations decrease with time.

While 25 of the 40 monitoring locations at the site have indicated at least one CUL exceedance during the past seven sampling events, a significant number of these 25 locations have indicated recent groundwater IHS concentrations below the CULs and/or statistically significant decreasing concentration trends. For example, 13 of the 25 monitoring locations that have exceeded a CUL during the last seven monitoring events have indicated groundwater concentrations less than CULs for at least the last

two monitoring events, with nine of these locations less than CULs for six of the seven monitoring events. Six of these 25 monitoring locations indicate statistically significant decreasing concentration trends with time, while four locations indicate statistically significant increasing concentration trends. In addition, the geochemical parameters indicate that groundwater conditions across the site are reducing, suggesting ongoing biodegradation of the remaining hydrocarbon constituents in groundwater at the site (Wiedemeier et al, 1999). Groundwater IHS trend analyses were based on seven bi-monthly data points; the 2010 sampling events will occur on a quarterly basis, resulting in a total of 11 monitoring events over the two-year period. The groundwater IHS trends will be re-evaluated at the end of the two-year monitoring period.

Source removal has been conducted at the site, trend analyses indicate that the groundwater plume is generally stable or shrinking, and geochemical data provide evidence of ongoing biodegradation of hydrocarbon constituents in groundwater at the site, indicating that natural attenuation is a feasible remedial action for remaining groundwater hydrocarbon impacts at the site.

8. References

Hun Seak Park. 2005. *Guidance on Remediation of Petroleum-Contaminated Ground Water by Natural Attenuation*. July 2005. Washington State Department of Ecology.

SLR. 2007a. *Interim Action Report - Work Plan for 2007 Lower Yard Interim Action, Unocal Edmonds Bulk Fuel Terminal*. June 25, 2007. SLR International Corporation.

SLR. 2007b. *Sampling and Analysis Plan*. July 5, 2007. SLR International Corporation.

U.S. Environmental Protection Agency (USEPA), 2002. Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies. EPA/540/S-02/500, National Risk Management Research Laboratory, Office of Research and Development, Cincinnati, OH. November 2002.

Wiedemeier, T.H., C.J. Newall, H.S. Rifai, and J.T. Wilson. 1999. Natural Attenuation of Fuels and Chlorinated Solvents in the Subsurface. John Wiley & Sons, Inc., New York, NY.

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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
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
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
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
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
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

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-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
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
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
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
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
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
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

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-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
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
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
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
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
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
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

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
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
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
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
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
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
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

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-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	10:43		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
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	10:30		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
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
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
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
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
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

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-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	5.81
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
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
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
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
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
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

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-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
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
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
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
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
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
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

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	8:50		8.03	--	NP	5.13
	10/29/09	8:50		6.75	--	NP	6.41
Southeast Lower Yard 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
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
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
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
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
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
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
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
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
D-2	10/20/08	--	--	--	--	--	--
	12/08/08	11:05	5.60	1.24	--	NP	6.84
	02/20/09	9:55		0.60	--	NP	6.20
	04/20/09	9:49		0.17	--	NP	5.77
	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

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
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
D-5	10/20/08	17:15	5.60	1.20	--	NP	6.80
	12/08/08	11:18		1.25	--	NP	6.85
	02/20/09	9:45		0.30	--	NP	5.90*
	04/20/09	9:22		0.08	--	NP	5.68
	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

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-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
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
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

Notes:

amsl= Above Mean Sea Level

LNAPL = Light non-aqeous 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.

^ = 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
MW-104*	10/22/08	3.89	11.8	0.554	1.00 U	0.00755 UU	253 U	728	505 U	1,110
	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	0.5 [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
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
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
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

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-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	
MW-20R*	10/22/08	2.95		3.31		0.50	U	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	
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	
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	
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	

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-519	10/22/08	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 [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
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
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]
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
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

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	
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	
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	
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	
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

Table 3

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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-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	
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 [5.0]	U	0.5 [5.0]	U	0.5 [5.0]	U	1.00 [1.00]	U	0.00712 [0.00740]	UU	238 [243]	U	50.0 [50.0]	U	476 [485]	U	382 [389]	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	402	
	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	
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	
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	
MW-500*	10/27/08	0.800		0.934		0.50	U	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	

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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-501*	10/24/08	0.50 U	1.42	1.15	1.00 U	0.00838 UU	6,690 J	1,040	597 J	8,330 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
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	32 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
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
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
MW-505	10/24/08	0.5 [5.0] U	0.50 [2.78] UJ	0.5 [5.0] 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	0.50 [0.647] U	0.5 [5.0] 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

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-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
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
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]
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
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	5,410
	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								

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-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]
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
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]
MW-514	10/23/08	2.98	0.640	1.54	4.69	0.00712 UU	253	1020 JZ	490 U	1,520 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	1,170 [1,200]
	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
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

Table 3

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

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

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
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 quantitation limit.
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.

Table 4

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

Monitoring Well	Date Sampled	Temperature (ºF)[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
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	0.460	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
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	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	186	520	2.80	340	1.41	2.0
MW-101	10/22/08	59.63	6.13	2,773.56	0.19	64.36	42.0	96.2	0.210	170	1.33	3.6
	12/10/08	55.79	5.99	1,807.60	0.41	132.69	50.0	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	83.0	83.3	0.980	300	0.977	1.0
	06/25/09	57.14	6.10	901.96	1.65	129.31	56.4	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	136	37.5	1.20	1.7	0.185	0.5
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	0.25 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	3.2	1.4	4.5
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

Table 4

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

Monitoring Well	Date Sampled	Temperature (ºF)[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-109	10/23/08	54.91	6.22	16,332.14	1.34	-194.55	342	693	1 UJ	785	1.59	0.6
	12/11/08	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
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
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
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
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
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
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

Table 4

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

Monitoring Well	Date Sampled	Temperature (ºF)[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-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
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
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
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	1.50	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
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

Table 4

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

Monitoring Well	Date Sampled	Temperature (ºF)[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-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
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
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
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
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
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
	06/25/09	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
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

Table 4

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

Monitoring Well	Date Sampled	Temperature (ºF)[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-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										
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
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
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
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
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

Table 4

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

Monitoring Well	Date Sampled	Temperature (ºF)[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-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
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
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
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

Table 4

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

Monitoring Well	Date Sampled	Temperature (ºF)[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-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
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
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
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	0.59	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
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	0.023	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

Table 4

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

Monitoring Well	Date Sampled	Temperature (ºF)[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]

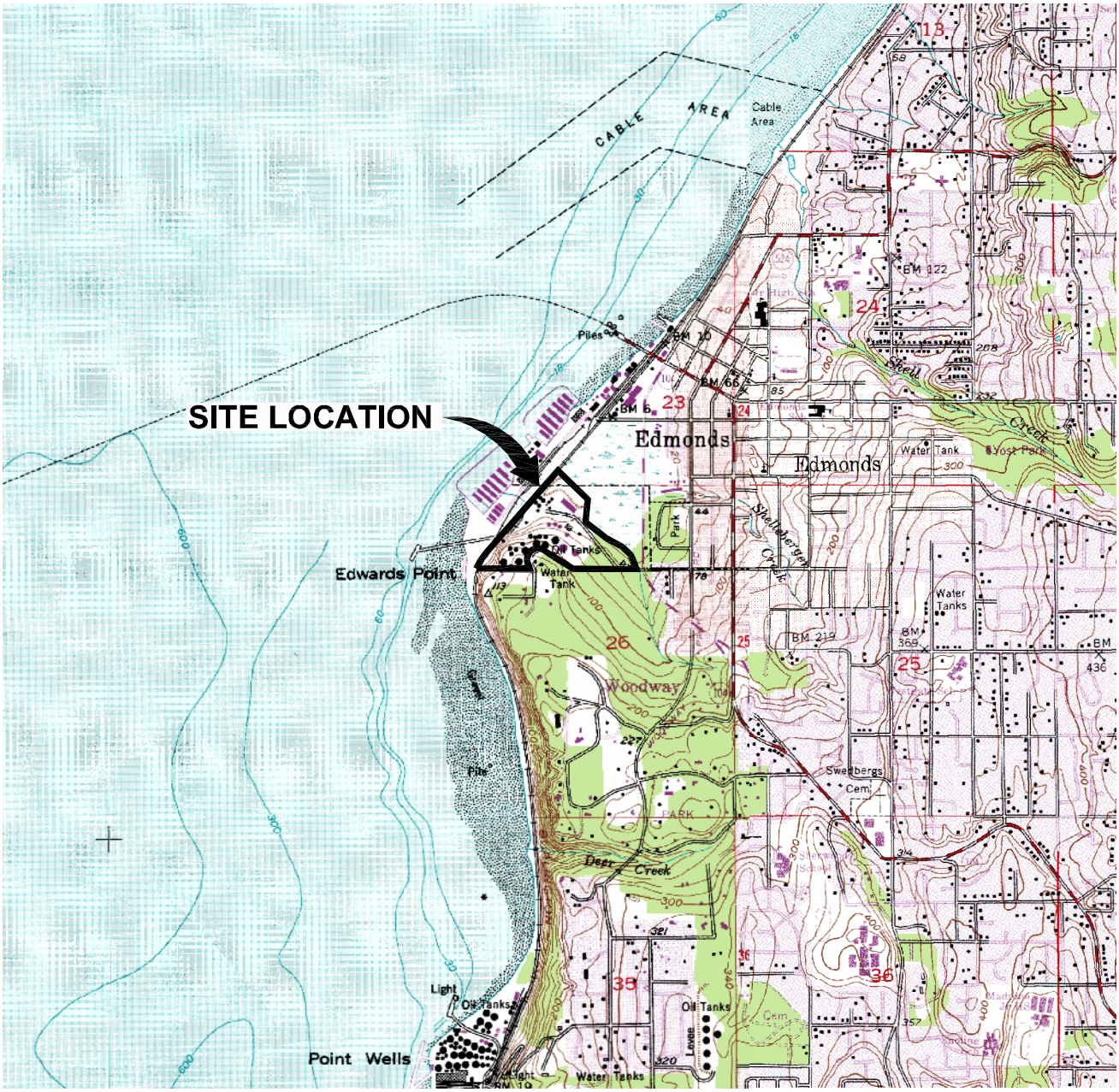
Notes:

[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.
ºF = 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

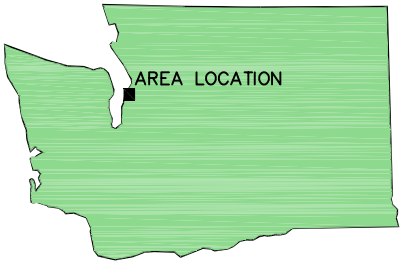
Figures



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



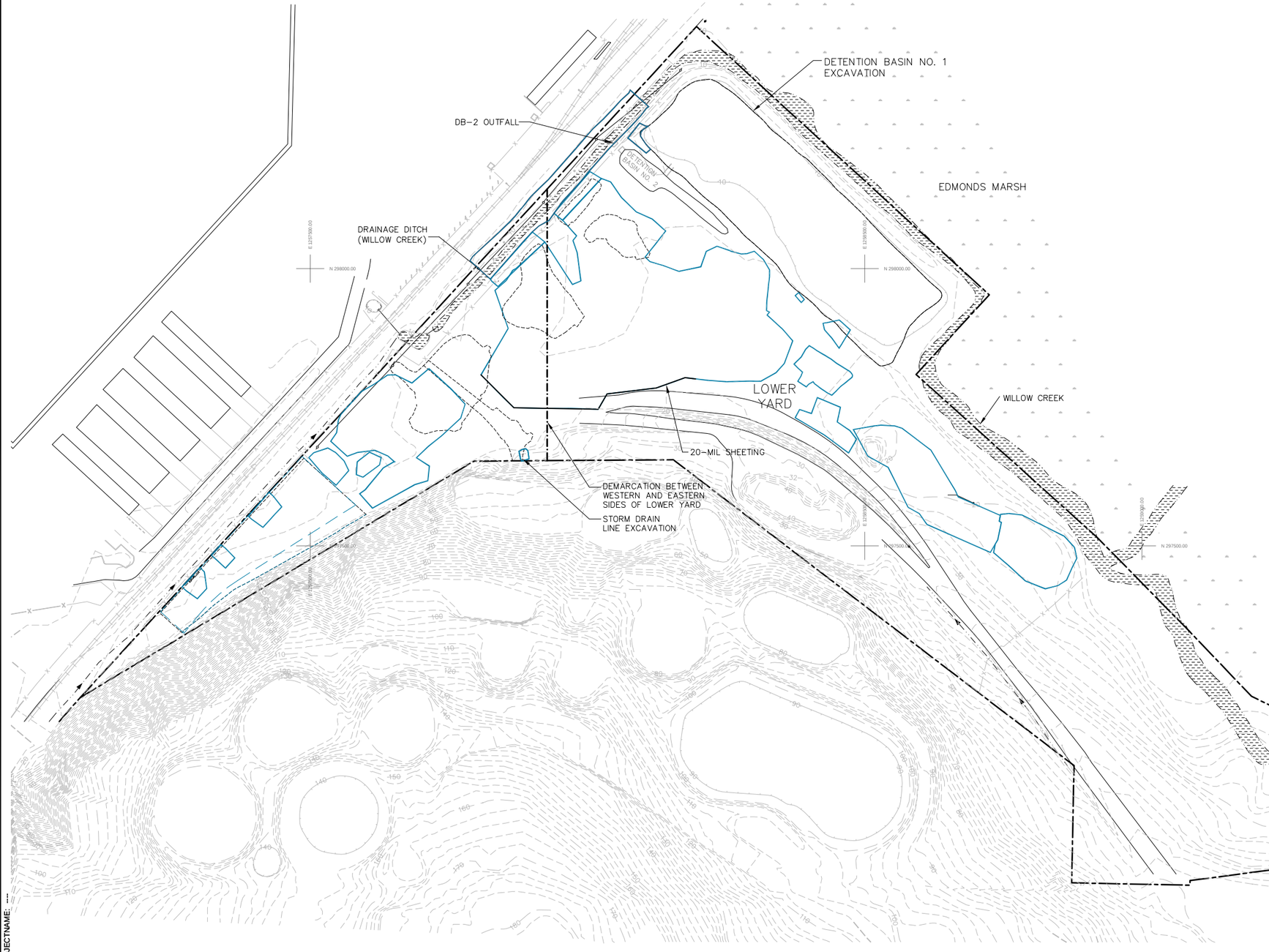
WASHINGTON

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL TERMINAL
EDMONDS, WASHINGTON

SITE LOCATION MAP

ARCADIS

FIGURE
1



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
EDMONDS, WASHINGTON

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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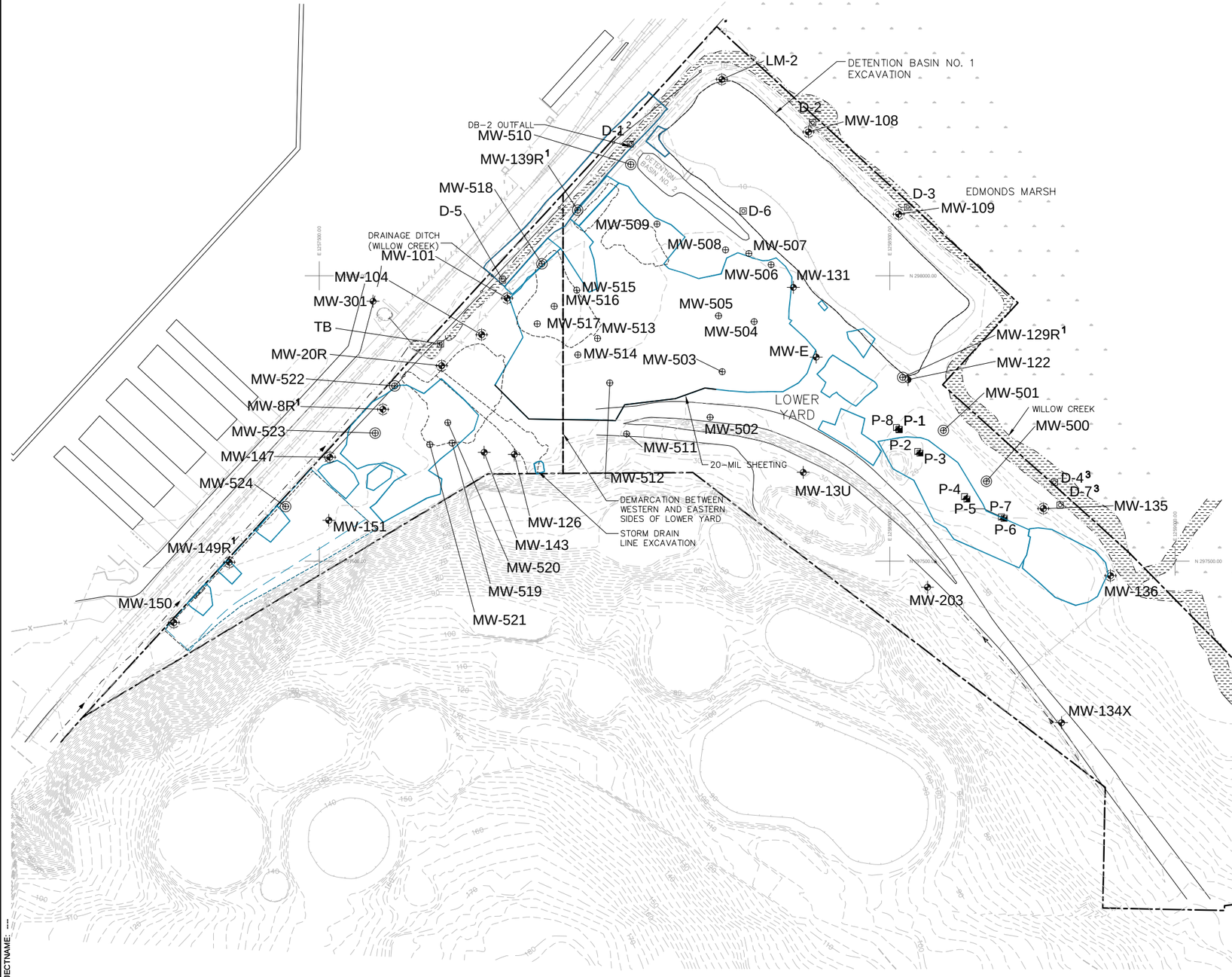
45362X02
45362X00



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
- PIEZOMETER
- 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
EDMONDS, WASHINGTON

MONITORING WELL LOCATIONS

ARCADIS

FIGURE 3

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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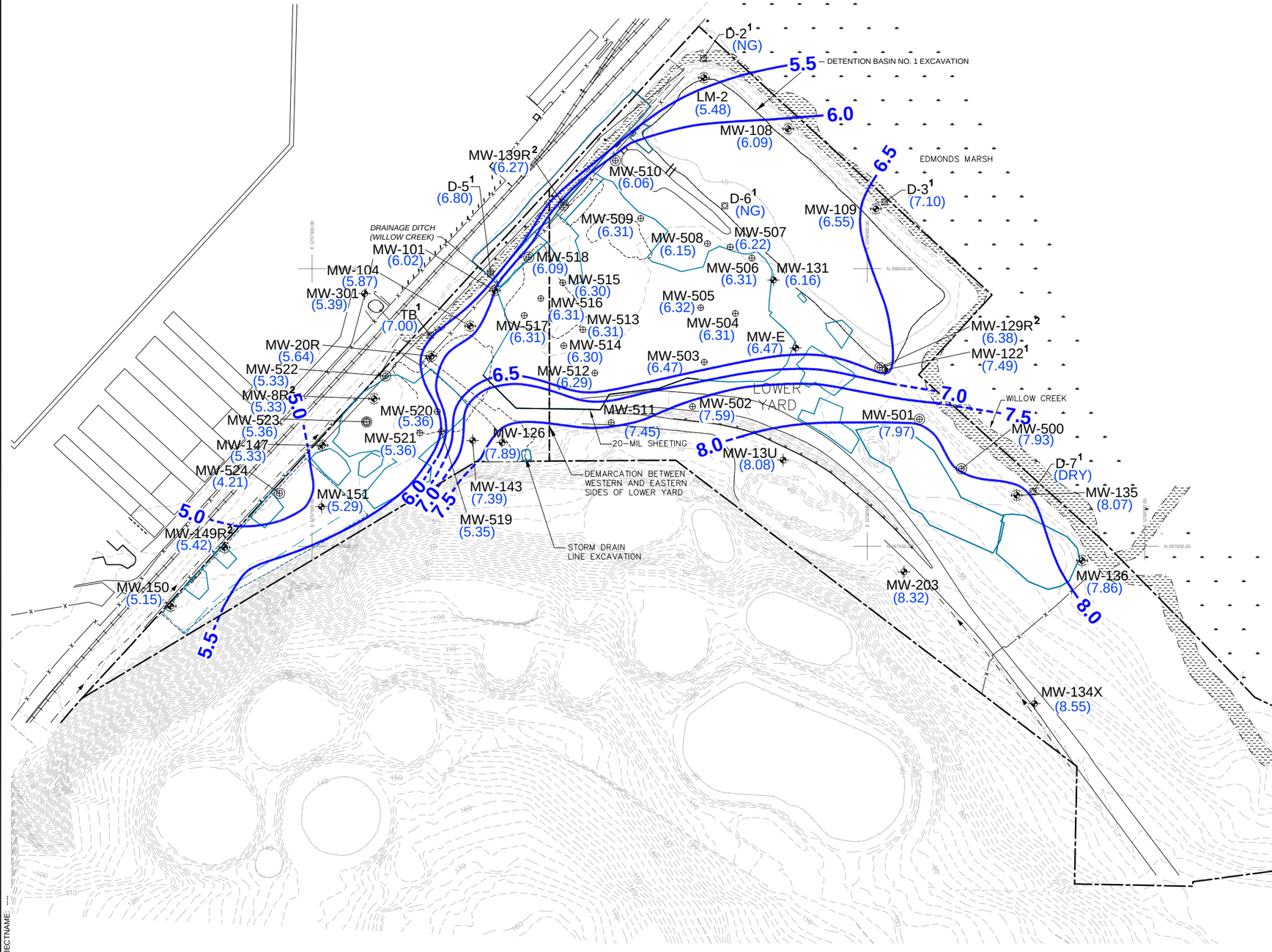


LEGEND:

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
	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
	GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
(7.86)	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
(NG)	NOT GAUGED

NOTES:

1. NOT USED TO DEVELOP CONTOURS, OCTOBER 2008.
2. MONITORING WELL WAS ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
3. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

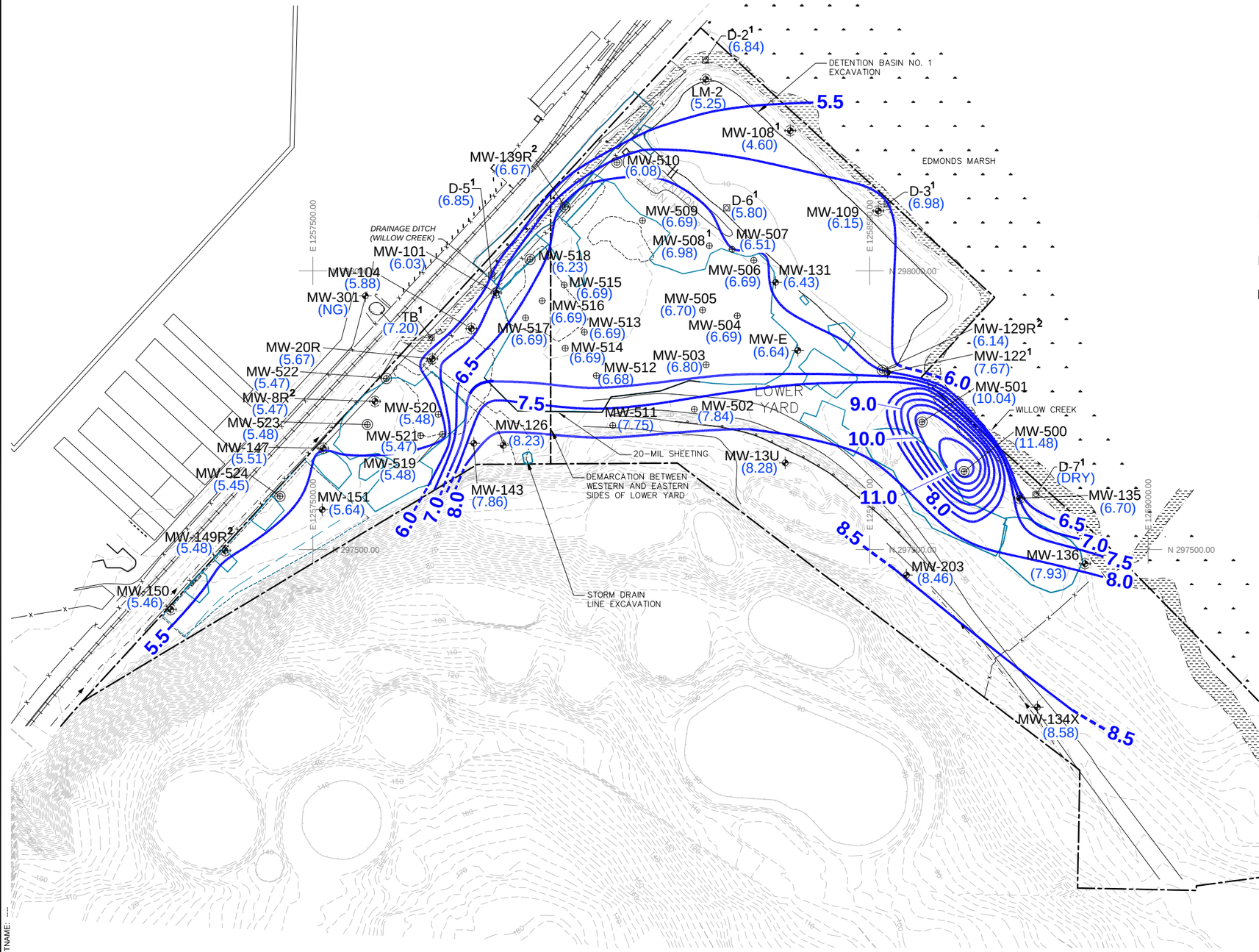
0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

OCTOBER 20, 2008 GROUNDWATER ELEVATIONS AND CONTOURS

ARCADIS

FIGURE 4



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
⊠	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
	GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
(7.93)	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
(NG)	NOT GAUGED

NOTES:

1. NOT USED TO DEVELOP CONTOURS, DECEMBER 2008.
2. MONITORING WELL WAS ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
3. 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
EDMONDS, WASHINGTON

DECEMBER 8, 2008 GROUNDWATER ELEVATIONS AND CONTOURS

ARCADIS

FIGURE 5

CITY:(TAMPA,FL), SYRACUSE,NY GROUP: ENVCAD DB:(J.RICHARDS) A. SCHILLING, P. LISTER PM: R.ANDRESEN TM: S. ZORN TR: D.RASAR LYR: ON=*;OFF=REF; (FR2)
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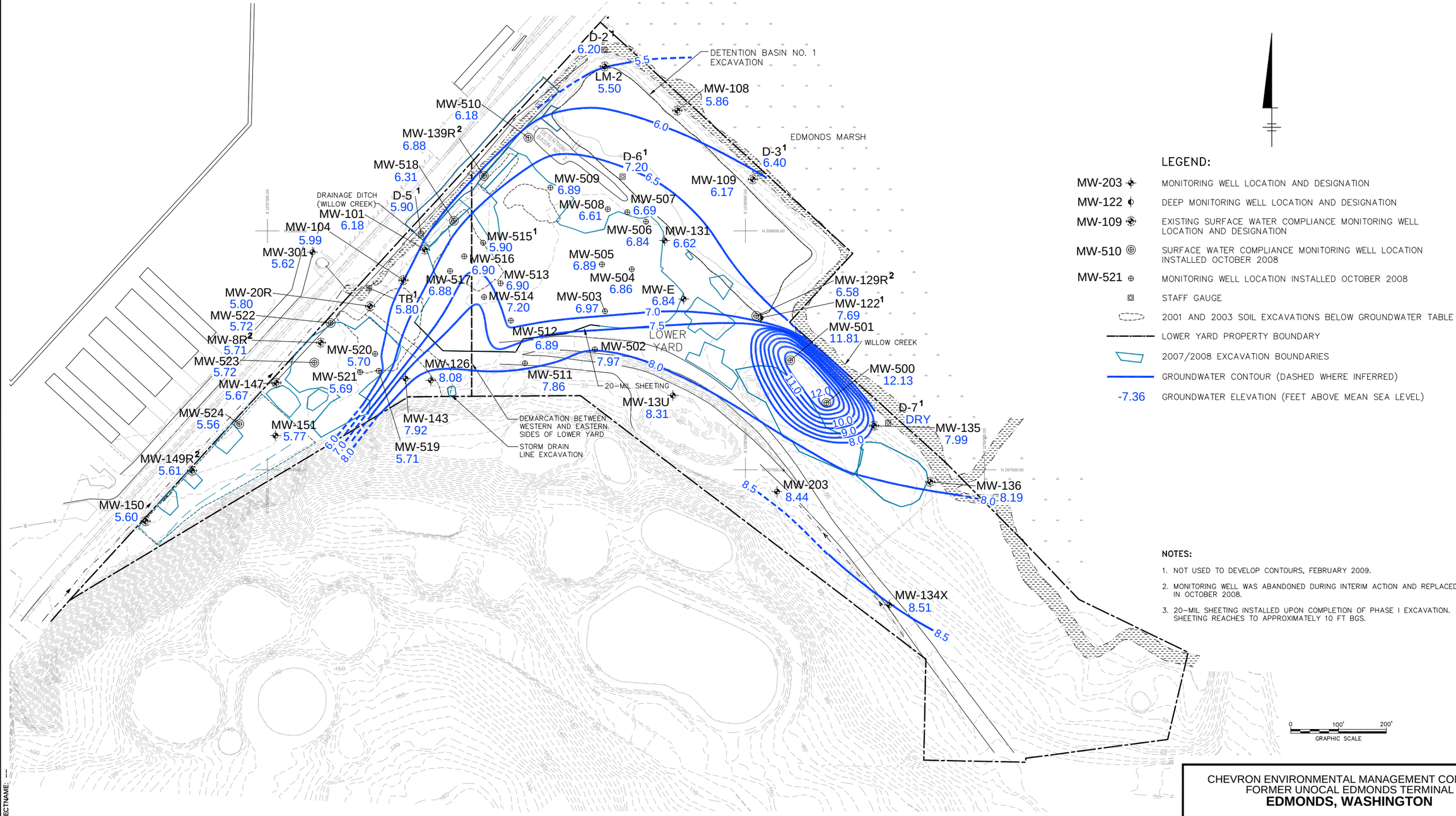

LEGEND:

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
	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
	GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
-7.36	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

NOTES:

1. NOT USED TO DEVELOP CONTOURS, FEBRUARY 2009.
2. MONITORING WELL WAS ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
3. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

FEBRUARY 20, 2009 GROUNDWATER ELEVATIONS AND CONTOURS

ARCADIS

FIGURE
6

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, (FRZ)
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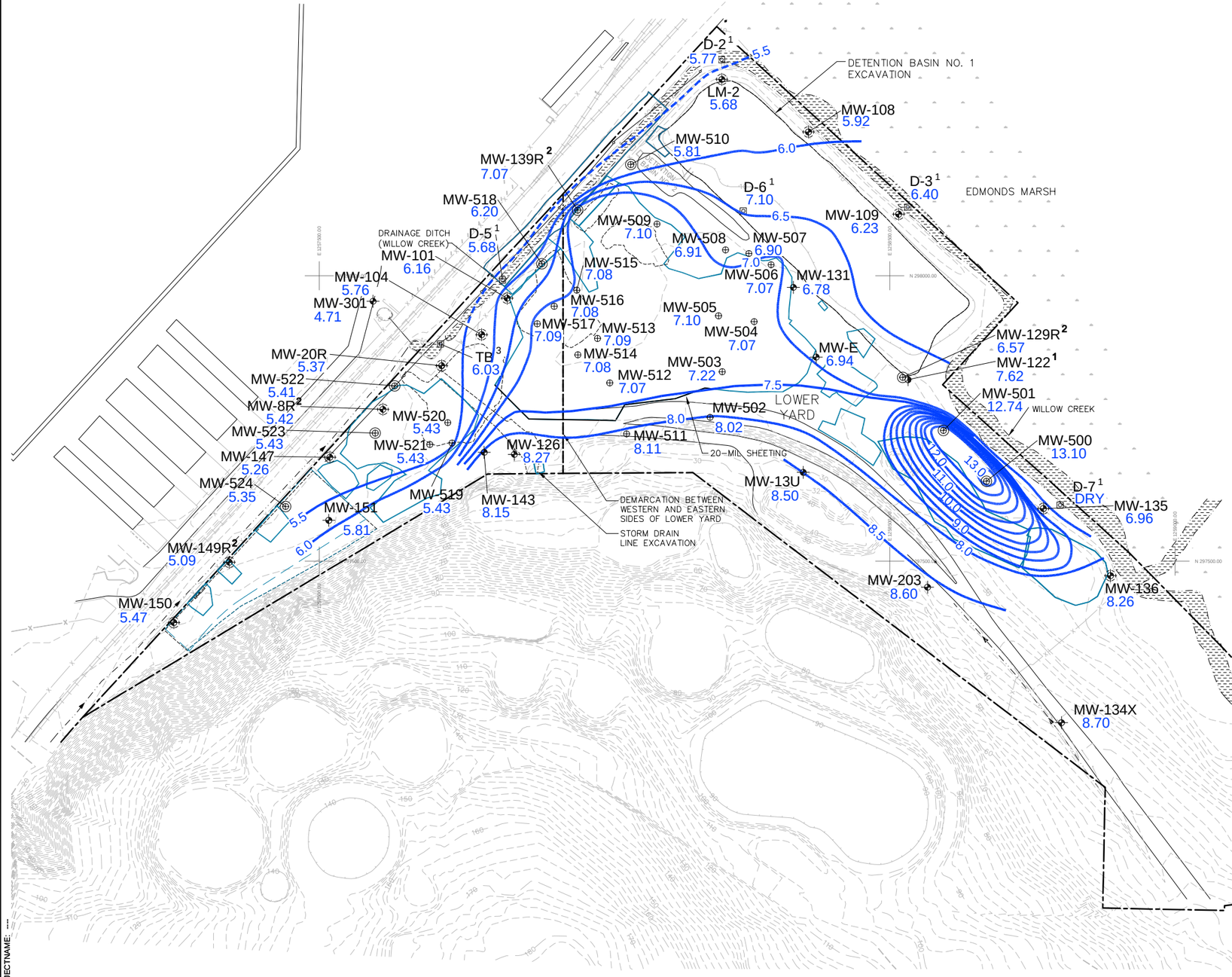

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

APRIL 20, 2009 GROUNDWATER ELEVATIONS AND CONTOURS

ARCADIS

FIGURE
7

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, (FRZ)
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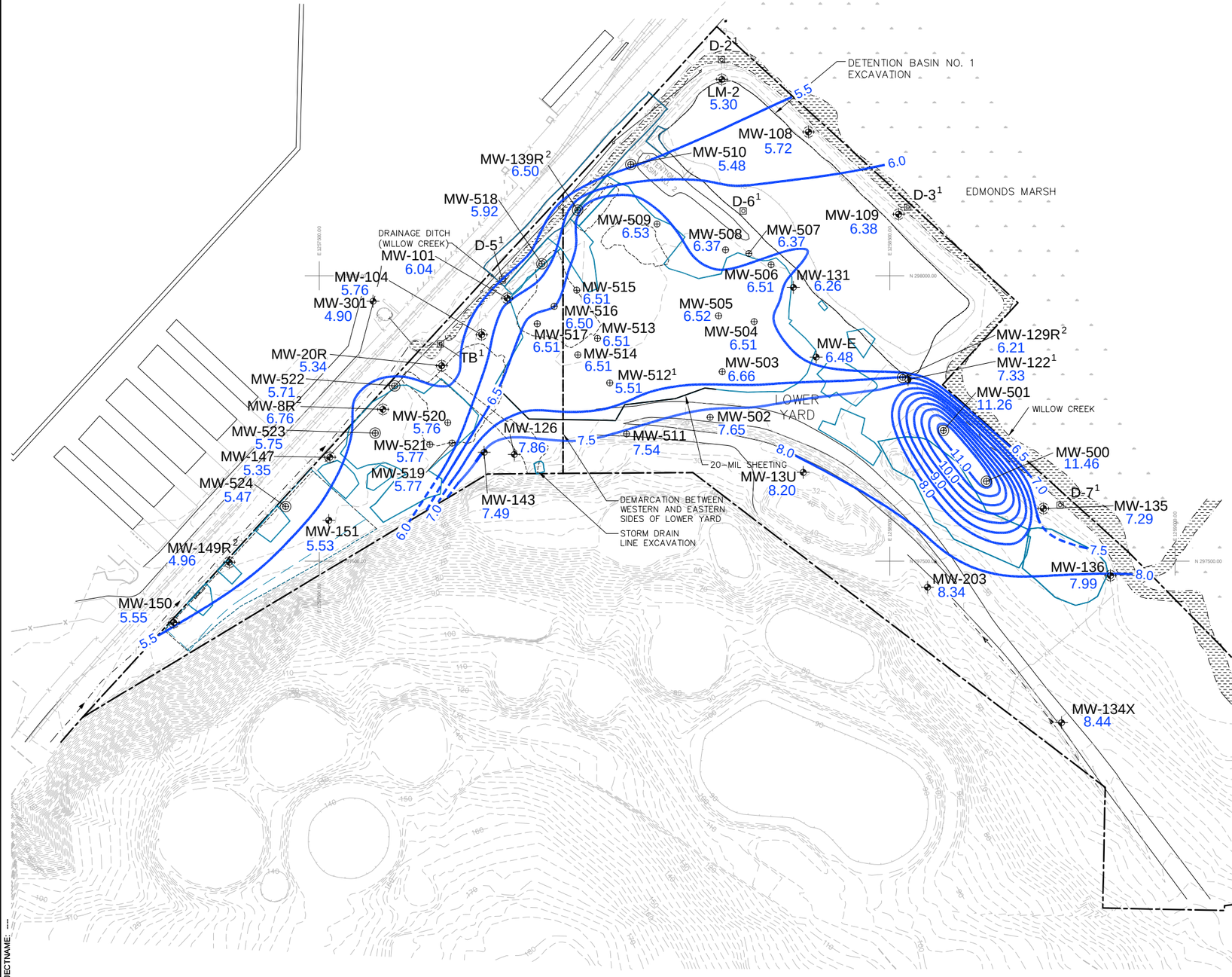

LEGEND:

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
	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
8.0	GROUNDWATER CONTOUR (DASHED WHERE INFERRED) 0.5 FEET INTERVAL
7.29	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

NOTES:

1. NOT USED TO DEVELOP CONTOURS, JUNE 22, 2009.
2. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
3. 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
EDMONDS, WASHINGTON

JUNE 22, 2009 GROUNDWATER ELEVATIONS AND CONTOURS

ARCADIS

FIGURE
8

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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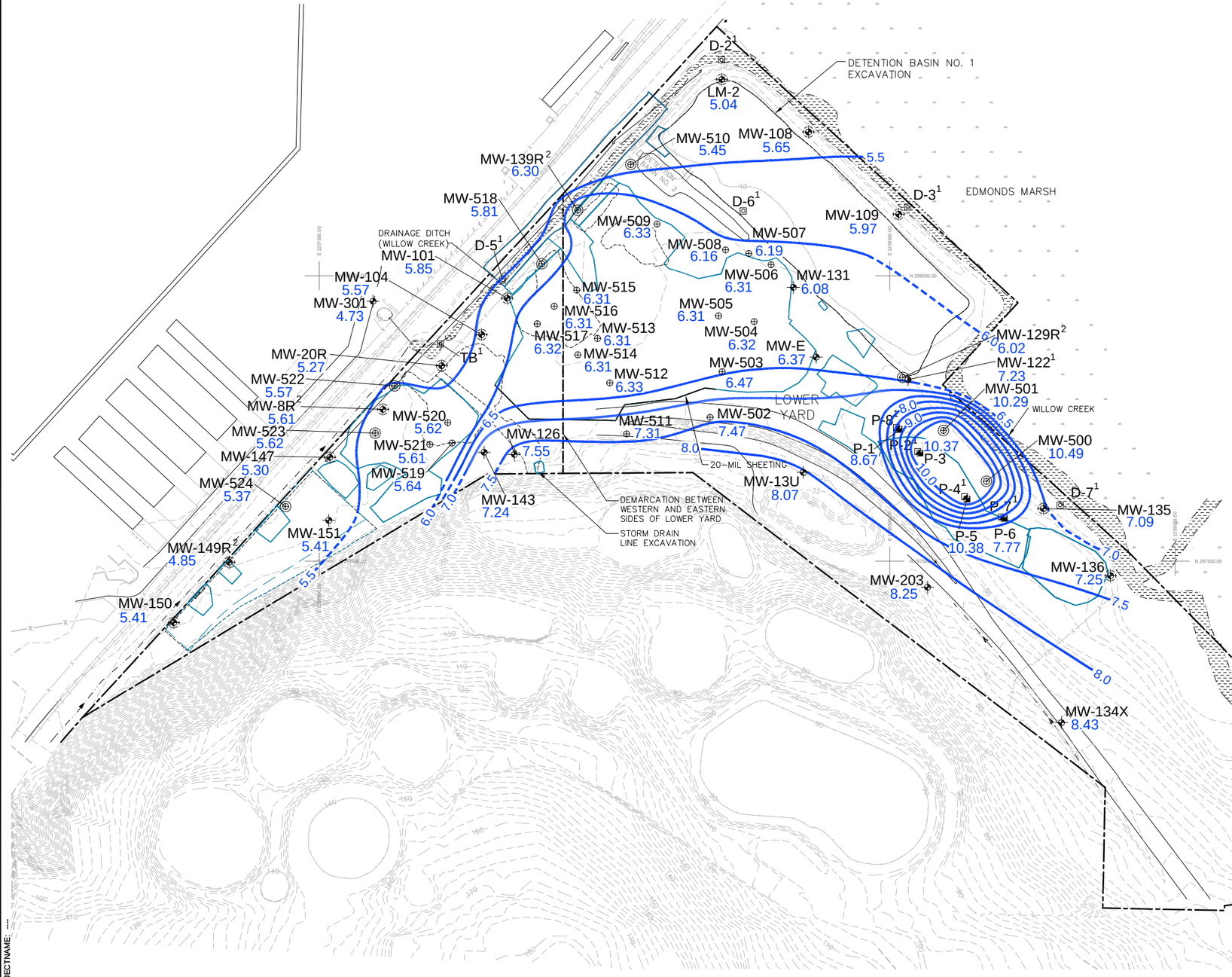

LEGEND:

- 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
- STAFF GAUGE
- PIEZOMETER
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- LOWER YARD PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- 8.0 — GROUNDWATER CONTOUR (DASHED WHERE INFERRED) 0.5 FEET INTERVAL
- 7.09 — GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

NOTES:

1. NOT USED TO DEVELOP CONTOURS, AUGUST 3, 2009.
2. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
3. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

AUGUST 3, 2009 GROUNDWATER ELEVATIONS AND CONTOURS

ARCADIS

FIGURE 9

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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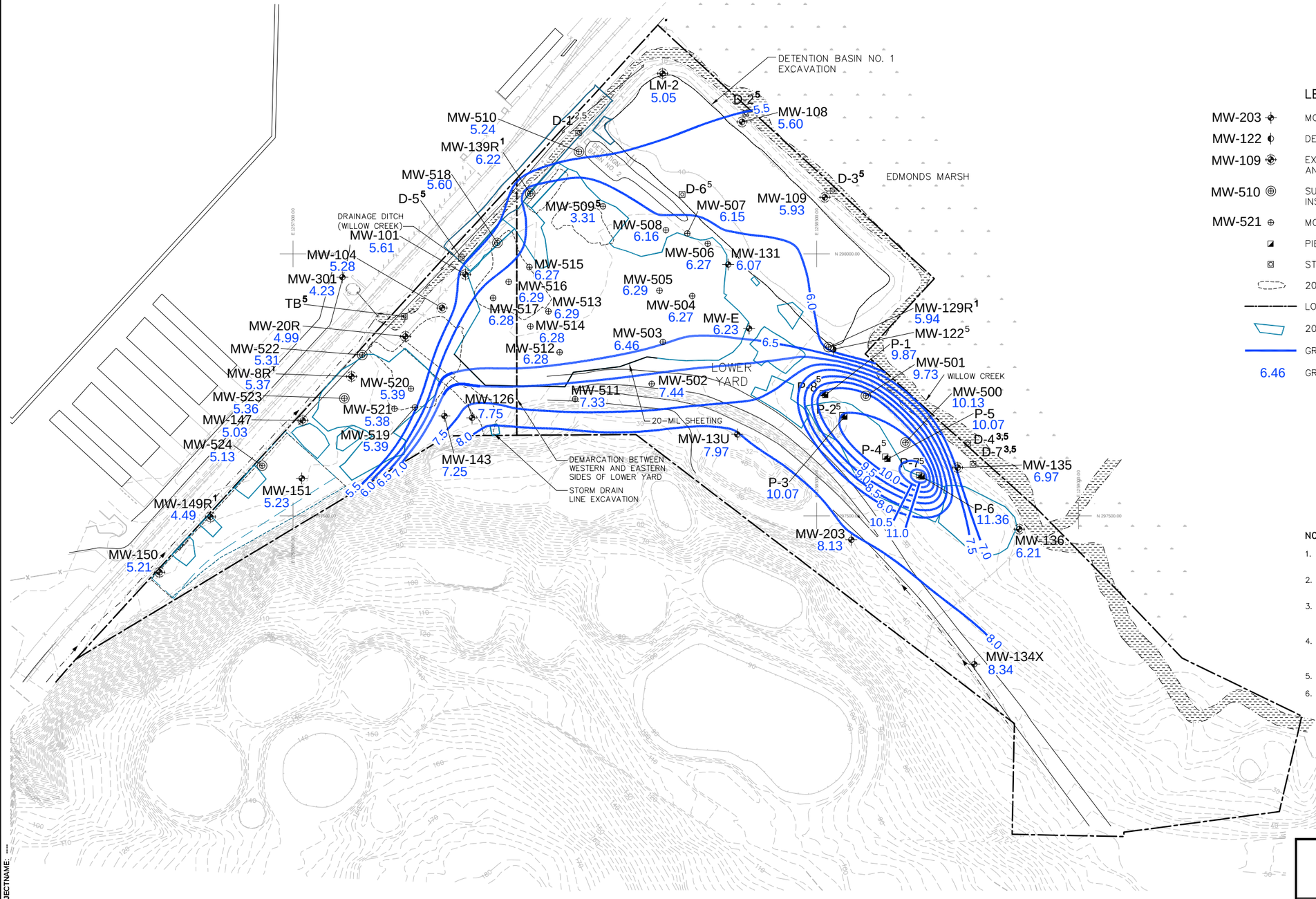

LEGEND:

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
	PIEZOMETER
	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
	GROUNDWATER CONTOUR (0.5 FEET INTERVAL)
6.46	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

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. NOT USED TO DEVELOP GROUNDWATER CONTOURS.
6. 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
EDMONDS, WASHINGTON

AUGUST 17, 2009 GROUNDWATER ELEVATIONS AND CONTOURS

ARCADIS

FIGURE
10

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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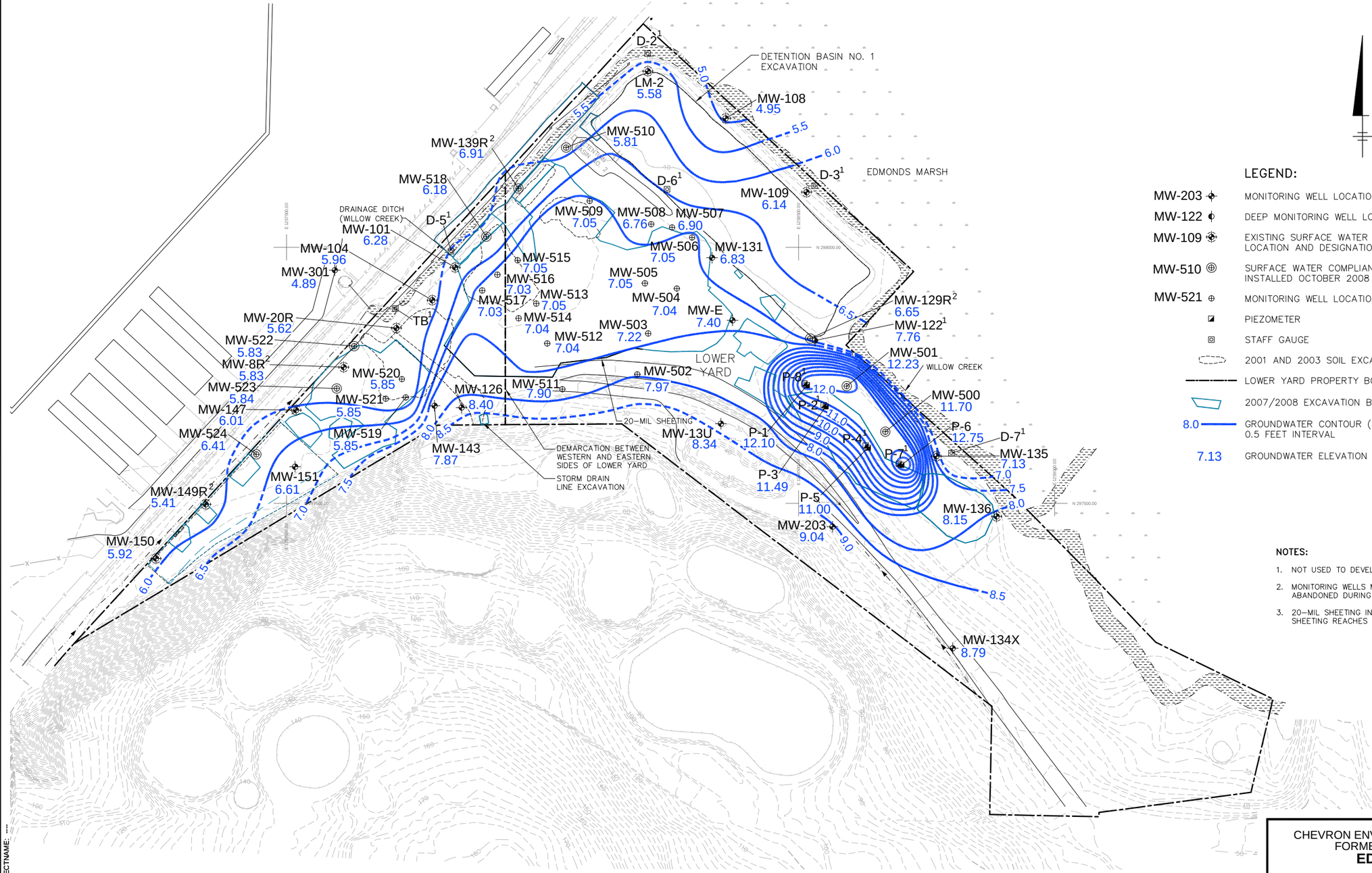

LEGEND:

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
◪	PIEZOMETER
⊡	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
8.0	GROUNDWATER CONTOUR (DASHED WHERE INFERRED) 0.5 FEET INTERVAL
7.13	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

NOTES:

1. NOT USED TO DEVELOP CONTOURS, OCTOBER 29, 2009.
2. MONITORING WELLS MW-129R, MW-139R, MW-8R, AND MW-149R WERE ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
3. 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
EDMONDS, WASHINGTON

OCTOBER 29, 2009 GROUNDWATER ELEVATIONS AND CONTOURS

ARCADIS

FIGURE
11

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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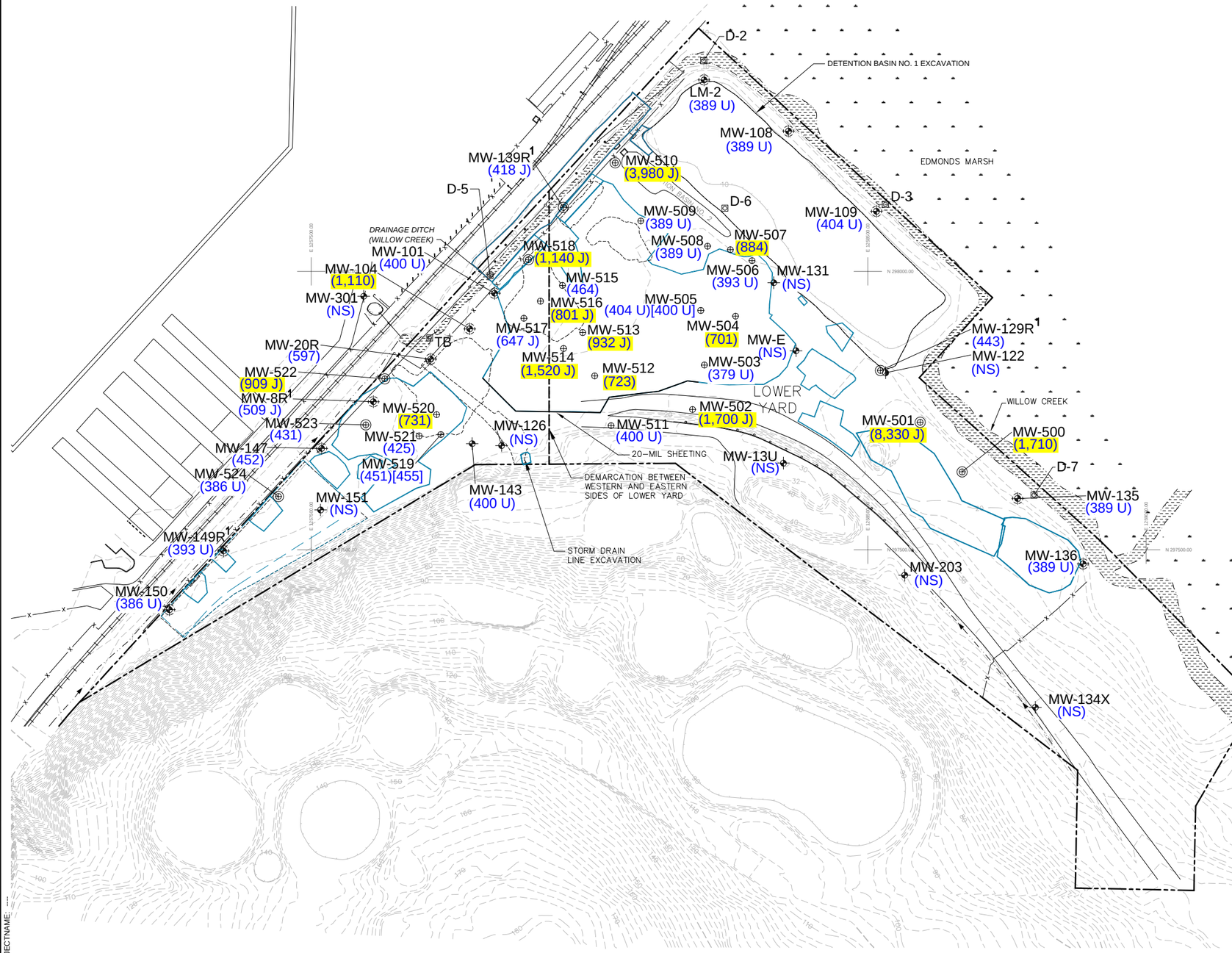

LEGEND:

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

NOTES:

1. MONITORING WELL WAS ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. 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.
3. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
4. HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L.
5. NS = NOT SAMPLED.
6. U = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
7. J = INDICATES AN ESTIMATED VALUE.
8. [ ] INDICATES DUPLICATE SAMPLE.
9. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

OCTOBER 2008
TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
12

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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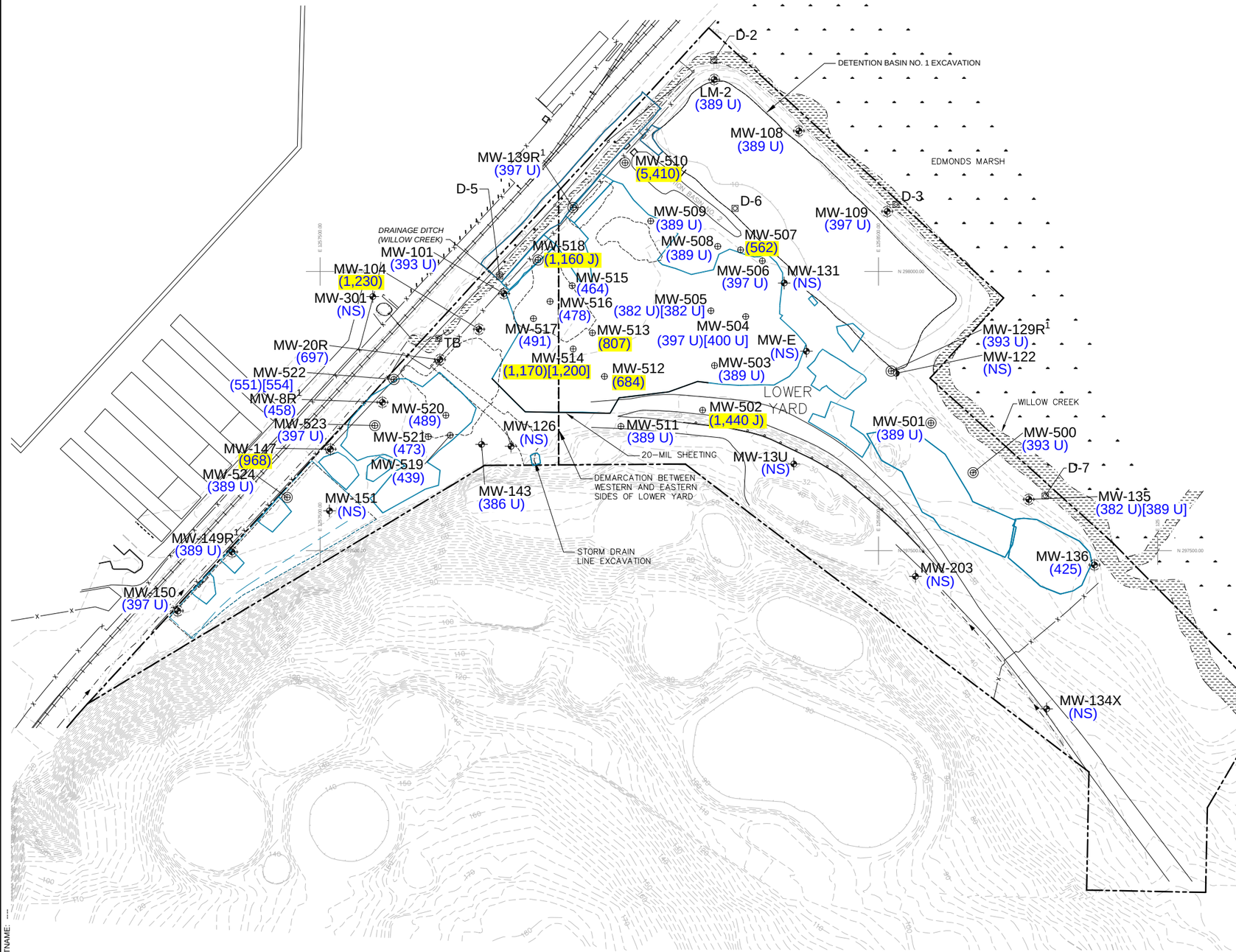

LEGEND:

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

NOTES:

1. MONITORING WELL WAS ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. 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.
3. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
4. HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L.
5. NS = NOT SAMPLED.
6. U = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
7. J = INDICATES AN ESTIMATED VALUE.
8. [ ] INDICATES DUPLICATE SAMPLE.
9. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

DECEMBER 2008
TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
13

CITY:(TAMPA, FL) SYRACUSE, NY GROUP: ENV/CAD DB:(J. RICHARDS), A. SAMOS, P. LISTER PM: R. ANDRESEN TM: D. RASAR LYR:ON=*;OFF=REF, (FRZ)
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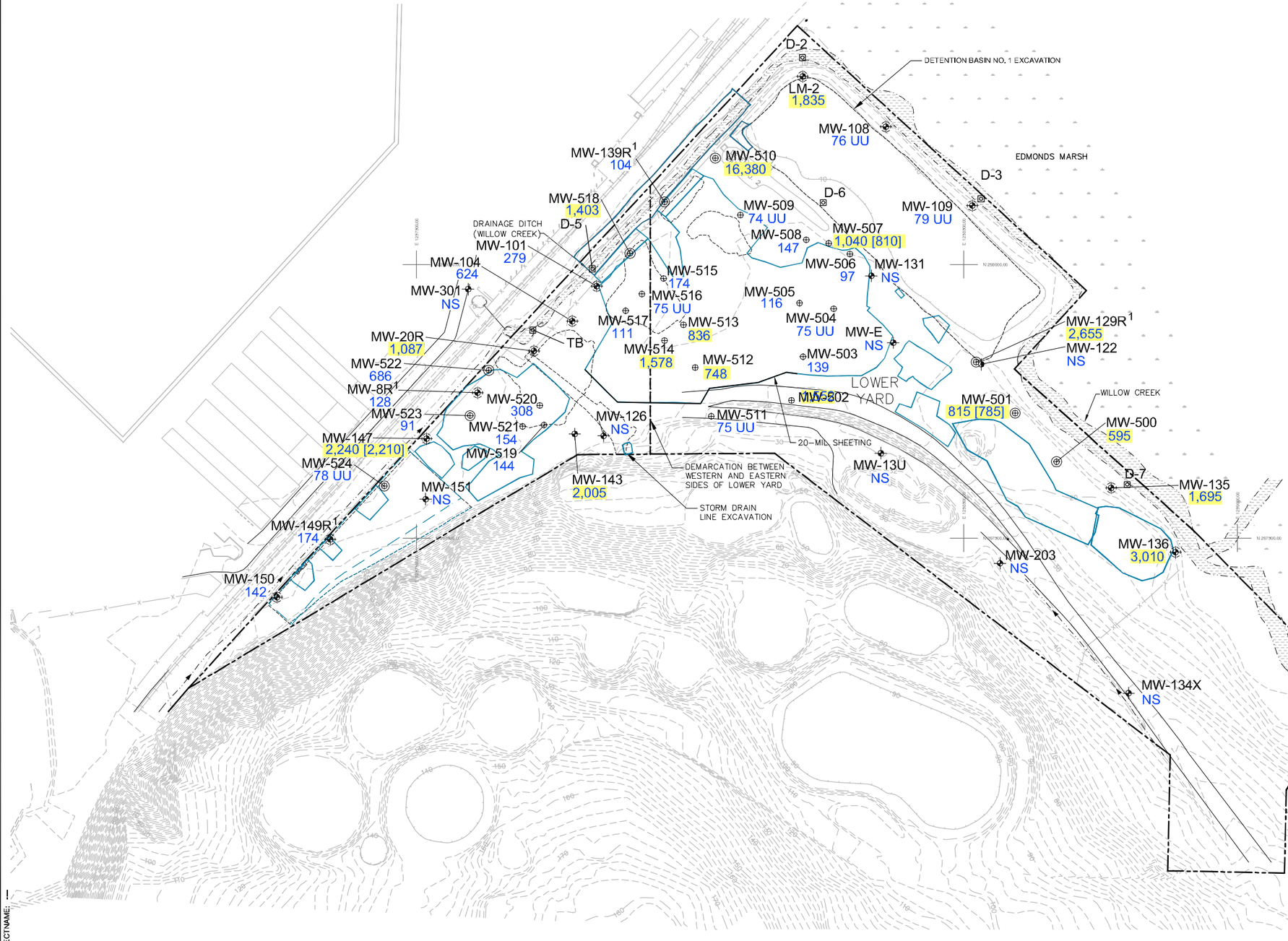

LEGEND:

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

NOTES:

1. MONITORING WELL WAS ABANDONED DURING INTERIM ACTION AND REPLACED IN OCTOBER 2008.
2. 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.
3. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
4. HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L.
5. NS = NOT SAMPLED.
6. UU = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
7. J = INDICATES AN ESTIMATED VALUE.
8. [ ] INDICATES DUPLICATE SAMPLE.
9. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

FEBRUARY 2009
TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
14

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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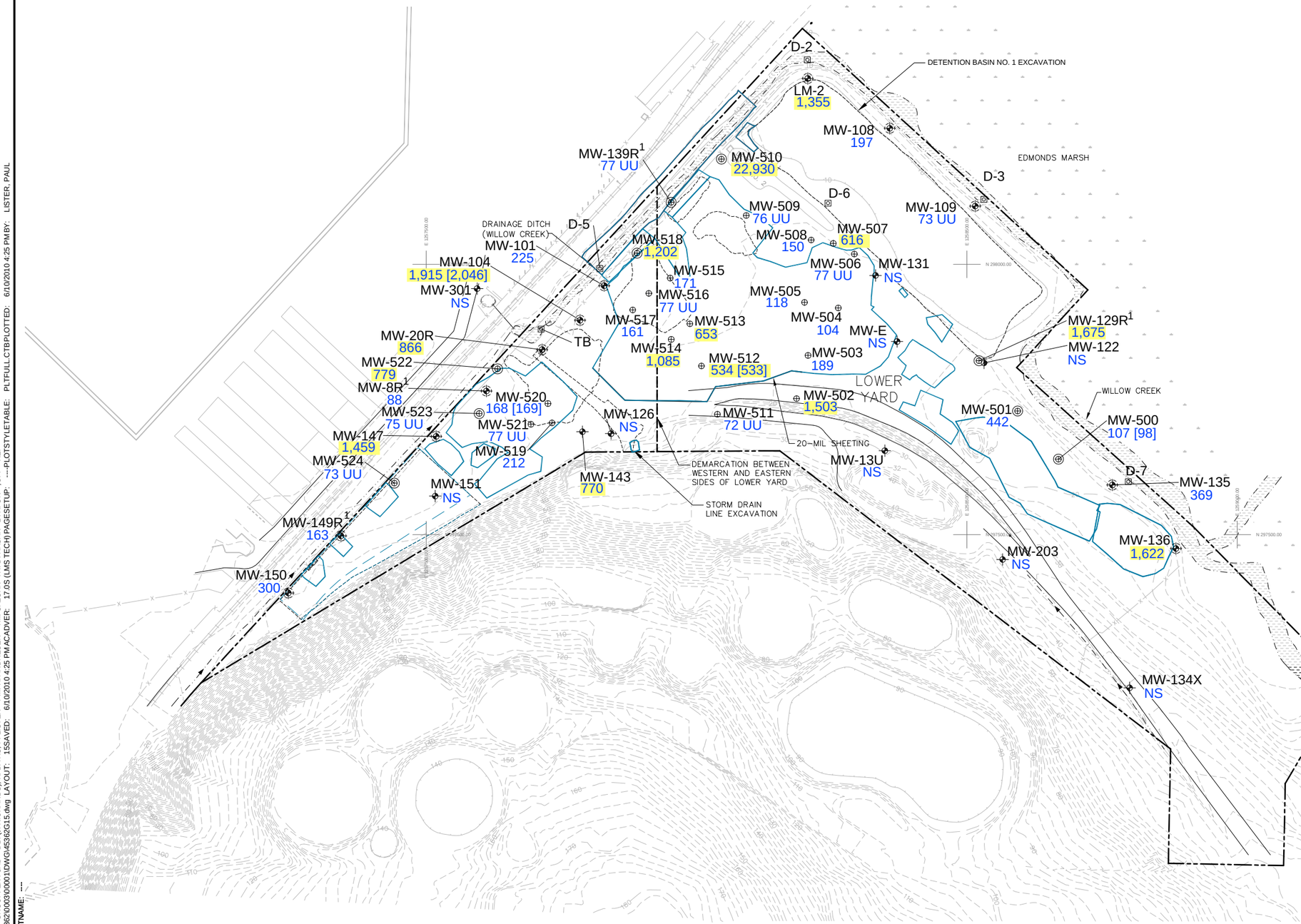

LEGEND:

- 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
- 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. 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.
3. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
4. HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L.
5. NS = NOT SAMPLED.
6. UU = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
7. J = INDICATES AN ESTIMATED VALUE.
8. [ ] INDICATES DUPLICATE SAMPLE.
9. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

APRIL 2009
TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
15

CITY: (TAMPA, FL) SYRACUSE, NY GROUP: ENVCAD DB: (J. RICHARDS), K. DAVIS, P. LISTER PM: R. ANDRESEN TM: S. ZORN TR: D. RASAR LYR: D. RASAR LYR: ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIB\00453620003900001\DWG\45362G15.dwg LAYOUT: 15SAVED: 6/10/2010 4:25 PM BY: LISTER, PAUL
(LMS TECH) PAGESETUP: ---PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 6/10/2010 4:25 PM BY: LISTER, PAUL
IMAGES: PROJECTNAME: ---
XREFS:
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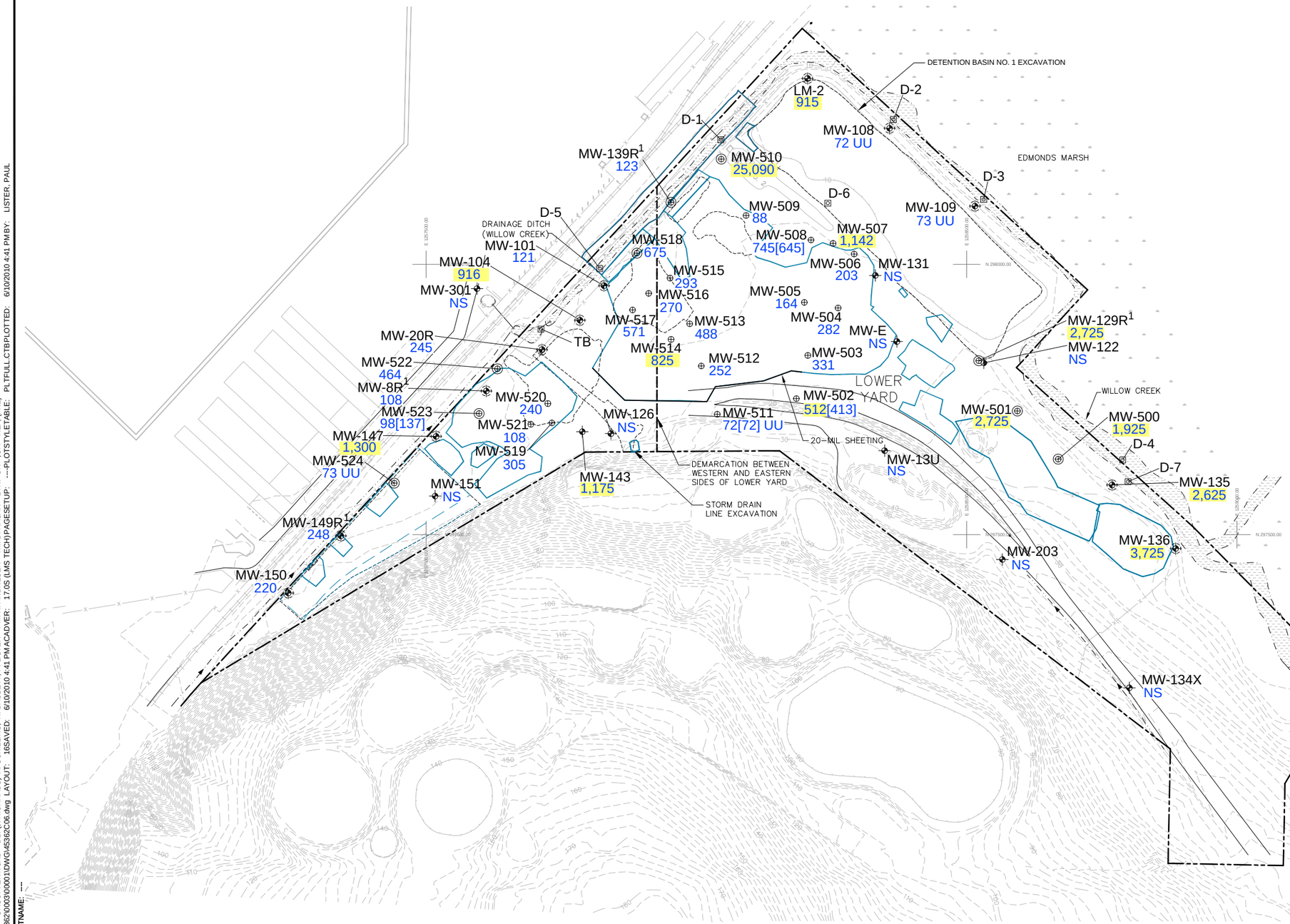
45362X01
45362X02



LEGEND:

MW-203	MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-109	EXISTING SURFACE WATER COMPLIANCE MONITORING WEL LOCATION AND DESIGNATION
MW-510	SURFACE WATER COMPLIANCE MONITORING WELL LOCATION INSTALLED OCTOBER 2008
MW-521	MONITORING WELL LOCATION INSTALLED OCTOBER 2008
	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. 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.
3. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L).
4. HIGHLIGHTED CONCENTRATIONS EXCEED THE SITE SPECIFIC TPH CUL FOR EAST SIDE OF THE SITE = 506 µg/L, WEST SIDE OF SITE = 706 µg/L.
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CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

JUNE 2009
TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
16

CITY: (TAMPA, FL) SYRACUSE, NY GROUP: ENV/CAD DB: (J. RICHRADS) A. SCHILLING, R. BASSETT, P. LISTER PM: R. ANDRESEN TM: D. RASAR
G:\ENVCAD\SYRACUSE\ACTIVE\004536200300001\DWG\45362C06.dwg LAYOUT: 16SAVED: 6/10/2010 4:41 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: ---PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 6/10/2010 4:41 PM BY: LISTER, PAUL
XREFS: IMAGES: PROJECTNAME: ---
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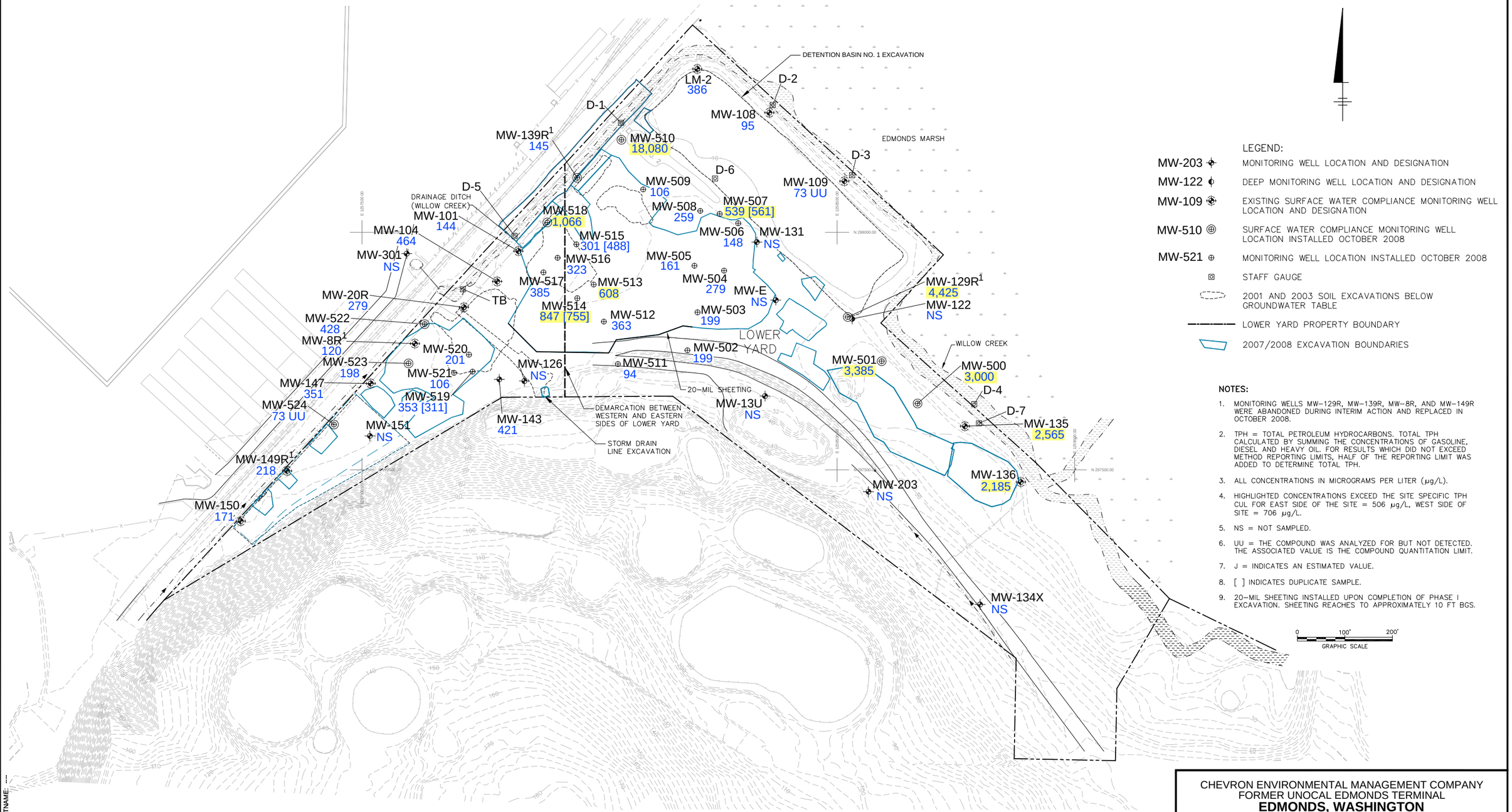
45362X01
45362X02



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

NOTES:

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CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

AUGUST 2009
TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
17

CITY: (TAMPA, FL) SYRACUSE, NY GROUP: ENV/CAD DB: (J. RICHRADS) A. SCHILLING, R. BASSETT, P. LISTER PM: R. ANDRESEN TM: D. RASAR LYR: ON=*;OFF=REF, (FRZ)
G:\ENV\CAD\SYRACUSE\ACTIVE\004536200300001\DWG\045362C01.dwg LAYOUT: 17SAVED: 6/10/2010 4:53 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: ---PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 6/10/2010 4:53 PM BY: LISTER, PAUL
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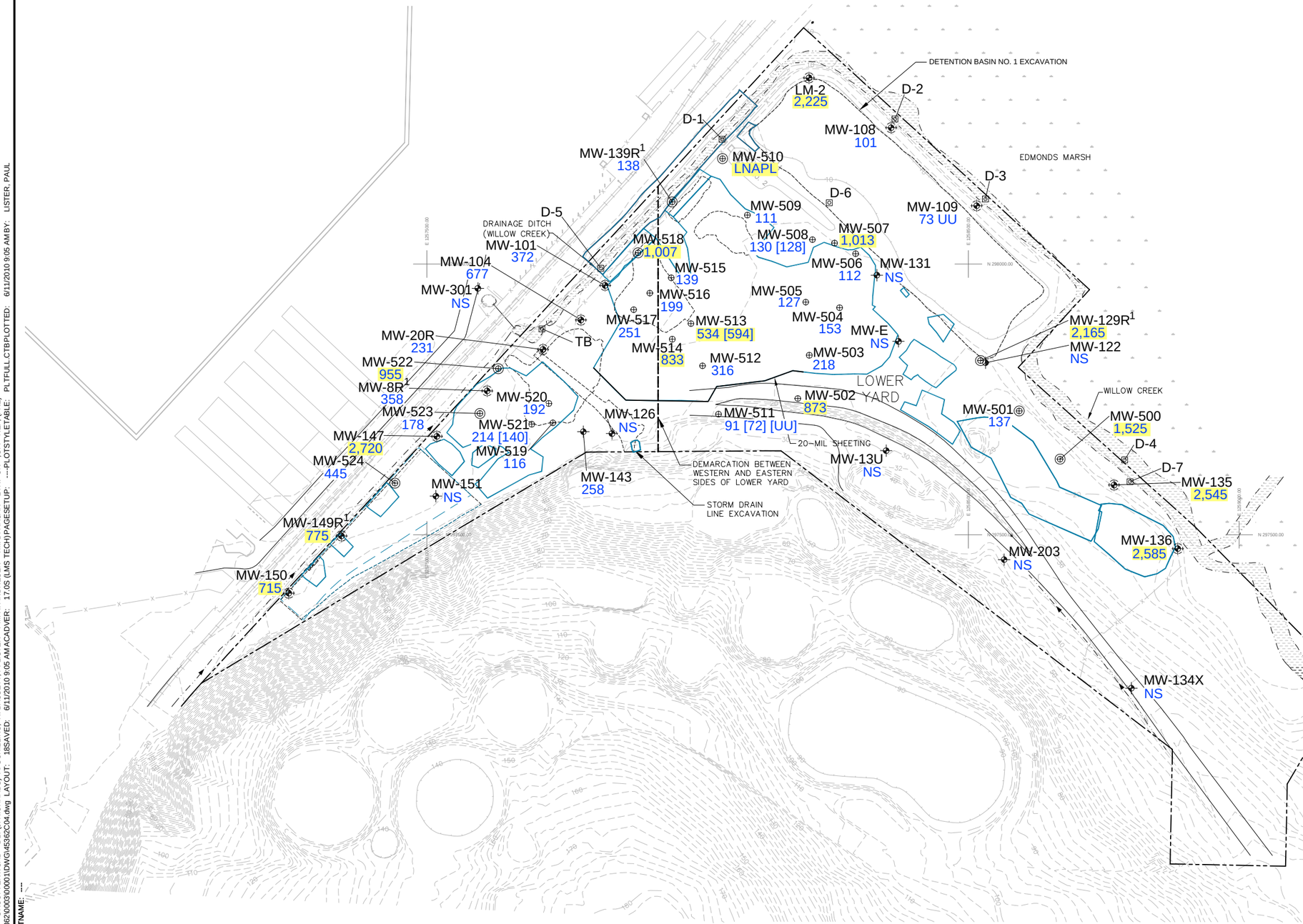
45362X01
45362X02



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
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8. [ ] INDICATES DUPLICATE SAMPLE.
9. 20-MIL SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 10 FT BGS.
10. LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

OCTOBER 2009
TOTAL TPH CONCENTRATIONS

ARCADIS

FIGURE
18

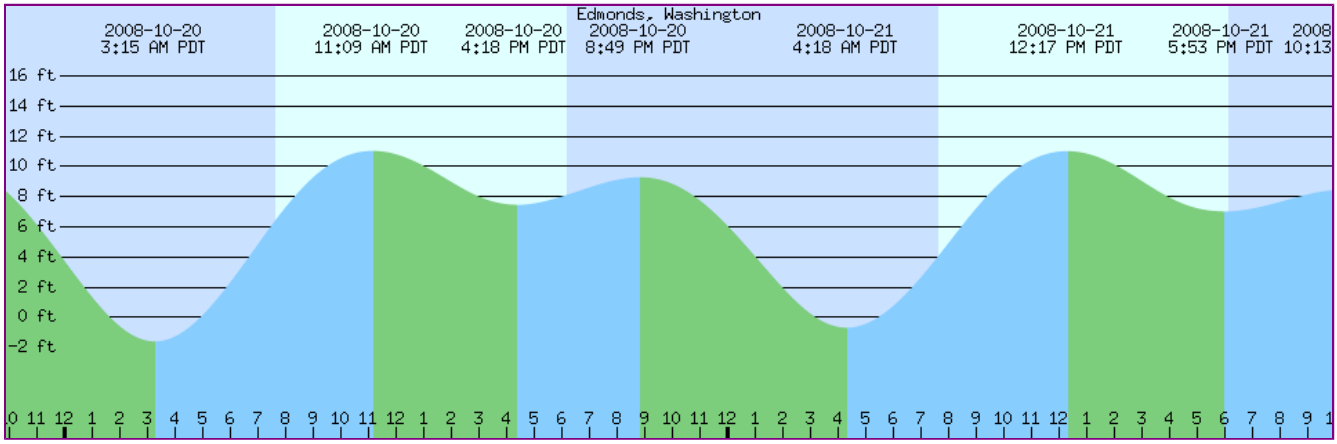
CITY: (TAMPA, FL) SYRACUSE, NY GROUP: ENV/CAD DB: (J. RICHRADS) A. SCHILLING, R. BASSETT, P. LISTER PM: R. ANDRESEN TM: D. RASAR LYR: ON=*;OFF=REF, (FRZ)
G:\ENV\CAD\SYRACUSE\ACT\B0045362\0003\0001\DWG\45362C04.dwg LAYOUT: 18SAVED: 6/11/2010 9:05 AM ACADVER: 17.0S (LMS TECH)PAGESETUP: ---PLOTSTYLETABLE: PLTFULL.CTBPLOTTED: 6/11/2010 9:05 AM BY: LISTER, PAUL
XREFS: IMAGES: PROJECTNAME: ---
45382X00
45382X01
45382X02

ARCADIS

Appendix **A**

Edmonds, Washington Tide Tables

Edmonds, Washington
Requested time: 2008-10-20 12:00 AM PDT



Save this tide table: subscribe (iCal) or download (WinDates or Mozilla)

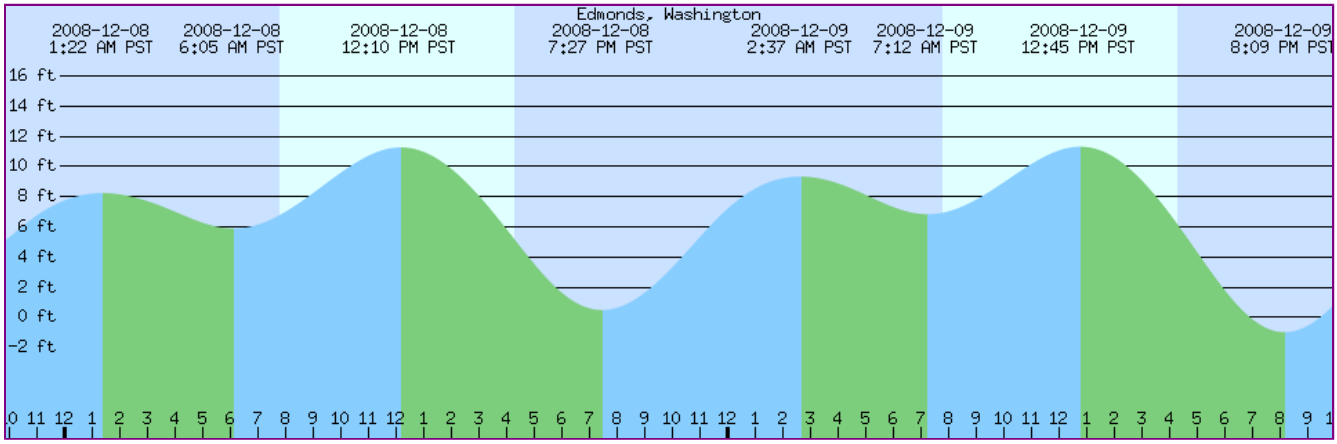
Edmonds, Washington
47.8133° N, 122.3833° W

2008-10-20	3:16 AM PDT	-1.64 feet Low Tide
2008-10-20	7:36 AM PDT	Sunrise
2008-10-20	11:09 AM PDT	10.98 feet High Tide
2008-10-20	4:18 PM PDT	7.56 feet Low Tide
2008-10-20	6:10 PM PDT	Sunset
2008-10-20	8:49 PM PDT	9.23 feet High Tide
2008-10-21	4:18 AM PDT	-0.73 feet Low Tide
2008-10-21	4:56 AM PDT	Last Quarter
2008-10-21	7:38 AM PDT	Sunrise
2008-10-21	12:17 PM PDT	10.96 feet High Tide
2008-10-21	5:53 PM PDT	7.10 feet Low Tide
2008-10-21	6:09 PM PDT	Sunset
2008-10-21	10:13 PM PDT	8.41 feet High Tide
2008-10-22	5:27 AM PDT	0.27 feet Low Tide
2008-10-22	7:40 AM PDT	Sunrise
2008-10-22	1:16 PM PDT	11.04 feet High Tide
2008-10-22	6:07 PM PDT	Sunset
2008-10-22	7:21 PM PDT	6.02 feet Low Tide
2008-10-22	11:58 PM PDT	7.93 feet High Tide
2008-10-23	6:39 AM PDT	1.23 feet Low Tide
2008-10-23	7:41 AM PDT	Sunrise
2008-10-23	2:06 PM PDT	11.12 feet High Tide
2008-10-23	6:05 PM PDT	Sunset
2008-10-23	8:24 PM PDT	4.62 feet Low Tide
2008-10-24	1:41 AM PDT	8.04 feet High Tide

From sailwx.info: show nearby weather conditions

From sailwx.info: show nearby shipping

Edmonds, Washington
Requested time: 2008-12-08 12:00 AM PST



Save this tide table: subscribe (iCal) or download (WinDates or Mozilla)

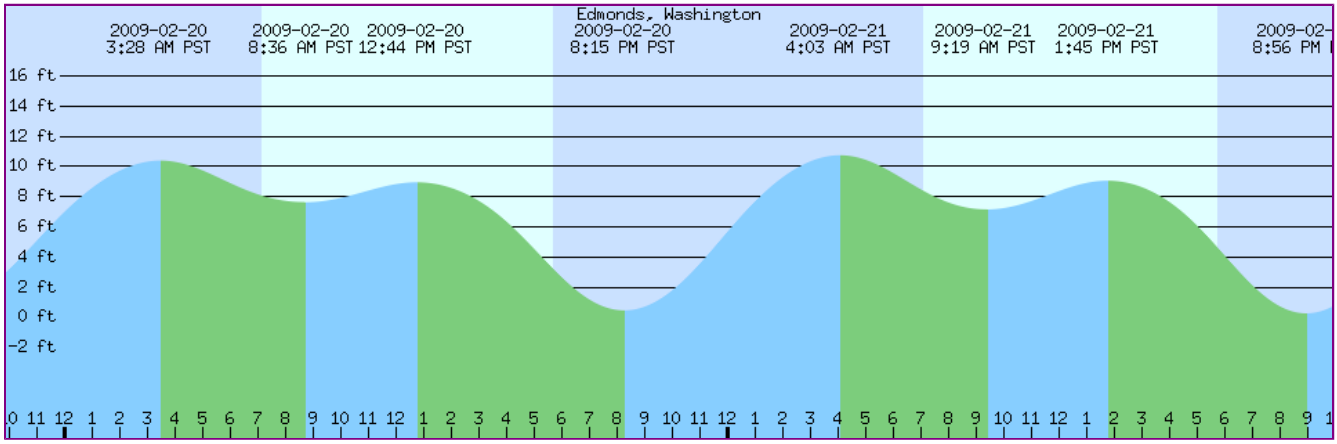
Edmonds, Washington
47.8133° N, 122.3833° W

2008-12-08	1:22 AM PST	8.19 feet	High Tide
2008-12-08	6:05 AM PST	5.92 feet	Low Tide
2008-12-08	7:46 AM PST	Sunrise	
2008-12-08	12:10 PM PST	11.21 feet	High Tide
2008-12-08	4:17 PM PST	Sunset	
2008-12-08	7:27 PM PST	0.44 feet	Low Tide
2008-12-09	2:37 AM PST	9.28 feet	High Tide
2008-12-09	7:12 AM PST	6.89 feet	Low Tide
2008-12-09	7:47 AM PST	Sunrise	
2008-12-09	12:45 PM PST	11.26 feet	High Tide
2008-12-09	4:17 PM PST	Sunset	
2008-12-09	8:09 PM PST	-1.03 feet	Low Tide
2008-12-10	3:39 AM PST	10.39 feet	High Tide
2008-12-10	7:48 AM PST	Sunrise	
2008-12-10	8:16 AM PST	7.59 feet	Low Tide
2008-12-10	1:24 PM PST	11.36 feet	High Tide
2008-12-10	4:16 PM PST	Sunset	
2008-12-10	8:52 PM PST	-2.30 feet	Low Tide
2008-12-11	4:32 AM PST	11.34 feet	High Tide
2008-12-11	7:49 AM PST	Sunrise	
2008-12-11	9:15 AM PST	8.02 feet	Low Tide
2008-12-11	2:07 PM PST	11.47 feet	High Tide
2008-12-11	4:17 PM PST	Sunset	
2008-12-11	9:37 PM PST	-3.24 feet	Low Tide
2008-12-12	5:21 AM PST	12.05 feet	High Tide

From sailwx.info: show nearby weather conditions

From sailwx.info: show nearby shipping

Edmonds, Washington
Requested time: 2009-02-20 12:00 AM PST



Save this tide table: subscribe (iCal) or download (WinDates or Mozilla)

Edmonds, Washington
47.8133° N, 122.3833° W

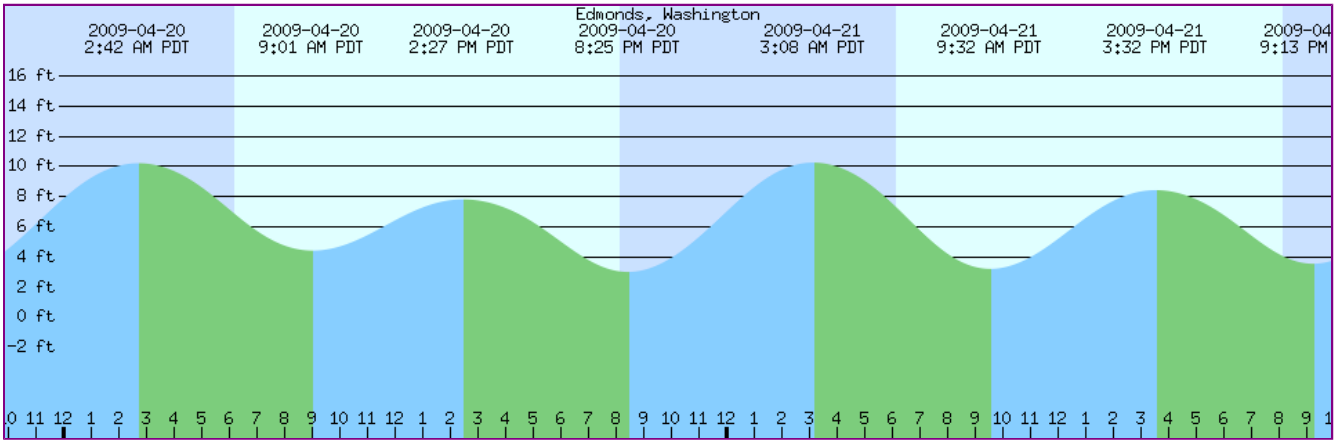
2009-02-20	3:28 AM PST	10.34 feet	High Tide
2009-02-20	7:06 AM PST	Sunrise	
2009-02-20	8:37 AM PST	7.74 feet	Low Tide
2009-02-20	12:44 PM PST	8.90 feet	High Tide
2009-02-20	5:40 PM PST	Sunset	
2009-02-20	8:15 PM PST	0.42 feet	Low Tide
2009-02-21	4:03 AM PST	10.69 feet	High Tide
2009-02-21	7:04 AM PST	Sunrise	
2009-02-21	9:19 AM PST	7.23 feet	Low Tide
2009-02-21	1:45 PM PST	9.01 feet	High Tide
2009-02-21	5:42 PM PST	Sunset	
2009-02-21	8:56 PM PST	0.22 feet	Low Tide
2009-02-22	4:32 AM PST	10.91 feet	High Tide
2009-02-22	7:02 AM PST	Sunrise	
2009-02-22	9:51 AM PST	6.60 feet	Low Tide
2009-02-22	2:37 PM PST	9.20 feet	High Tide
2009-02-22	5:43 PM PST	Sunset	
2009-02-22	9:32 PM PST	0.18 feet	Low Tide
2009-02-23	4:53 AM PST	11.05 feet	High Tide
2009-02-23	7:00 AM PST	Sunrise	
2009-02-23	10:20 AM PST	5.84 feet	Low Tide
2009-02-23	3:25 PM PST	9.41 feet	High Tide
2009-02-23	5:45 PM PST	Sunset	
2009-02-23	10:06 PM PST	0.34 feet	Low Tide
2009-02-24	5:11 AM PST	11.14 feet	High Tide

From sailwx.info: show nearby weather conditions

From sailwx.info: show nearby shipping

Mobile Geographics Tides for iPhone

Edmonds, Washington
Requested time: 2009-04-20 12:00 AM PDT



Save this tide table: subscribe (iCal) or download (WinDates or Mozilla)

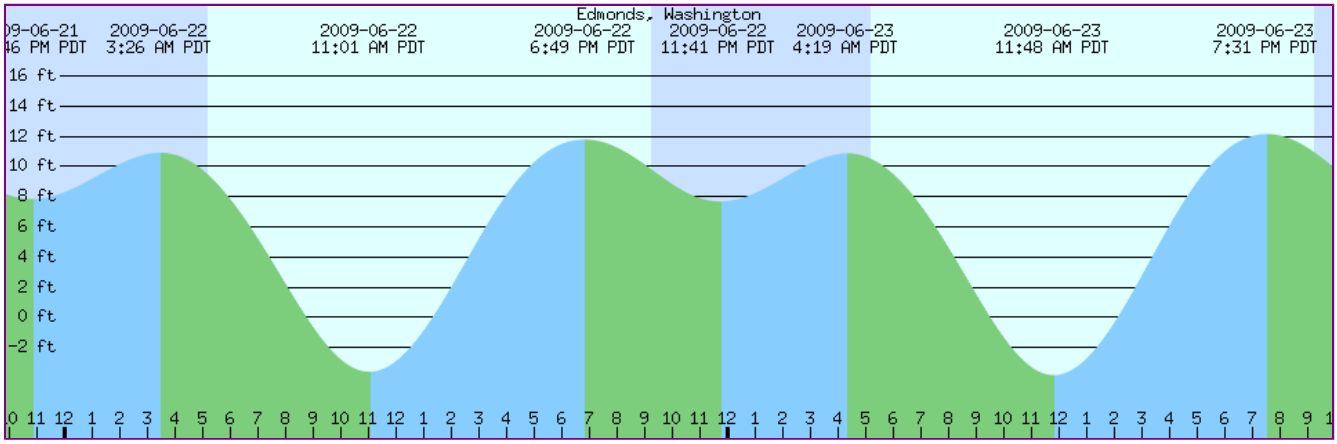
Edmonds, Washington
47.8133° N, 122.3833° W

2009-04-20	2:42 AM PDT	10.16 feet	High Tide
2009-04-20	6:10 AM PDT	Sunrise	
2009-04-20	9:01 AM PDT	4.38 feet	Low Tide
2009-04-20	2:27 PM PDT	7.77 feet	High Tide
2009-04-20	8:07 PM PDT	Sunset	
2009-04-20	8:25 PM PDT	2.96 feet	Low Tide
2009-04-21	3:08 AM PDT	10.21 feet	High Tide
2009-04-21	6:08 AM PDT	Sunrise	
2009-04-21	9:32 AM PDT	3.17 feet	Low Tide
2009-04-21	3:32 PM PDT	8.38 feet	High Tide
2009-04-21	8:08 PM PDT	Sunset	
2009-04-21	9:13 PM PDT	3.51 feet	Low Tide
2009-04-22	3:30 AM PDT	10.27 feet	High Tide
2009-04-22	6:06 AM PDT	Sunrise	
2009-04-22	10:03 AM PDT	1.89 feet	Low Tide
2009-04-22	4:26 PM PDT	9.10 feet	High Tide
2009-04-22	8:09 PM PDT	Sunset	
2009-04-22	9:58 PM PDT	4.09 feet	Low Tide
2009-04-23	3:53 AM PDT	10.36 feet	High Tide
2009-04-23	6:05 AM PDT	Sunrise	
2009-04-23	10:34 AM PDT	0.59 feet	Low Tide
2009-04-23	5:16 PM PDT	9.82 feet	High Tide
2009-04-23	8:11 PM PDT	Sunset	
2009-04-23	10:41 PM PDT	4.71 feet	Low Tide
2009-04-24	4:18 AM PDT	10.50 feet	High Tide

From sailwx.info: show nearby weather conditions

From sailwx.info: show nearby shipping

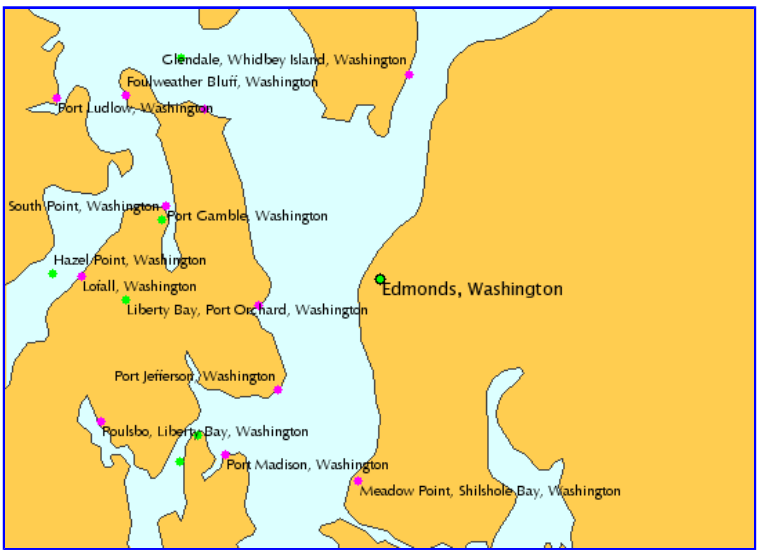
Edmonds, Washington
Requested time: 2009-06-22 12:00 AM PDT



Save this tide table: subscribe (iCal) or download (WinDates or Mozilla)

Edmonds, Washington
47.8133° N, 122.3833° W

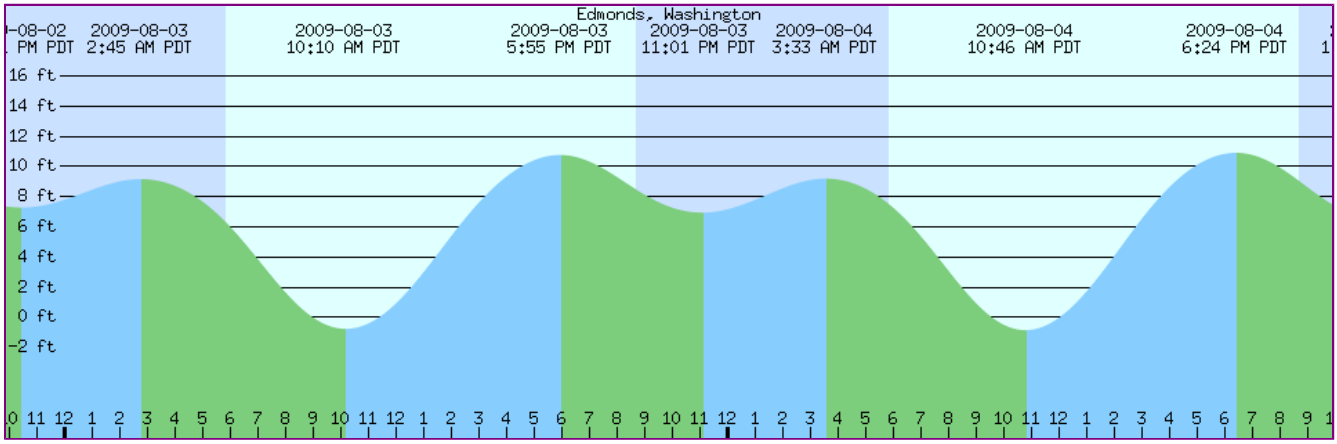
2009-06-22	3:27 AM PDT	10.85 feet	High Tide
2009-06-22	5:11 AM PDT	Sunrise	
2009-06-22	11:01 AM PDT	-3.65 feet	Low Tide
2009-06-22	12:36 PM PDT	New Moon	
2009-06-22	6:49 PM PDT	11.74 feet	High Tide
2009-06-22	9:12 PM PDT	Sunset	
2009-06-22	11:41 PM PDT	7.78 feet	Low Tide
2009-06-23	4:19 AM PDT	10.82 feet	High Tide
2009-06-23	5:11 AM PDT	Sunrise	
2009-06-23	11:48 AM PDT	-3.87 feet	Low Tide
2009-06-23	7:31 PM PDT	12.10 feet	High Tide
2009-06-23	9:12 PM PDT	Sunset	
2009-06-24	12:35 AM PDT	7.35 feet	Low Tide
2009-06-24	5:11 AM PDT	Sunrise	
2009-06-24	5:15 AM PDT	10.58 feet	High Tide
2009-06-24	12:35 PM PDT	-3.60 feet	Low Tide
2009-06-24	8:12 PM PDT	12.28 feet	High Tide
2009-06-24	9:12 PM PDT	Sunset	
2009-06-25	1:30 AM PDT	6.69 feet	Low Tide
2009-06-25	5:12 AM PDT	Sunrise	
2009-06-25	6:15 AM PDT	10.10 feet	High Tide
2009-06-25	1:22 PM PDT	-2.82 feet	Low Tide
2009-06-25	8:52 PM PDT	12.33 feet	High Tide
2009-06-25	9:12 PM PDT	Sunset	
2009-06-26	2:27 AM PDT	5.82 feet	Low Tide



From sailwx.info: show nearby weather conditions

From sailwx.info: show nearby shipping

Edmonds, Washington
Requested time: 2009-08-03 12:00 AM PDT



Save this tide table: subscribe (iCal) or download (WinDates or Mozilla)

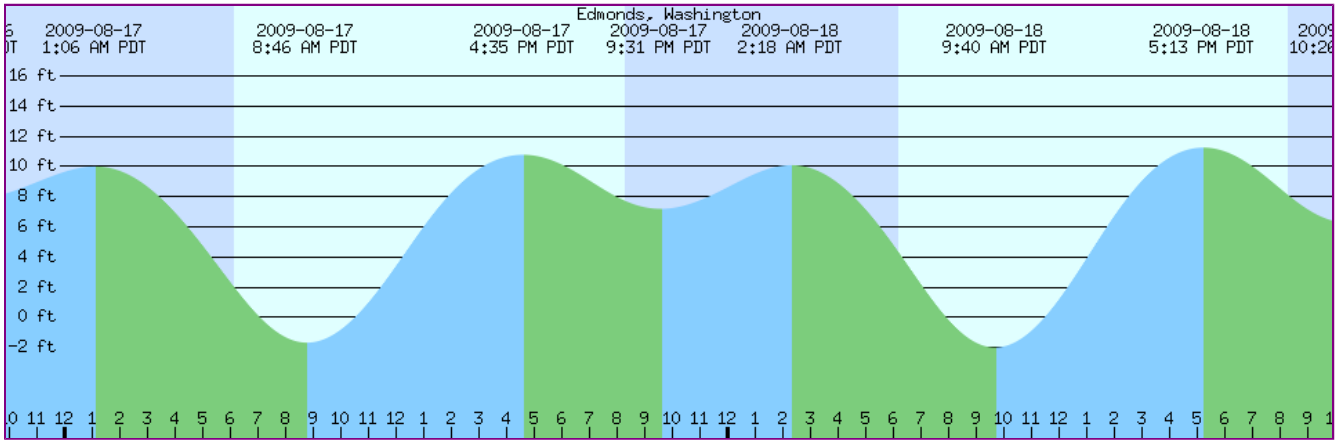
Edmonds, Washington
47.8133° N, 122.3833° W

2009-08-03 2:45 AM PDT	9.11 feet	High Tide
2009-08-03 5:49 AM PDT	Sunrise	
2009-08-03 10:10 AM PDT	-0.81 feet	Low Tide
2009-08-03 5:55 PM PDT	10.71 feet	High Tide
2009-08-03 8:41 PM PDT	Sunset	
2009-08-03 11:01 PM PDT	7.01 feet	Low Tide
2009-08-04 3:33 AM PDT	9.14 feet	High Tide
2009-08-04 5:50 AM PDT	Sunrise	
2009-08-04 10:46 AM PDT	-0.89 feet	Low Tide
2009-08-04 6:24 PM PDT	10.85 feet	High Tide
2009-08-04 8:39 PM PDT	Sunset	
2009-08-04 11:34 PM PDT	6.56 feet	Low Tide
2009-08-05 4:17 AM PDT	9.20 feet	High Tide
2009-08-05 5:51 AM PDT	Sunrise	
2009-08-05 11:20 AM PDT	-0.83 feet	Low Tide
2009-08-05 5:56 PM PDT	Full Moon	
2009-08-05 6:47 PM PDT	10.92 feet	High Tide
2009-08-05 8:38 PM PDT	Sunset	
2009-08-06 12:05 AM PDT	5.98 feet	Low Tide
2009-08-06 5:01 AM PDT	9.23 feet	High Tide
2009-08-06 5:53 AM PDT	Sunrise	
2009-08-06 11:51 AM PDT	-0.58 feet	Low Tide
2009-08-06 7:06 PM PDT	10.97 feet	High Tide
2009-08-06 8:36 PM PDT	Sunset	
2009-08-07 12:37 AM PDT	5.29 feet	Low Tide

From sailwx.info: show nearby weather conditions

From sailwx.info: show nearby shipping

Edmonds, Washington
Requested time: 2009-08-17 12:00 AM PDT



Save this tide table: subscribe (iCal) or download (WinDates or Mozilla)

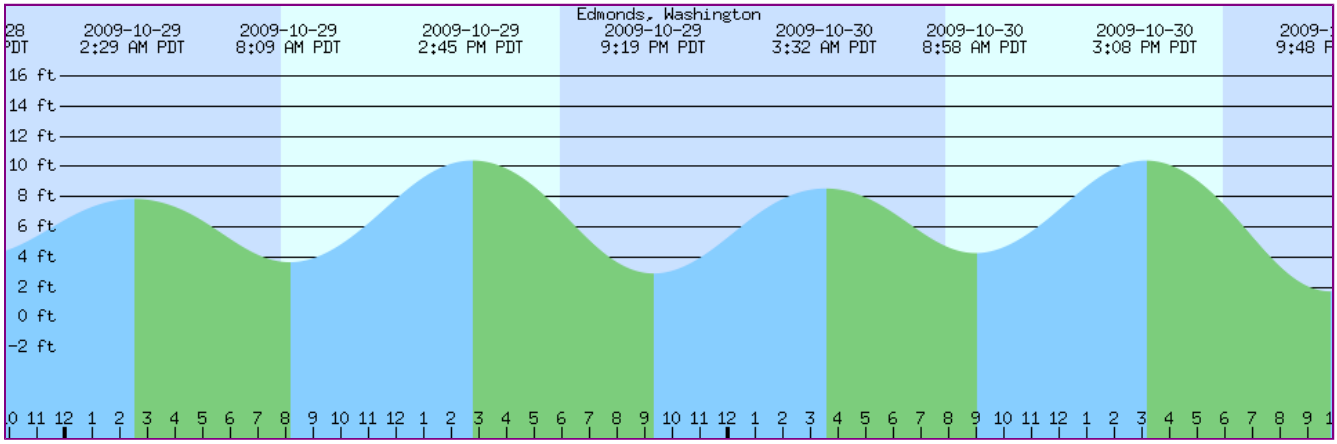
Edmonds, Washington
47.8133° N, 122.3833° W

2009-08-17 1:06 AM PDT	9.95 feet	High Tide
2009-08-17 6:07 AM PDT	Sunrise	
2009-08-17 8:46 AM PDT	-1.72 feet	Low Tide
2009-08-17 4:35 PM PDT	10.72 feet	High Tide
2009-08-17 8:17 PM PDT	Sunset	
2009-08-17 9:31 PM PDT	7.28 feet	Low Tide
2009-08-18 2:18 AM PDT	10.04 feet	High Tide
2009-08-18 6:09 AM PDT	Sunrise	
2009-08-18 9:40 AM PDT	-2.04 feet	Low Tide
2009-08-18 5:13 PM PDT	11.20 feet	High Tide
2009-08-18 8:16 PM PDT	Sunset	
2009-08-18 10:26 PM PDT	6.32 feet	Low Tide
2009-08-19 3:27 AM PDT	10.20 feet	High Tide
2009-08-19 6:10 AM PDT	Sunrise	
2009-08-19 10:30 AM PDT	-1.99 feet	Low Tide
2009-08-19 5:46 PM PDT	11.52 feet	High Tide
2009-08-19 8:14 PM PDT	Sunset	
2009-08-19 11:14 PM PDT	5.15 feet	Low Tide
2009-08-20 3:02 AM PDT	New Moon	
2009-08-20 4:32 AM PDT	10.32 feet	High Tide
2009-08-20 6:11 AM PDT	Sunrise	
2009-08-20 11:17 AM PDT	-1.53 feet	Low Tide
2009-08-20 6:18 PM PDT	11.69 feet	High Tide
2009-08-20 8:12 PM PDT	Sunset	
2009-08-21 12:00 AM PDT	3.89 feet	Low Tide

From sailwx.info: show nearby weather conditions

From sailwx.info: show nearby shipping

Edmonds, Washington
Requested time: 2009-10-29 12:00 AM PDT



Save this tide table: subscribe (iCal) or download (WinDates or Mozilla)

Edmonds, Washington
47.8133° N, 122.3833° W

2009-10-29	2:29 AM PDT	7.80 feet	High Tide
2009-10-29	7:50 AM PDT	Sunrise	
2009-10-29	8:09 AM PDT	3.61 feet	Low Tide
2009-10-29	2:45 PM PDT	10.34 feet	High Tide
2009-10-29	5:55 PM PDT	Sunset	
2009-10-29	9:19 PM PDT	2.86 feet	Low Tide
2009-10-30	3:32 AM PDT	8.49 feet	High Tide
2009-10-30	7:51 AM PDT	Sunrise	
2009-10-30	8:58 AM PDT	4.21 feet	Low Tide
2009-10-30	3:08 PM PDT	10.34 feet	High Tide
2009-10-30	5:54 PM PDT	Sunset	
2009-10-30	9:48 PM PDT	1.68 feet	Low Tide
2009-10-31	4:24 AM PDT	9.23 feet	High Tide
2009-10-31	7:53 AM PDT	Sunrise	
2009-10-31	9:43 AM PDT	4.82 feet	Low Tide
2009-10-31	3:31 PM PDT	10.38 feet	High Tide
2009-10-31	5:52 PM PDT	Sunset	
2009-10-31	10:18 PM PDT	0.51 feet	Low Tide
2009-11-01	4:10 AM PST	9.95 feet	High Tide
2009-11-01	6:54 AM PST	Sunrise	
2009-11-01	9:26 AM PST	5.40 feet	Low Tide
2009-11-01	2:54 PM PST	10.47 feet	High Tide
2009-11-01	4:50 PM PST	Sunset	
2009-11-01	9:50 PM PST	-0.56 feet	Low Tide
2009-11-02	4:54 AM PST	10.59 feet	High Tide

From sailwx.info: show nearby weather conditions

From sailwx.info: show nearby shipping

ARCADIS

Appendix **B**

October 2009 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Appendix **C**

December 2009 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Appendix **D**

February 2009 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Appendix **E**

April 2009 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Appendix **F**

June 2009 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Appendix **G**

August 2009 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Appendix **H**

October 2009 Low Flow Sampling Field Sheets and Laboratory Analytical Reports

(Analytical Reports available on attached CD)

ARCADIS

Appendix I

Monitored Natural Attenuation Linear Regression Analysis

Table 1a
Summary of Statistical Analysis for Locations with CUL Exceedances

Former Unocal Edmonds Terminal
Edmonds, Washington

		Range (µg/L)			Linear Regression Analysis					
Well	Constituent	Minimum	Maximum	CUL	Start	End	Coefficient, R^2	p-value of Correlation	Trend Direction	Significant Trend?
Western Side										
MW-104										
	TPH	464	1,915	706	10/22/2008	10/27/2009	0.25	0.26	Decreasing	No
MW-143										
	TPH	258	2,005	706	10/22/2008	10/27/2009	0.03	0.73	Decreasing	No
MW-147										
	TPH	351	2,720	706	10/21/2008	10/26/2009	0.09	0.52	Increasing	No
MW-149R										
	TPH	163	775	706	10/21/2008	10/26/2009	0.03	0.72	Increasing	No
MW-150										
	TPH	142	715	706	10/21/2008	10/26/2009	0.01	0.86	Increasing	No
MW-20R										
	TPH	231	1,087	706	10/22/2008	10/27/2009	0.54	0.06	Decreasing	Yes
	Benzene	1	55	51	10/22/2008	10/27/2009	0.06	0.60	Decreasing	No
MW-516										
	TPH	75	801	706	10/22/2008	10/27/2009	0.11	0.46	Decreasing	No
MW-518										
	TPH	675	1,403	706	10/22/2008	10/30/2009	0.18	0.34	Decreasing	No
MW-520										
	TPH	168	731	706	10/21/2008	10/27/2009	0.74	0.01	Decreasing	Yes
MW-522										
	TPH	428	955	706	10/21/2008	10/26/2009	0.03	0.73	Decreasing	No
	Total cPAHs	0.00719	0.03560	0.018	10/21/2008	10/26/2009	0.09	0.52	Decreasing	No
Eastern Side										
LM-2										
	TPH	386	2,225	506	10/23/2008	10/30/2009	0.23	0.28	Increasing	No
MW-129R										
	TPH	393	4,425	506	10/24/2008	10/28/2009	0.64	0.03	Increasing	Yes
MW-135										
	TPH	369	2,625	506	10/27/2008	10/29/2009	0.62	0.03	Increasing	Yes
	Total cPAHs	0.00712	0.07928	0.018	10/27/2008	10/29/2009	0.00	0.96	Increasing	No
MW-136										
	TPH	389	3,725	506	10/27/2008	10/29/2009	0.60	0.04	Increasing	Yes
MW-500										
	TPH	107	3,000	506	10/27/2008	10/29/2009	0.11	0.46	Increasing	No
MW-501										
	TPH	137	8,330	506	10/24/2008	10/29/2009	0.13	0.42	Decreasing	No
MW-502										
	TPH	199	1,700	506	10/24/2008	10/28/2009	0.46	0.09	Decreasing	Yes
	Total cPAHs	0.00719	0.07120	0.018	10/24/2008	10/28/2009	0.04	0.66	Increasing	No
MW-504										
	TPH	75	701	506	10/24/2008	10/28/2009	0.16	0.37	Decreasing	No
MW-507										
	TPH	539	1,142	506	10/24/2008	10/28/2009	0.02	0.78	Increasing	No
MW-508										
	TPH	130	745	506	10/24/2008	10/28/2009	0.09	0.51	Decreasing	No
MW-510										
	TPH	3,980	25,090	506	10/23/2008	8/20/2009	0.76	0.02	Increasing	Yes
	Total cPAHs	0.00733	0.14900	0.018	10/23/2008	8/20/2009	0.78	0.02	Decreasing	Yes
MW-512										
	TPH	316	748	506	10/23/2008	10/27/2009	0.23	0.28	Decreasing	No
MW-513										
	TPH	488	932	506	10/23/2008	10/27/2009	0.77	0.01	Decreasing	Yes
MW-514										
	TPH	825	1,578	506	10/23/2008	10/27/2009	0.71	0.02	Decreasing	Yes
MW-515										
	TPH	139	947	506	10/22/2008	10/27/2009	0.50	0.08	Decreasing	Yes

Notes:
TPH = Total petroleum hydrocarbons
cPAH = Carcinogenic Polynuclear Aromatic Hydrocarbons
µg/L = Micrograms per liter
CUL = Cleanup Level

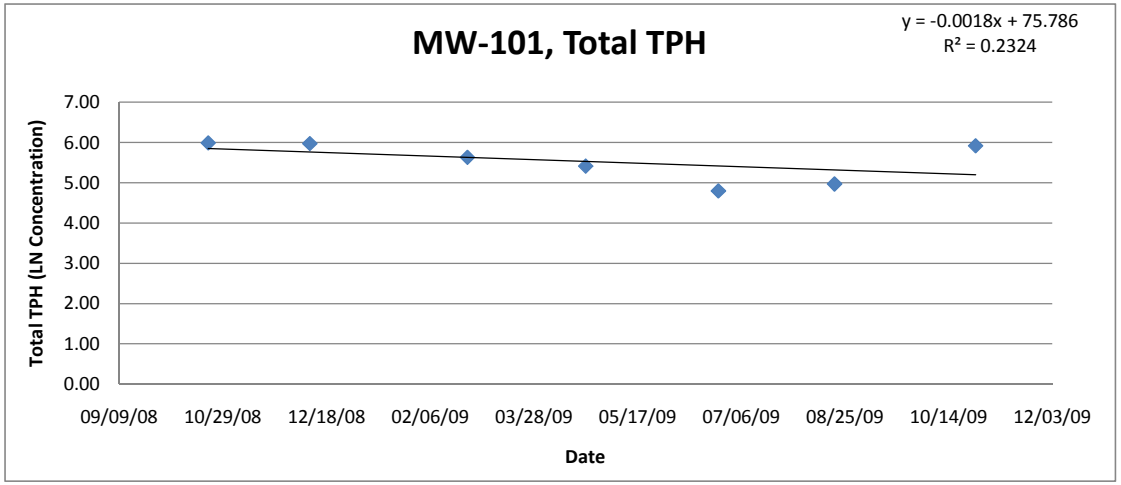
Sample Information
Sample Location **MW-101, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	400	5.99
12/10/08	393	5.97
02/24/09	279	5.63
04/22/09	225	5.41
06/25/09	121	4.80
08/20/09	144	4.97
10/27/09	372	5.92

Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.482093752
R Square	0.232414386
Adjusted R Square	0.078897263
Standard Error	0.46980334
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.334147629	0.33414763	1.51393136	0.273265153
Residual	5	1.10357589	0.22071518		
Total	6	1.43772352			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	75.78641731	57.10161312	1.32722025	0.24180901	-70.99795211	222.5707867
X Variable 1	-0.001759764	0.001430215	-1.23041918	0.27326515	-0.005436249	0.001916721

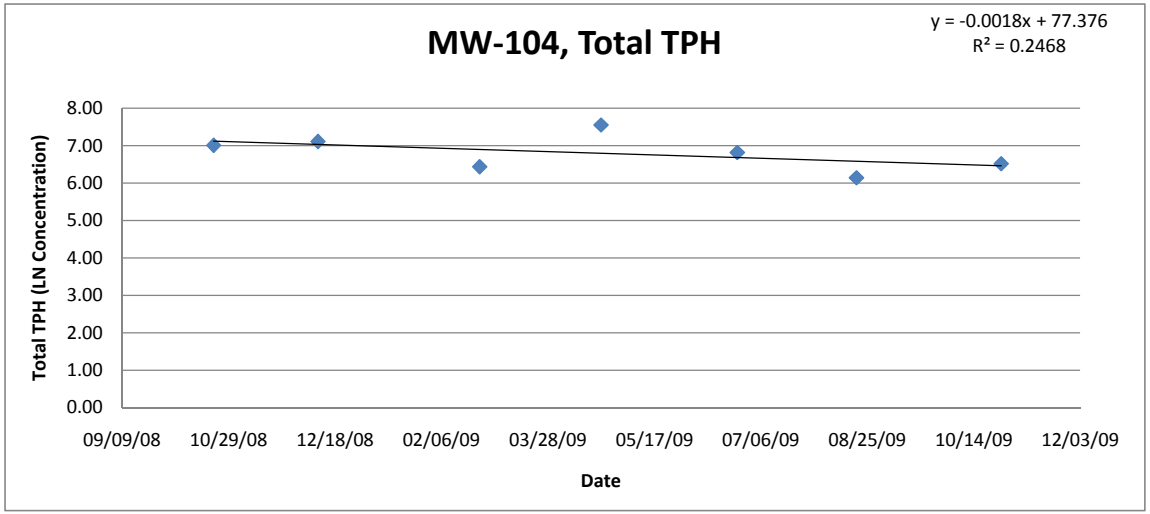
Sample Information
Sample Location **MW-104, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	1,110	7.01
12/10/08	1,230	7.11
02/24/09	624	6.44
04/22/09	1,915	7.56
06/25/09	916	6.82
08/20/09	464	6.14
10/27/09	677	6.52

Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.496808555
R Square	0.246818741
Adjusted R Square	0.096182489
Standard Error	0.453632174
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.337175749	0.33717575	1.63850825	0.256700281
Residual	5	1.028910749	0.20578215		
Total	6	1.366086498			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	77.37593743	55.13611065	1.40336227	0.21945939	-64.35594703	219.1078219
X Variable 1	-0.00176772	0.001380985	-1.28004228	0.25670028	-0.005317656	0.001782216

Sample Information

Sample Location **MW-143, West Side**

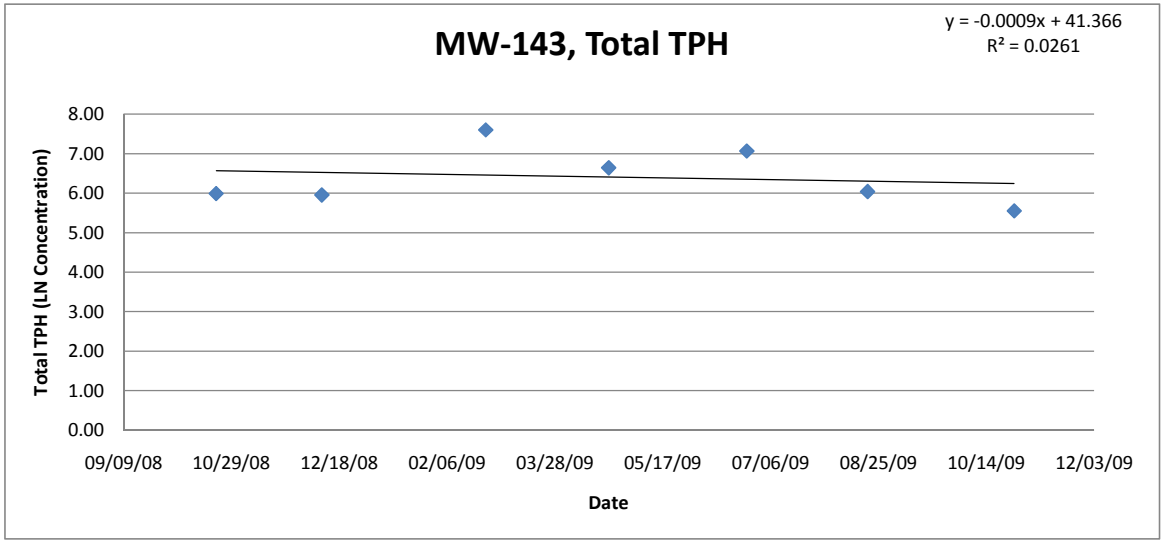
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	400	5.99
12/10/08	386	5.96
02/24/09	2,005	7.60
04/22/09	770	6.65
06/25/09	1,175	7.07
08/20/09	421	6.04
10/27/09	258	5.55

Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.161668169
R Square	0.026136597
Adjusted R Square	-0.168636084
Standard Error	0.78514543
Observations	7

ANOVA

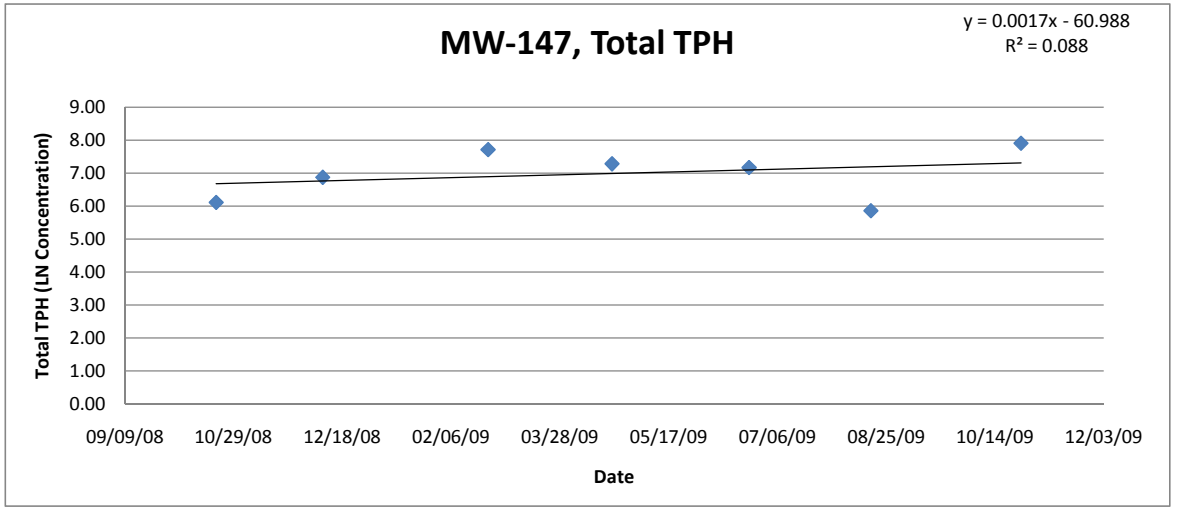
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.082722035	0.08272204	0.13419026	0.729116165
Residual	5	3.082266728	0.61645335		
Total	6	3.164988764			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	41.36625615	95.42944199	0.43347478	0.68273392	-203.9429339	286.6754462
X Variable 1	-0.00087558	0.002390206	-0.36631989	0.72911616	-0.007019801	0.00526864

Sample Information
Sample Location **MW-147, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	452	6.11
12/09/08	968	6.88
02/23/09	2,240	7.71
04/21/09	1,459	7.29
06/23/09	1,300	7.17
08/18/09	351	5.86
10/26/09	2,720	7.91



Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.296598913
R Square	0.087970915
Adjusted R Square	-0.094434902
Standard Error	0.804012057
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.311763702	0.3117637	0.4822813	0.518330295
Residual	5	3.232176939	0.64643539		
Total	6	3.543940641			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-60.9882225	97.88582559	-0.62305469	0.56056274	-312.6117476	190.6353026
X Variable 1	0.001702696	0.00245181	0.69446476	0.5183303	-0.004599882	0.008005273

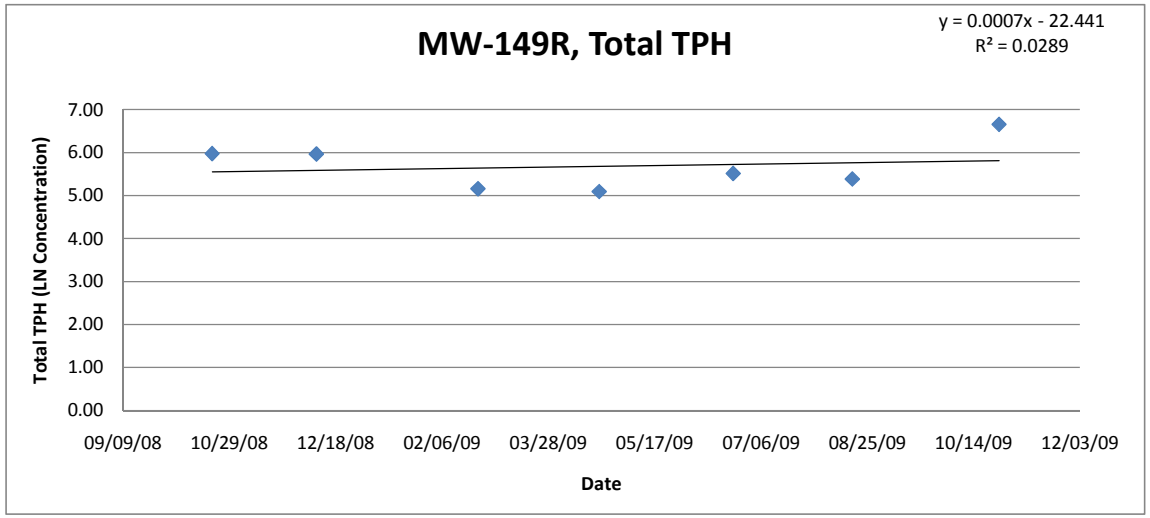
Sample Information

Sample Location **MW-149R, West Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	393	5.97
12/09/08	389	5.96
02/23/09	174	5.16
04/21/09	163	5.09
06/23/09	248	5.51
08/18/09	218	5.38
10/26/09	775	6.65



Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.170114708
R Square	0.028939014
Adjusted R Square	-0.165273183
Standard Error	0.598322722
Observations	7

ANOVA

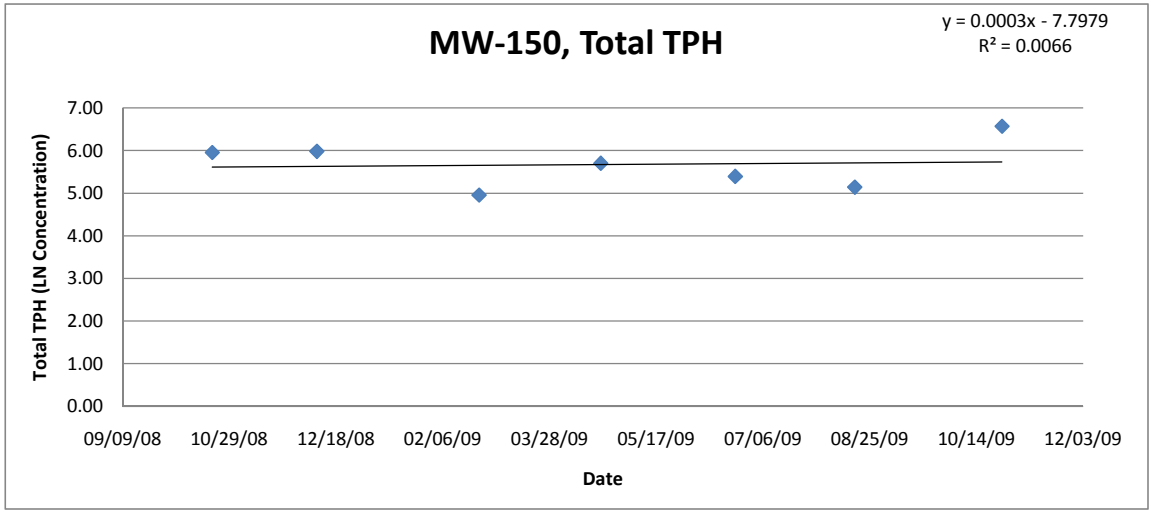
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.053343096	0.0533431	0.14900719	0.715364832
Residual	5	1.789950396	0.35799008		
Total	6	1.843293492			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-22.44135374	72.843825	-0.3080749	0.77044632	-209.6923671	164.8096596
X Variable 1	0.000704309	0.001824567	0.38601449	0.71536483	-0.003985889	0.005394507

Sample Information
Sample Location **MW-150, West Side, POC Well**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	386	5.96
12/09/08	397	5.98
02/23/09	142	4.96
04/21/09	300	5.70
06/23/09	220	5.39
08/18/09	171	5.14
10/26/09	715	6.57



Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.081105227
R Square	0.006578058
Adjusted R Square	-0.192106331
Standard Error	0.608061429
Observations	7

ANOVA

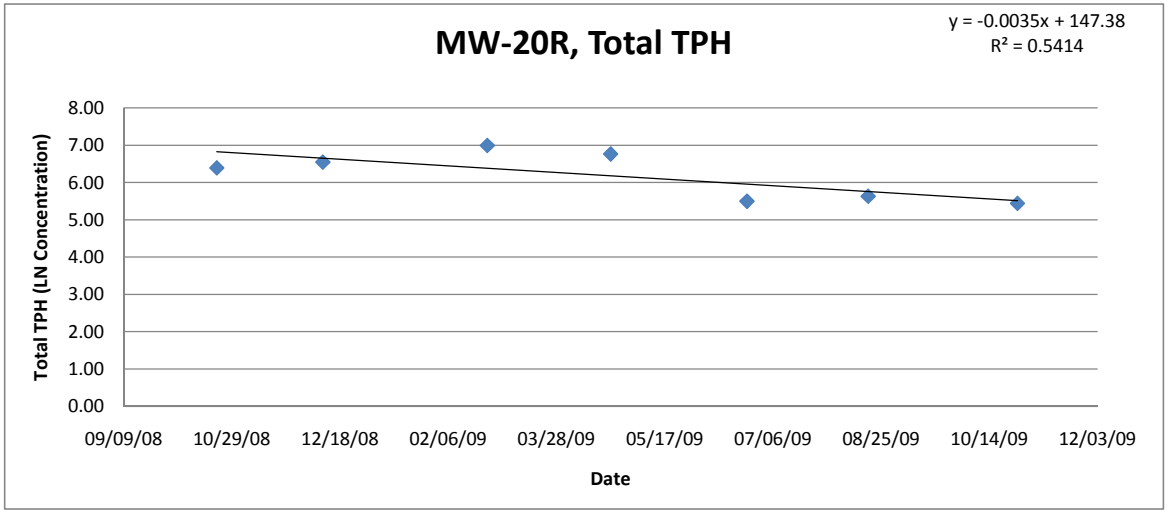
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.012241337	0.01224134	0.03310808	0.862763904
Residual	5	1.848693506	0.3697387		
Total	6	1.860934843			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-7.797877512	74.02948059	-0.10533476	0.92020543	-198.0967155	182.5009605
X Variable 1	0.000337395	0.001854264	0.18195625	0.8627639	-0.004429143	0.005103933

Sample Information
Sample Location **MW-20R, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	597	6.39
12/10/08	697	6.55
02/24/09	1,087	6.99
04/22/09	866	6.76
06/24/09	245	5.50
08/19/09	279	5.63
10/27/09	231	5.44



Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.735823744
R Square	0.541436582
Adjusted R Square	0.449723899
Standard Error	0.477322583
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.345061552	1.34506155	5.90361726	0.059399988
Residual	5	1.139184242	0.22783685		
Total	6	2.484245794			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	147.382021	58.11391138	2.53608848	0.05214164	-2.00454397	296.7685859
X Variable 1	-0.003536676	0.00145558	-2.42973605	0.05939999	-0.007278365	0.000205012

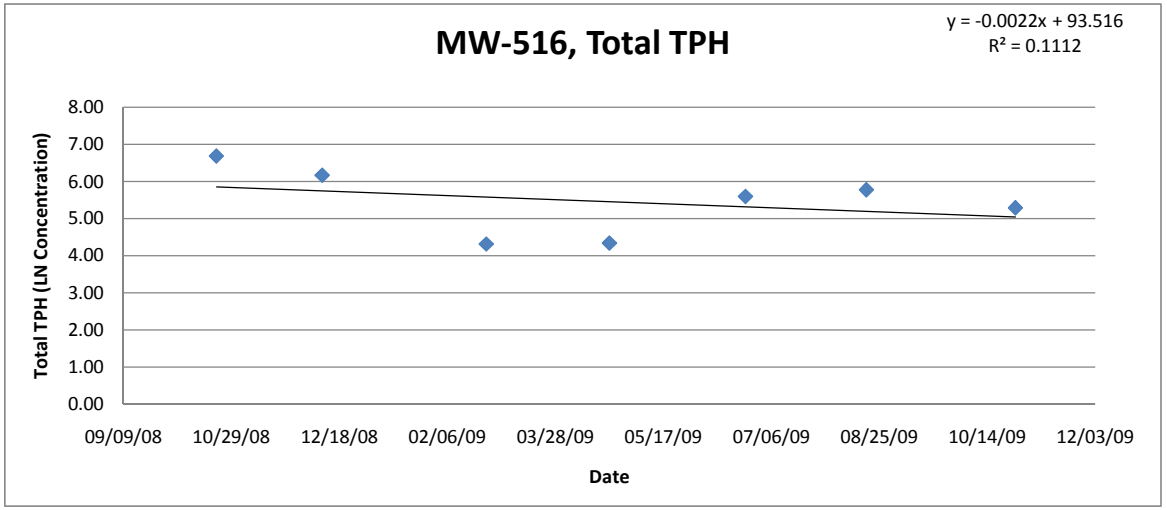
Sample Information

Sample Location **MW-516, West Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	801	6.69
12/10/08	478	6.17
02/24/09	75	4.32
04/22/09	77	4.34
06/24/09	270	5.60
08/19/09	323	5.78
10/27/09	199	5.29



Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.333449319
R Square	0.111188448
Adjusted R Square	-0.066573862
Standard Error	0.914552374
Observations	7

ANOVA

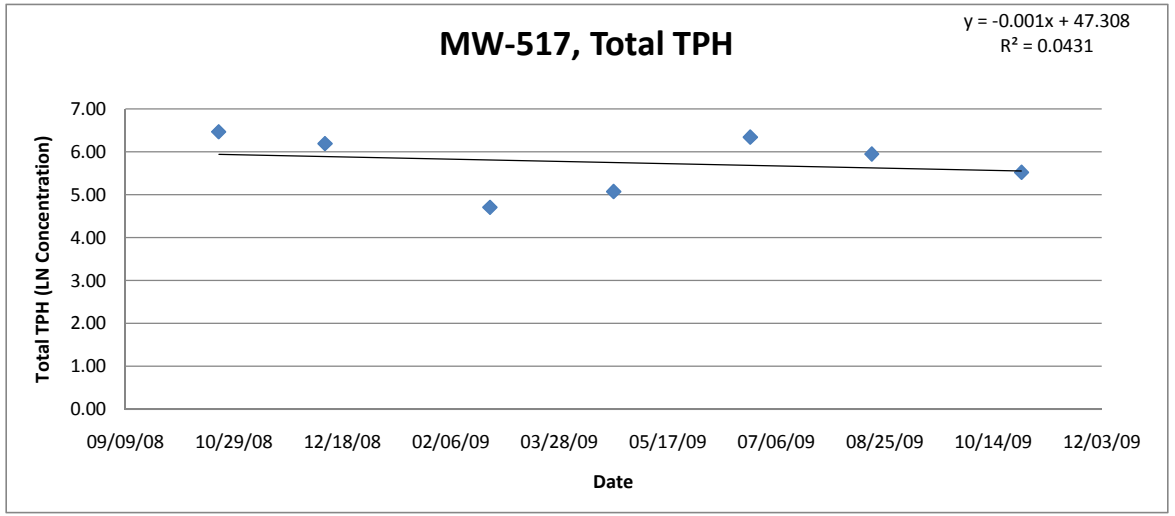
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.52316315	0.52316315	0.62548944	0.464857634
Residual	5	4.182030225	0.83640605		
Total	6	4.705193375			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	93.51636456	111.3465348	0.83986776	0.43928315	-192.7090152	379.7417443
X Variable 1	-0.002205681	0.002788899	-0.7908789	0.46485763	-0.009374775	0.004963412

Sample Information
Sample Location **MW-517, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	647	6.47
12/10/08	491	6.20
02/24/09	111	4.71
04/22/09	161	5.08
06/24/09	571	6.35
08/19/09	385	5.95
10/27/09	251	5.53



Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.20758164
R Square	0.043090137
Adjusted R Square	-0.148291835
Standard Error	0.719281192
Observations	7

ANOVA

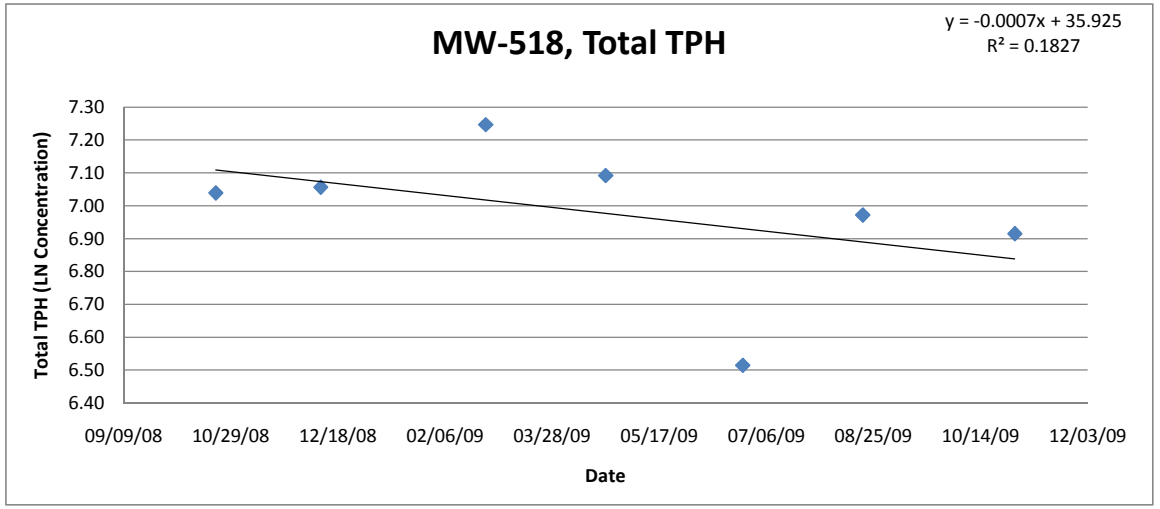
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.116486142	0.11648614	0.22515254	0.655141649
Residual	5	2.586827163	0.51736543		
Total	6	2.703313305			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	47.30774587	87.57231462	0.54021349	0.61223326	-177.8040553	272.4195471
X Variable 1	-0.001040786	0.002193426	-0.47450241	0.65514165	-0.006679166	0.004597594

Sample Information
Sample Location **MW-518, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	1,140	7.04
12/10/08	1,160	7.06
02/25/09	1,403	7.25
04/22/09	1,202	7.09
06/25/09	675	6.51
08/20/09	1,066	6.97
10/30/09	1,007	6.91



Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.427435249
R Square	0.182700892
Adjusted R Square	0.019241071
Standard Error	0.226345002
Observations	7

ANOVA

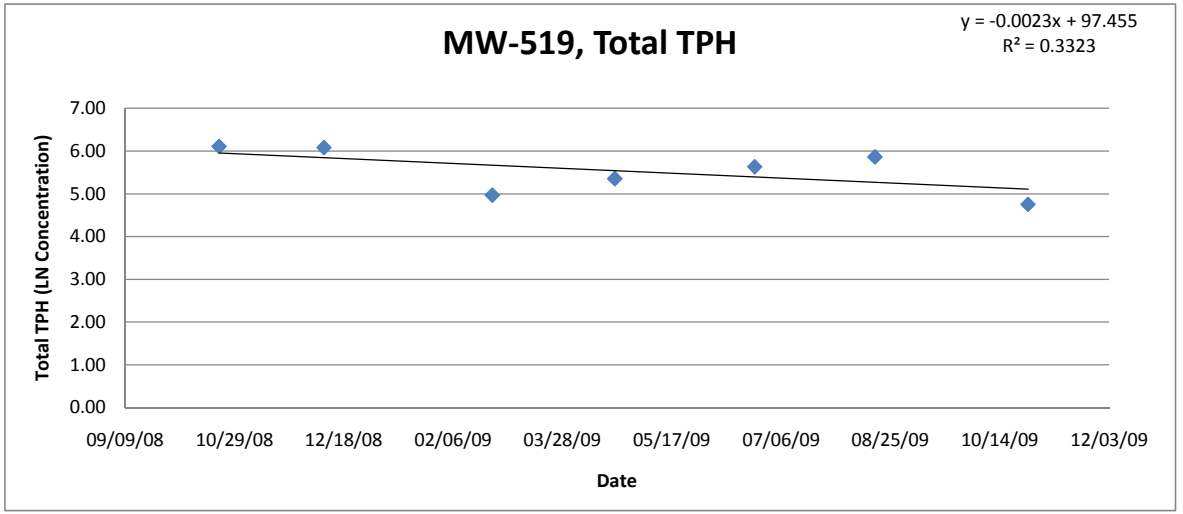
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.057262653	0.05726265	1.11771132	0.338792212
Residual	5	0.256160299	0.05123206		
Total	6	0.313422952			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	35.92478404	27.38186012	1.3119921	0.24652619	-34.46252817	106.3120963
X Variable 1	-0.000725061	0.000685819	-1.05721867	0.33879221	-0.002488016	0.001037894

Sample Information
Sample Location **MW-519, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	451	6.11
12/09/08	439	6.08
02/24/09	144	4.97
04/21/09	212	5.36
06/24/09	280	5.63
08/18/09	353	5.87
10/27/09	116	4.75



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.576434364
R Square	0.332276576
Adjusted R Square	0.198731891
Standard Error	0.478683408
Observations	7

ANOVA

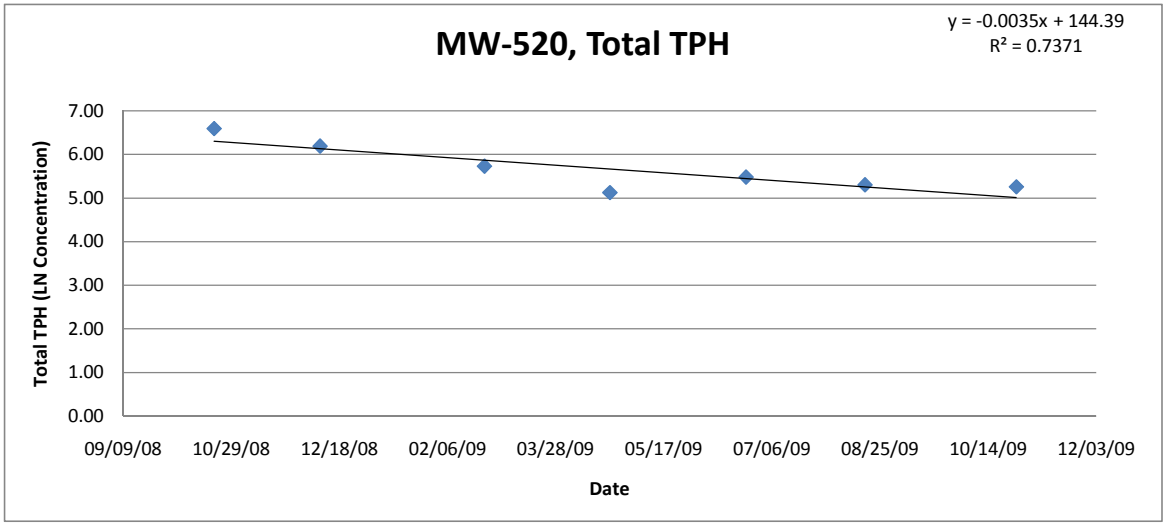
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.570124714	0.57012471	2.4881303	0.175535194
Residual	5	1.145689024	0.2291378		
Total	6	1.715813739			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	97.45531713	58.27138009	1.6724388	0.15529791	-52.33603402	247.2466683
X Variable 1	-0.002302251	0.00145954	-1.57738083	0.17553519	-0.006054118	0.001449617

Sample Information
Sample Location **MW-520, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	731	6.59
12/09/08	489	6.19
02/23/09	308	5.73
04/22/09	168	5.12
06/24/09	240	5.48
08/18/09	201	5.30
10/27/09	192	5.26



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.858550122
R Square	0.737108311
Adjusted R Square	0.684529973
Standard Error	0.305032738
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.304419738	1.30441974	14.0192395	0.013373079
Residual	5	0.465224856	0.09304497		
Total	6	1.769644594			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	144.3924717	37.05016496	3.89721535	0.01144136	49.15199064	239.6329527
X Variable 1	-0.003474679	0.00092801	-3.74422749	0.01337308	-0.005860203	-0.001089154

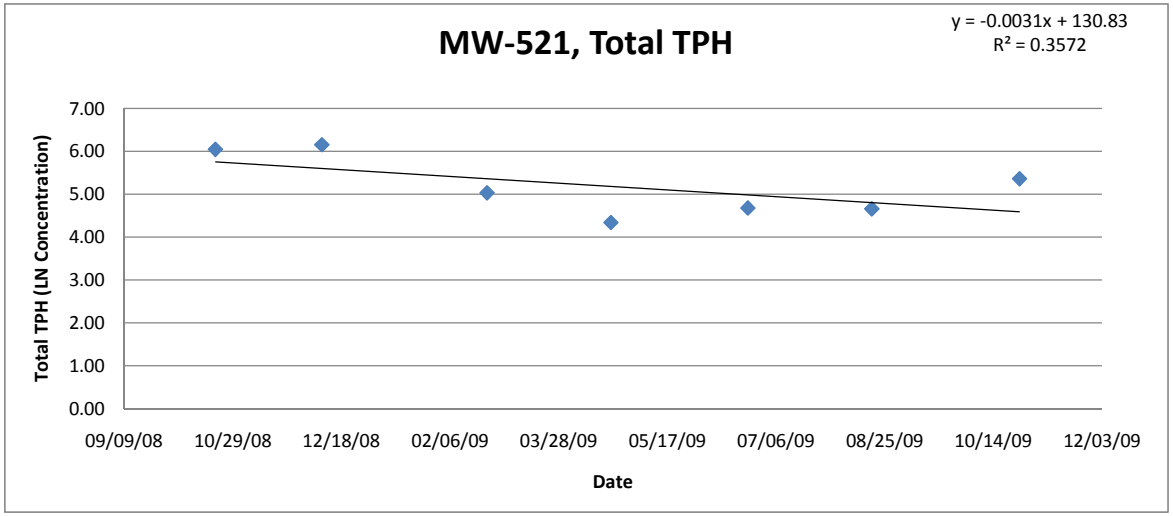
Sample Information

Sample Location **MW-521, West Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	425	6.05
12/09/08	473	6.16
02/23/09	154	5.04
04/21/09	77	4.34
06/23/09	108	4.68
08/19/09	106	4.66
10/26/09	214	5.37



Abbreviations and Notes

ug/l = micrograms per liter

LN = Natural Logarithm

CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.597691116
R Square	0.35723467
Adjusted R Square	0.228681604
Standard Error	0.619758581
Observations	7

ANOVA

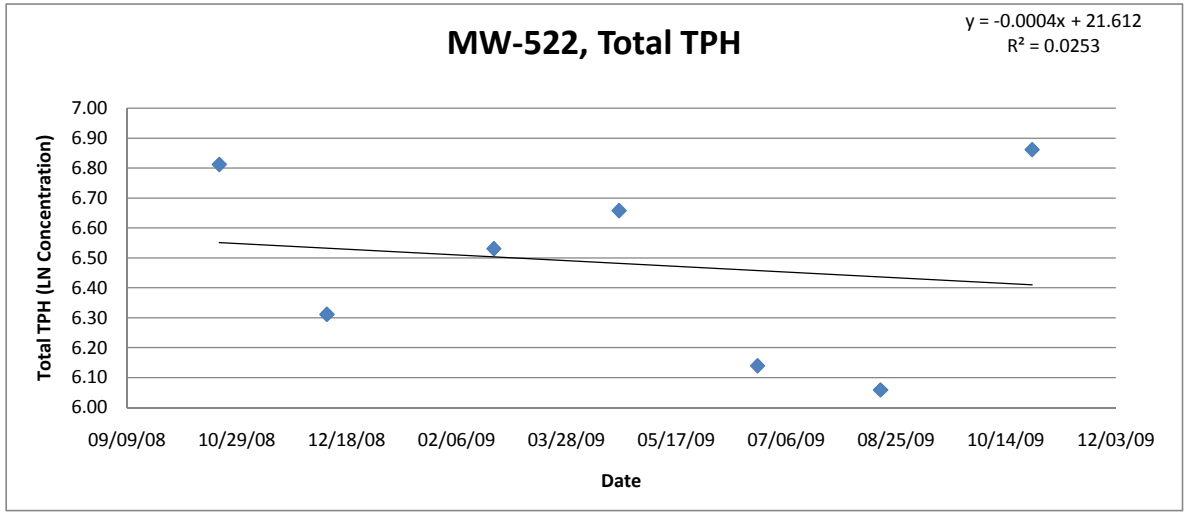
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.067373113	1.06737311	2.77888875	0.156390641
Residual	5	1.920503495	0.3841007		
Total	6	2.987876608			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	130.8273602	75.36998195	1.73580193	0.14311721	-62.91734625	324.5720667
X Variable 1	-0.003147019	0.001887834	-1.66699993	0.15639064	-0.007999851	0.001705813

Sample Information
Sample Location **MW-522, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	909	6.81
12/09/08	551	6.31
02/23/09	686	6.53
04/21/09	779	6.66
06/23/09	464	6.14
08/18/09	428	6.06
10/26/09	955	6.86



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.158920028
R Square	0.025255575
Adjusted R Square	-0.16969331
Standard Error	0.34527983
Observations	7

ANOVA

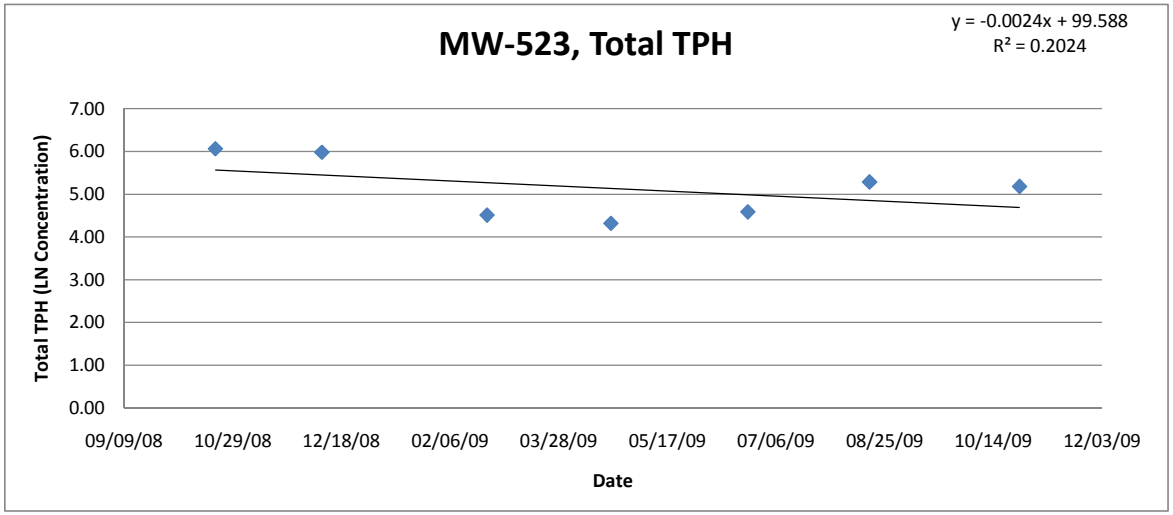
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.015444681	0.01544468	0.12954973	0.733602899
Residual	5	0.596090806	0.11921816		
Total	6	0.611535487			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	21.61215365	42.0366846	0.51412603	0.62907211	-86.44658416	129.6708915
X Variable 1	-0.000378978	0.00105292	-0.35993017	0.7336029	-0.003085595	0.00232764

Sample Information
Sample Location **MW-523, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	431	6.07
12/09/08	397	5.98
02/23/09	91	4.51
04/21/09	75	4.32
06/23/09	98	4.58
08/18/09	198	5.29
10/26/09	178	5.18



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.449901134
R Square	0.202411031
Adjusted R Square	0.042893237
Standard Error	0.688739835
Observations	7

ANOVA

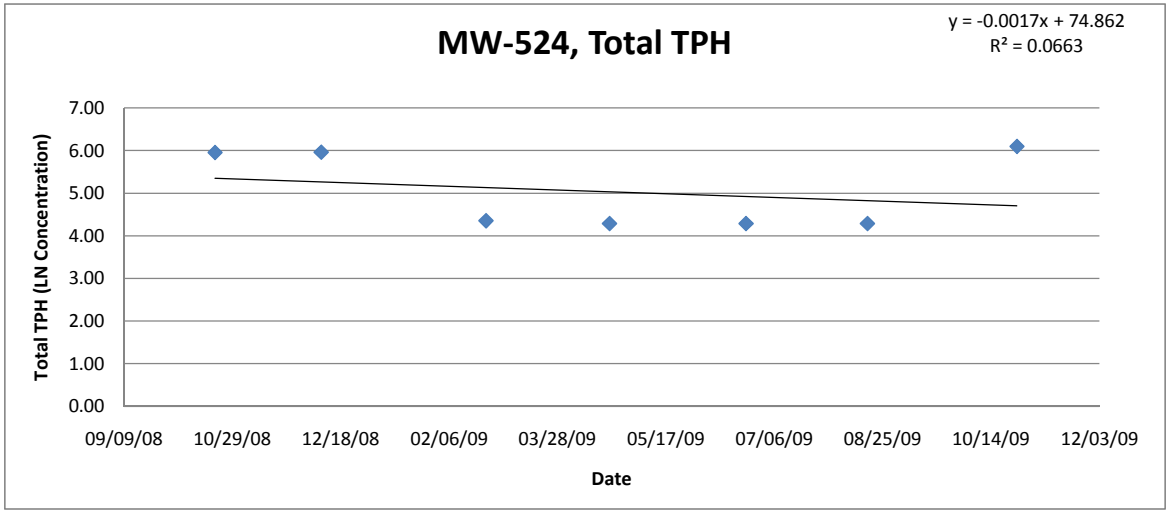
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.601915388	0.60191539	1.26889312	0.311115342
Residual	5	2.371812804	0.47436256		
Total	6	2.973728192			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	99.5878929	83.85181145	1.18766537	0.28830406	-115.9600504	315.1358362
X Variable 1	-0.002365876	0.002100291	-1.12645156	0.31111534	-0.007764845	0.003033093

Sample Information
Sample Location **MW-524, West Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	386	5.96
12/09/08	389	5.96
02/23/09	78	4.36
04/21/09	73	4.29
06/23/09	73	4.29
08/18/09	73	4.29
10/26/09	445	6.10



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.257438724
R Square	0.066274697
Adjusted R Square	-0.120470364
Standard Error	0.962754283
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.328949738	0.32894974	0.35489397	0.577295715
Residual	5	4.634479049	0.92689581		
Total	6	4.963428787			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	74.8615267	117.2121699	0.63868391	0.55113274	-226.4419481	376.1650015
X Variable 1	-0.001748997	0.002935889	-0.59572978	0.57729571	-0.00929594	0.005797947

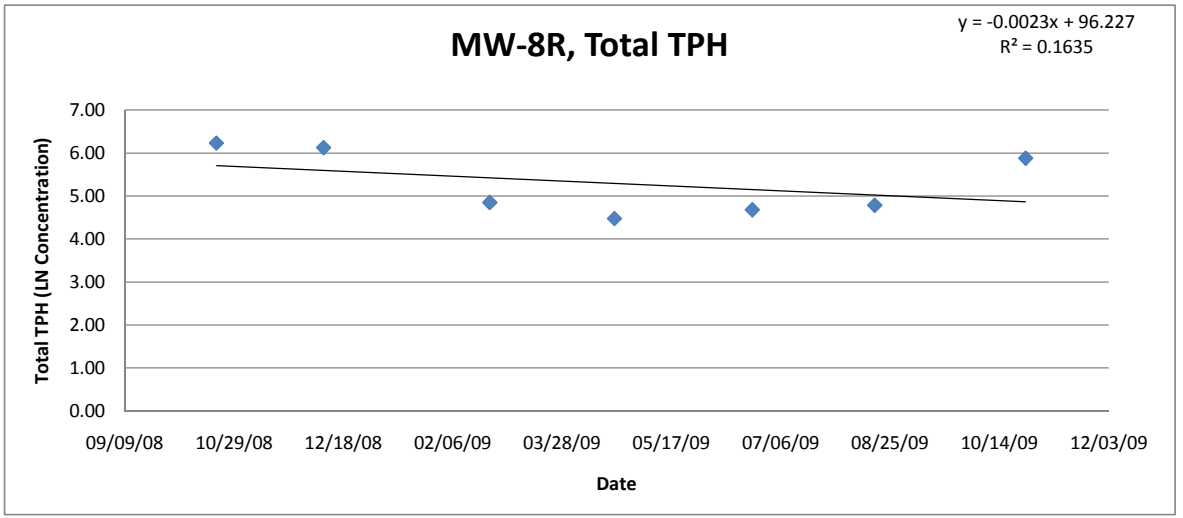
Sample Information

Sample Location **MW-8R, West Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	509	6.23
12/09/08	458	6.13
02/23/09	128	4.85
04/21/09	88	4.48
06/23/09	108	4.68
08/18/09	120	4.79
10/26/09	358	5.88



Abbreviations and Notes

ug/l = micrograms per liter
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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.404392035
R Square	0.163532918
Adjusted R Square	-0.003760498
Standard Error	0.755464906
Observations	7

ANOVA

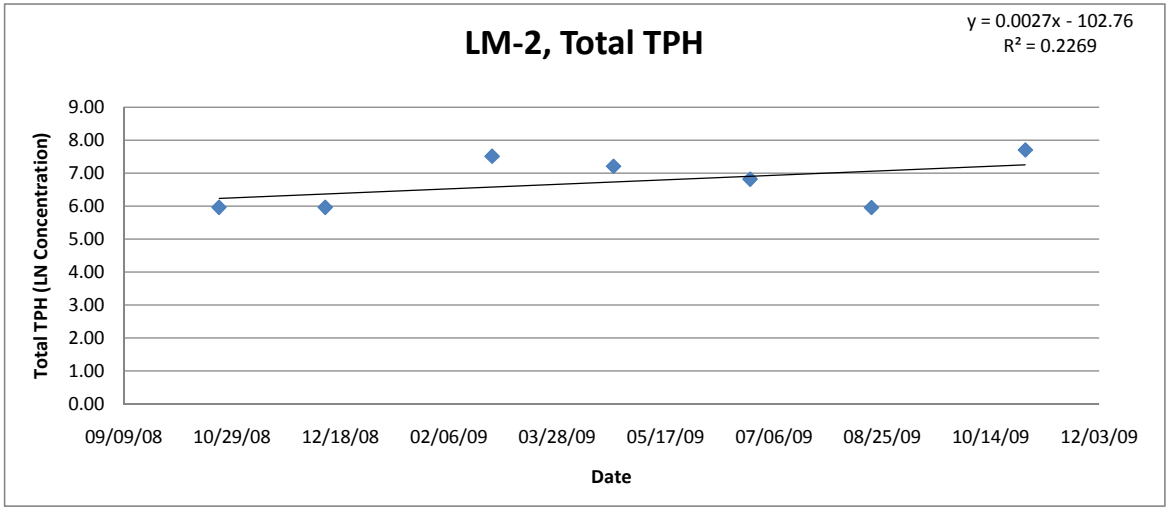
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.557898156	0.55789816	0.97752154	0.368211698
Residual	5	2.853636119	0.57072722		
Total	6	3.411534275			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	96.22658653	91.97536948	1.04622126	0.34337649	-140.2036275	332.6568006
X Variable 1	-0.002277727	0.002303767	-0.98869689	0.3682117	-0.008199748	0.003644294

Sample Information
Sample Location **LM-2, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/23/08	389	5.96
12/11/08	389	5.96
02/26/09	1,835	7.51
04/23/09	1,355	7.21
06/25/09	915	6.82
08/20/09	386	5.96
10/30/09	2,225	7.71



Abbreviations and Notes
ug/l = micrograms per liter
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CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.476372981
R Square	0.226931217
Adjusted R Square	0.072317461
Standard Error	0.744535746
Observations	7

ANOVA

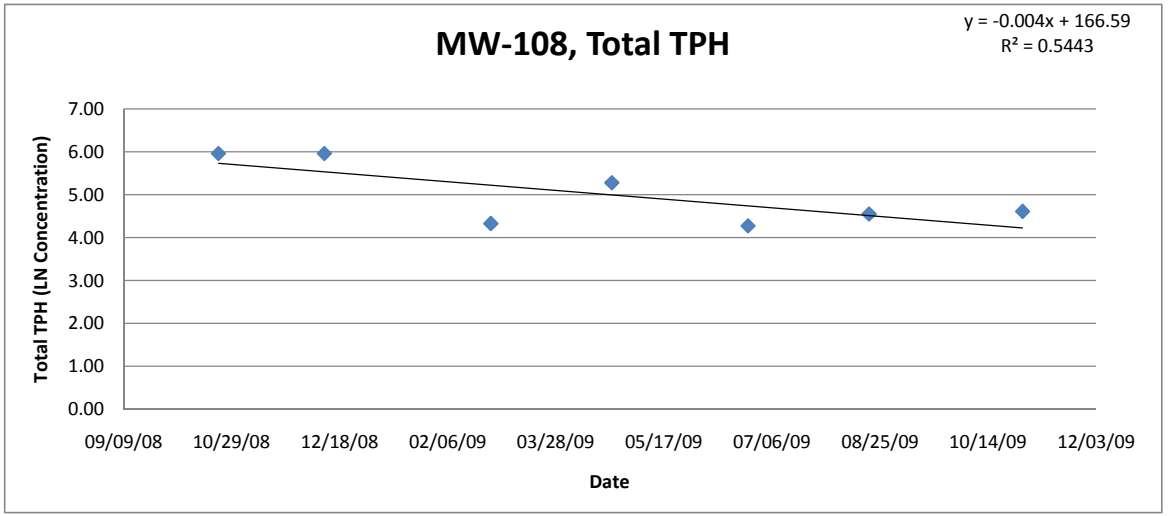
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.813611761	0.81361176	1.4677298	0.279831466
Residual	5	2.771667385	0.55433348		
Total	6	3.585279146			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-102.7614376	90.38030873	-1.13698923	0.3070791	-335.0914175	129.5685422
X Variable 1	0.002742442	0.002263676	1.21149899	0.27983147	-0.003076524	0.008561407

Sample Information
Sample Location **MW-108, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/23/08	389	5.96
12/11/08	389	5.96
02/26/09	76	4.33
04/23/09	197	5.28
06/25/09	72	4.28
08/20/09	95	4.55
10/30/09	101	4.62



Abbreviations and Notes
ug/l = micrograms per liter
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CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.737788839
R Square	0.544332371
Adjusted R Square	0.453198845
Standard Error	0.544682926
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.772039969	1.77203997	5.97291025	0.058368954
Residual	5	1.483397451	0.29667949		
Total	6	3.255437419			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	166.5912479	66.11987578	2.51953359	0.05320494	-3.375303694	336.5577995
X Variable 1	-0.004047302	0.001656047	-2.44395382	0.05836895	-0.008304305	0.000209702

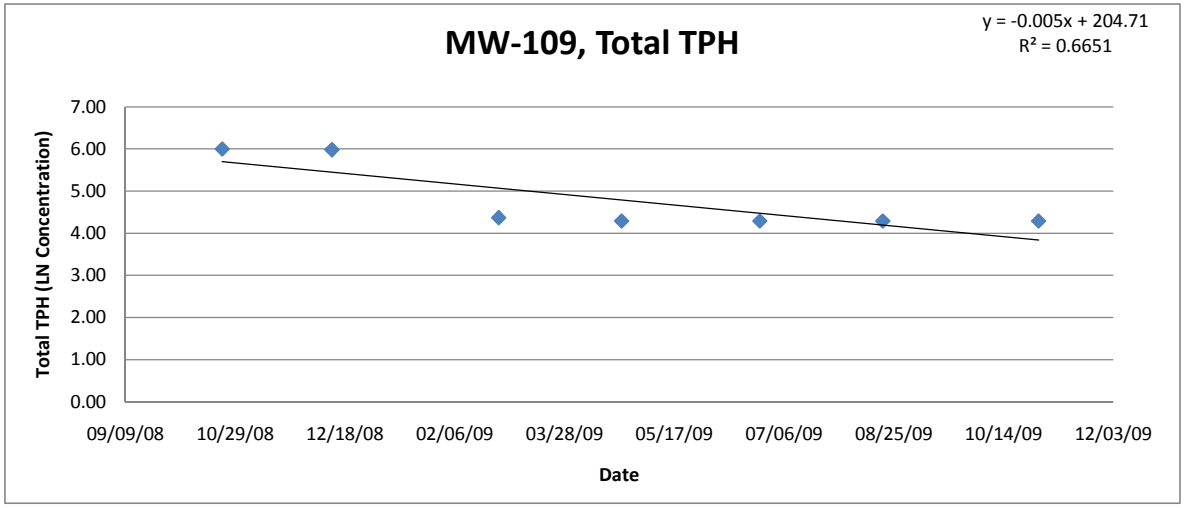
Sample Information

Sample Location **MW-109, East Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/23/08	404	6.00
12/12/08	397	5.98
02/26/09	79	4.37
04/23/09	73	4.29
06/25/09	73	4.29
08/20/09	73	4.29
10/30/09	73	4.29



Abbreviations and Notes

ug/l = micrograms per liter
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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.815544166
R Square	0.665112287
Adjusted R Square	0.598134744
Standard Error	0.521982198
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.70568445	2.70568445	9.93037757	0.025343272
Residual	5	1.362327077	0.27246542		
Total	6	4.068011527			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	204.7096996	63.44230549	3.2267065	0.02329104	41.62606159	367.7933377
X Variable 1	-0.005007268	0.001588978	-3.15125016	0.02534327	-0.009091866	-0.000922669

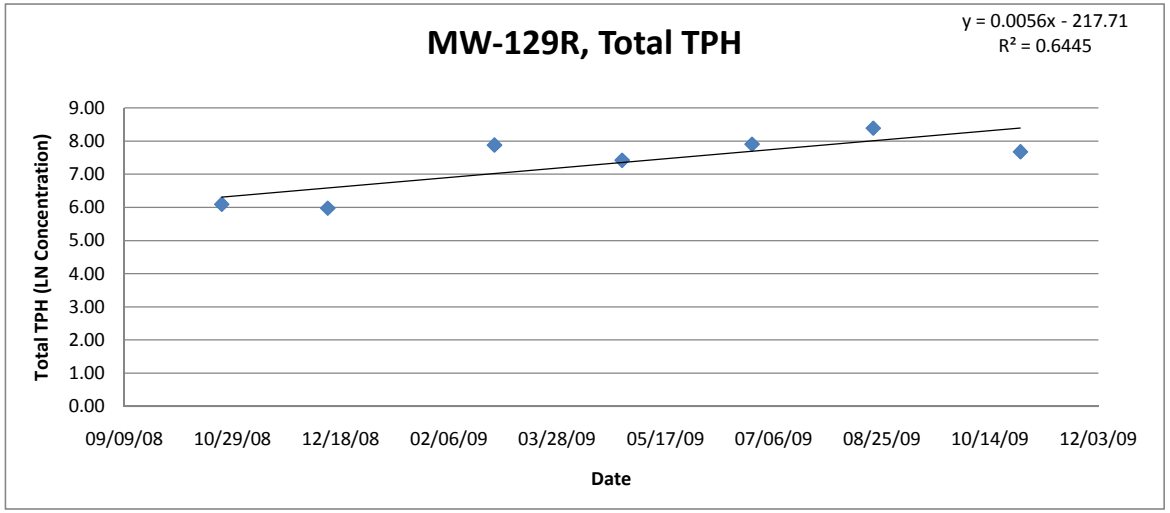
Sample Information

Sample Location **MW-129R, East Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	443	6.09
12/12/08	393	5.97
02/27/09	2,655	7.88
04/27/09	1,675	7.42
06/26/09	2,725	7.91
08/21/09	4,425	8.40
10/28/09	2,165	7.68



Abbreviations and Notes

ug/l = micrograms per liter
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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.802809494
R Square	0.644503084
Adjusted R Square	0.573403701
Standard Error	0.612534609
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3.401108064	3.40110806	9.06481964	0.029728858
Residual	5	1.875993236	0.37519865		
Total	6	5.277101299			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-217.7087267	74.74698918	-2.91260864	0.03329854	-409.8519793	-25.56547415
X Variable 1	0.005636415	0.001872076	3.01078389	0.02972886	0.000824092	0.010448739

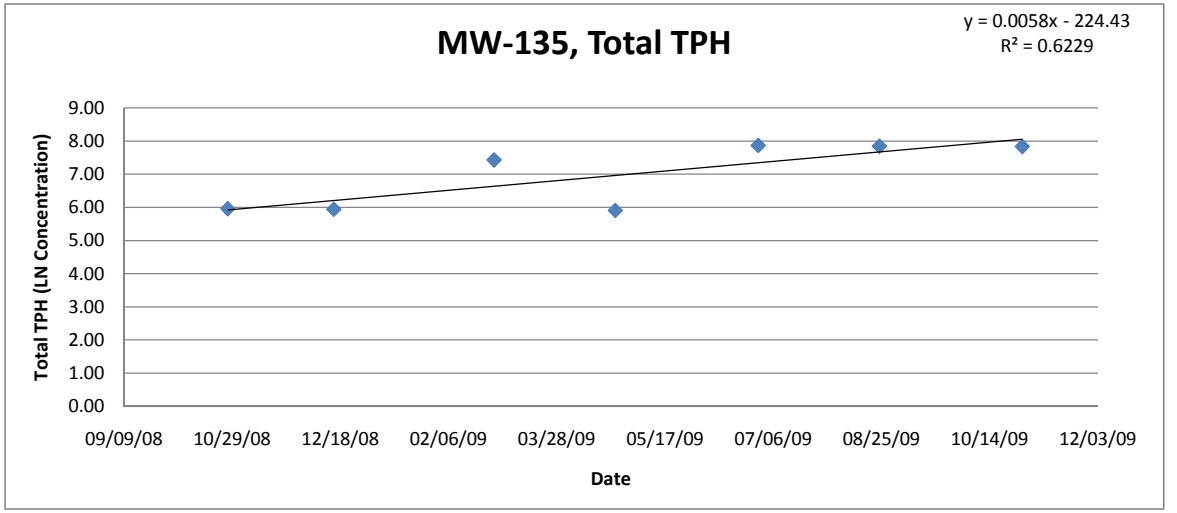
Sample Information

Sample Location **MW-135, East Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/27/08	389	5.96
12/15/08	382	5.95
02/27/09	1,695	7.44
04/24/09	369	5.91
06/29/09	2,625	7.87
08/24/09	2,565	7.85
10/29/09	2,545	7.84



Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.78925896
R Square	0.622929706
Adjusted R Square	0.547515647
Standard Error	0.658521325
Observations	7

ANOVA

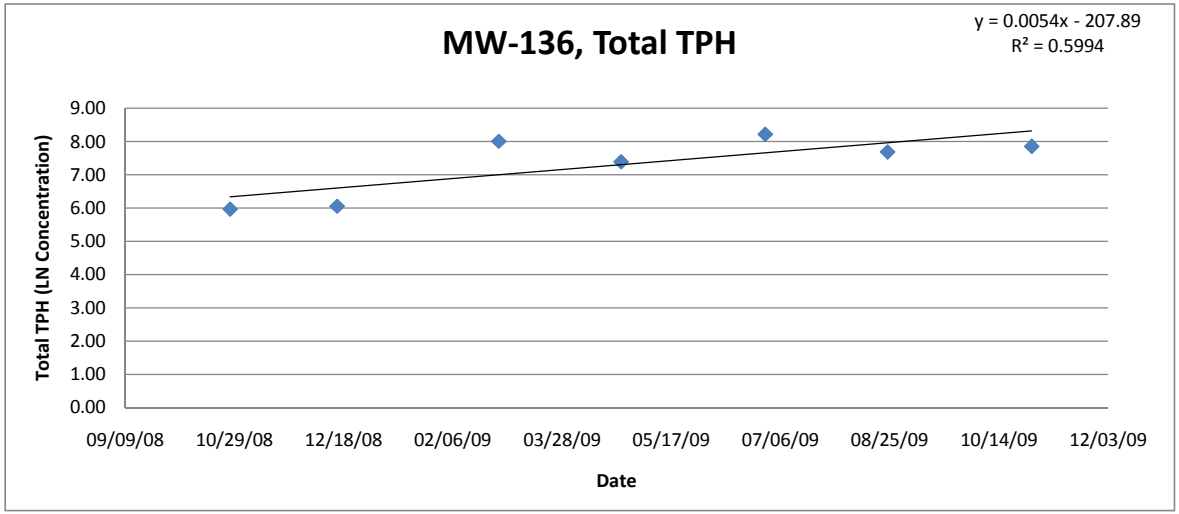
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3.582006856	3.58200686	8.26012703	0.034829596
Residual	5	2.168251675	0.43365034		
Total	6	5.750258531			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-224.4342827	80.51708788	-2.78741182	0.03856264	-431.4100462	-17.4585192
X Variable 1	0.005795562	0.002016519	2.87404367	0.0348296	0.000611936	0.010979188

Sample Information
Sample Location **MW-136, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/27/08	389	5.96
12/15/08	425	6.05
02/27/09	3,010	8.01
04/24/09	1,622	7.39
06/29/09	3,725	8.22
08/24/09	2,185	7.69
10/29/09	2,585	7.86



Abbreviations and Notes
ug/l = micrograms per liter
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CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.77422246
R Square	0.599420417
Adjusted R Square	0.519304501
Standard Error	0.643474448
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3.097956667	3.09795667	7.48191425	0.041020292
Residual	5	2.070296829	0.41405937		
Total	6	5.168253497			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-207.8933695	78.6773135	-2.6423547	0.04584608	-410.1398424	-5.646896609
X Variable 1	0.005389768	0.001970442	2.7353088	0.04102029	0.000324585	0.01045495

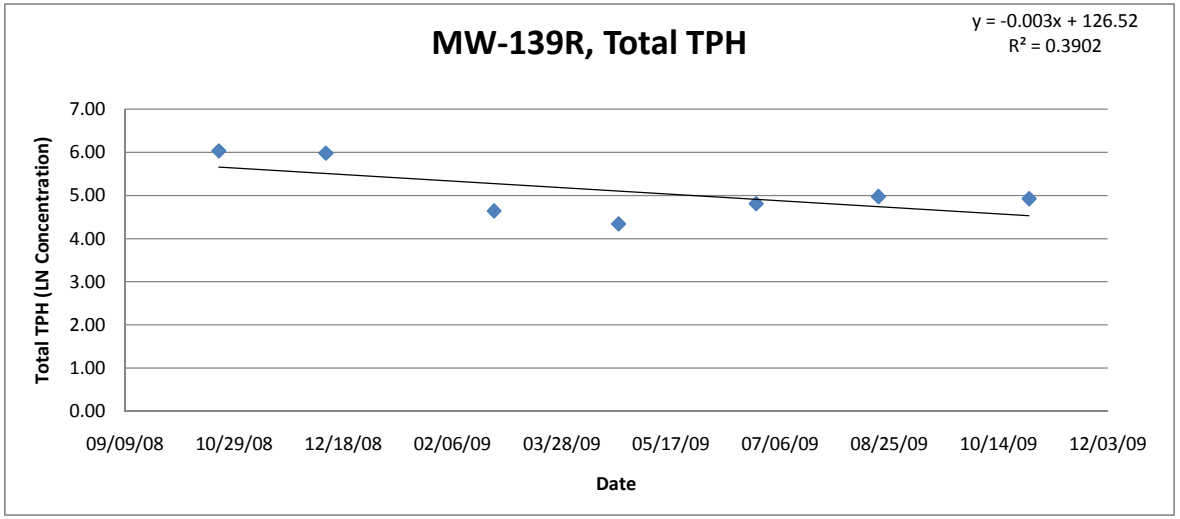
Sample Information

Sample Location **MW-139R, East Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	418	6.04
12/10/08	397	5.98
02/25/09	104	4.64
04/23/09	77	4.34
06/25/09	123	4.81
08/20/09	145	4.98
10/28/09	138	4.93



Abbreviations and Notes

ug/l = micrograms per liter

LN = Natural Logarithm

CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.624645461
R Square	0.390181952
Adjusted R Square	0.268218343
Standard Error	0.559173181
Observations	7

ANOVA

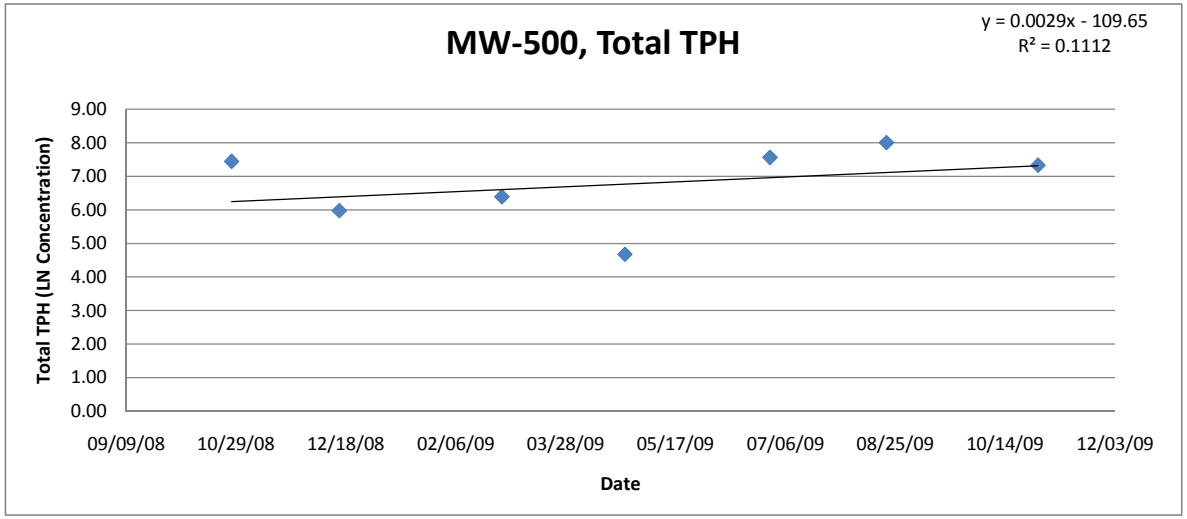
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.000298402	1.0002984	3.19916698	0.133702123
Residual	5	1.563373231	0.31267465		
Total	6	2.563671633			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	126.5176204	67.88177875	1.86379354	0.12137761	-47.97804691	301.0132878
X Variable 1	-0.003041025	0.001700206	-1.78862153	0.13370212	-0.007411543	0.001329494

Sample Information
Sample Location **MW-500, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/27/08	1,710	7.44
12/15/08	393	5.97
02/27/09	595	6.39
04/24/09	107	4.67
06/29/09	1,925	7.56
08/21/09	3,000	8.01
10/29/09	1,525	7.33



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.333392577
R Square	0.11115061
Adjusted R Square	-0.066619268
Standard Error	1.200151171
Observations	7

ANOVA

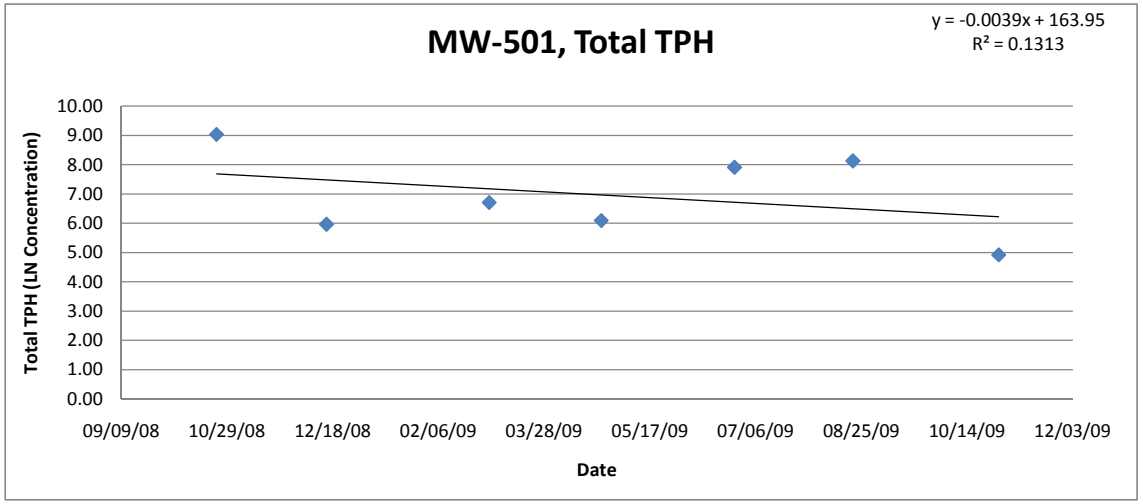
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.900586812	0.90058681	0.62524997	0.464938354
Residual	5	7.201814165	1.44036283		
Total	6	8.102400977			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-109.6535994	147.2346342	-0.74475411	0.48992295	-488.1322755	268.8250767
X Variable 1	0.002915786	0.003687473	0.79072749	0.46493835	-0.006563164	0.012394736

Sample Information
Sample Location **MW-501, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	8,330	9.03
12/15/08	389	5.96
03/02/09	815	6.70
04/24/09	442	6.09
06/26/09	2,725	7.91
08/21/09	3,385	8.13
10/29/09	137	4.92



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.362354427
R Square	0.131300731
Adjusted R Square	-0.042439123
Standard Error	1.474577862
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.643247995	1.64324799	0.75573179	0.424424649
Residual	5	10.87189936	2.17437987		
Total	6	12.51514736			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	163.9461947	180.5803919	0.90788481	0.40556981	-300.2504805	628.1428699
X Variable 1	-0.003931678	0.004522661	-0.86932836	0.42442465	-0.015557549	0.007694193

Sample Information
Sample Location **MW-502, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	1,700	7.44
12/12/08	1,440	7.27
02/25/09	1,552	7.35
04/22/09	1,503	7.32
06/26/09	512	6.24
08/21/09	199	5.29
10/28/09	873	6.77

Abbreviations and Notes

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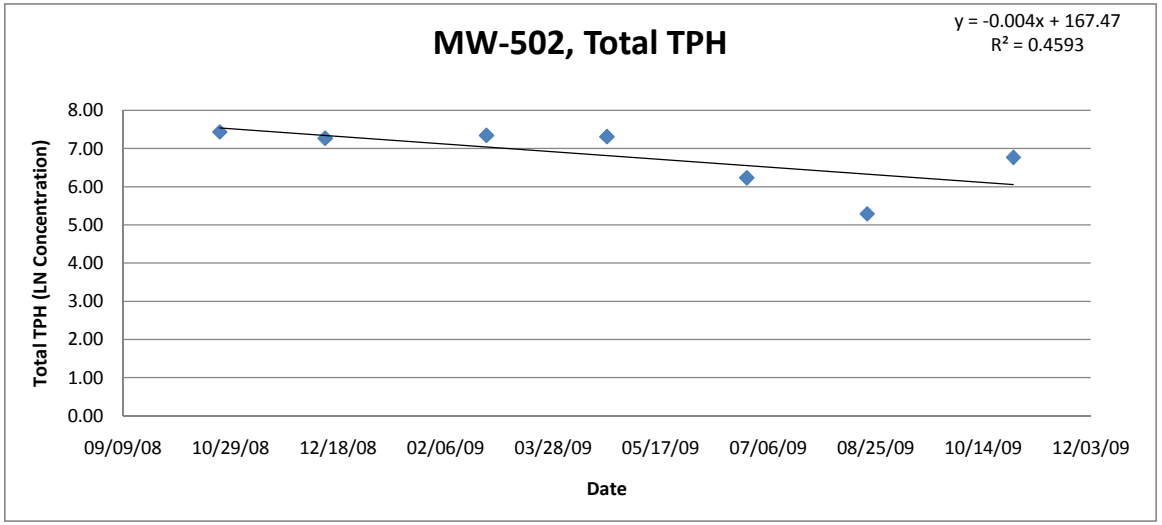


SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.677749289
R Square	0.459344098
Adjusted R Square	0.351212918
Standard Error	0.639428872
Observations	7

ANOVA

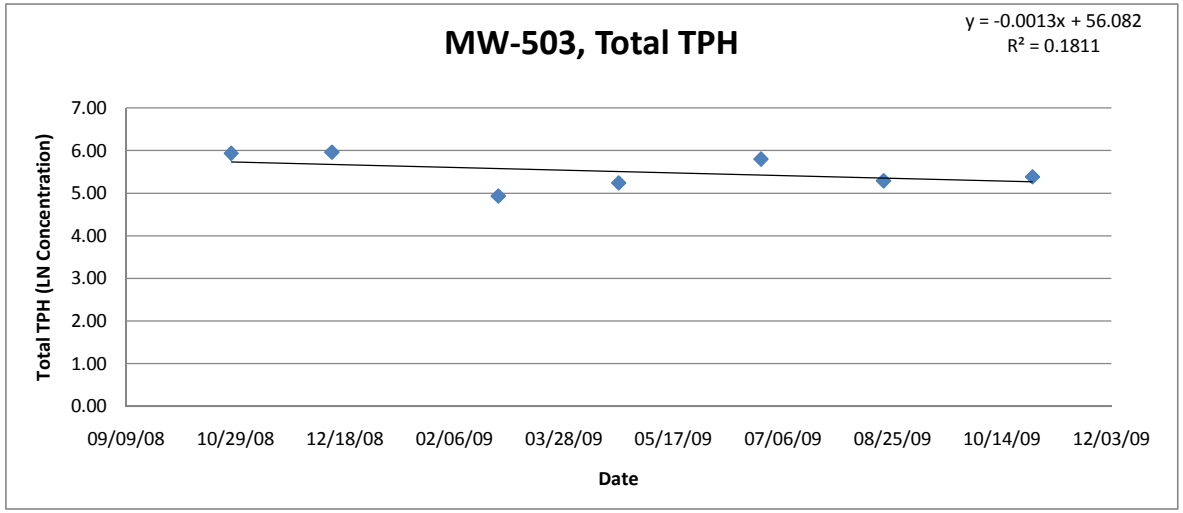
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.736887468	1.73688747	4.2480263	0.094304247
Residual	5	2.044346414	0.40886928		
Total	6	3.781233882			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	167.4659727	77.94759388	2.14844313	0.08441103	-32.9046962	367.8366416
X Variable 1	-0.004023804	0.001952285	-2.06107407	0.09430425	-0.009042313	0.000994704

Sample Information
Sample Location **MW-503, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/27/08	379	5.94
12/12/08	389	5.96
02/26/09	139	4.93
04/22/09	189	5.24
06/26/09	331	5.80
08/21/09	199	5.29
10/28/09	218	5.38



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.425579583
R Square	0.181117982
Adjusted R Square	0.017341578
Standard Error	0.392307953
Observations	7

ANOVA

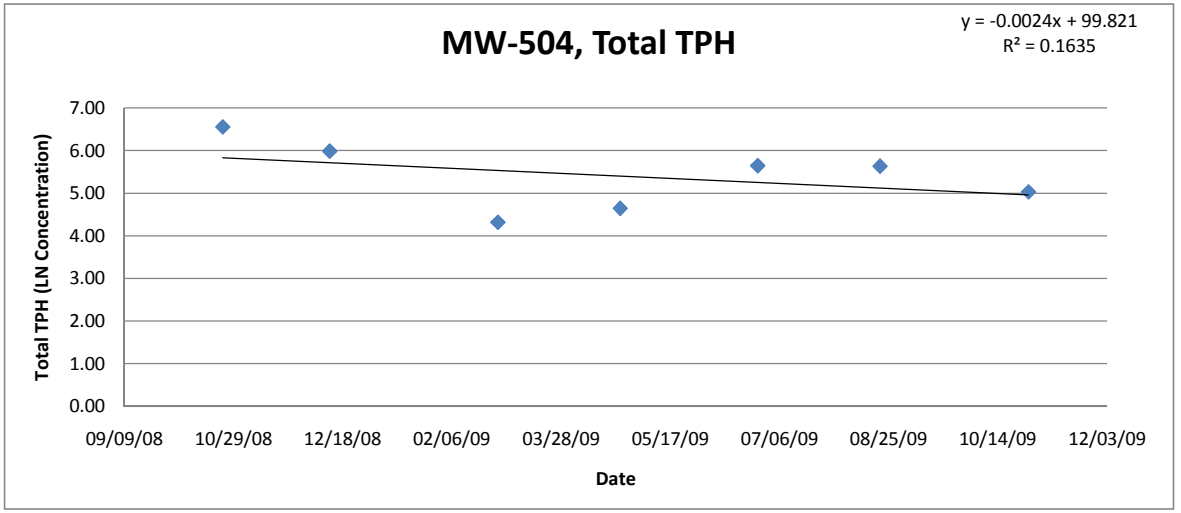
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.170201924	0.17020192	1.10588569	0.34112326
Residual	5	0.769527649	0.15390553		
Total	6	0.939729573			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	56.08204184	48.09202549	1.16614015	0.29615143	-67.54244528	179.706529
X Variable 1	-0.001266667	0.001204502	-1.051611	0.34112326	-0.004362938	0.001829603

Sample Information
Sample Location **MW-504, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	701	6.55
12/12/08	397	5.98
02/27/09	75	4.32
04/24/09	104	4.64
06/26/09	282	5.64
08/21/09	279	5.63
10/28/09	153	5.03



Abbreviations and Notes
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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.404407115
R Square	0.163545115
Adjusted R Square	-0.003745862
Standard Error	0.782549115
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.598671064	0.59867106	0.9776087	0.368192114
Residual	5	3.061915587	0.61238312		
Total	6	3.660586651			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	99.8214839	95.49687057	1.04528539	0.34376901	-145.6610369	345.3040047
X Variable 1	-0.002364863	0.002391792	-0.98874097	0.36819211	-0.008513161	0.003783435

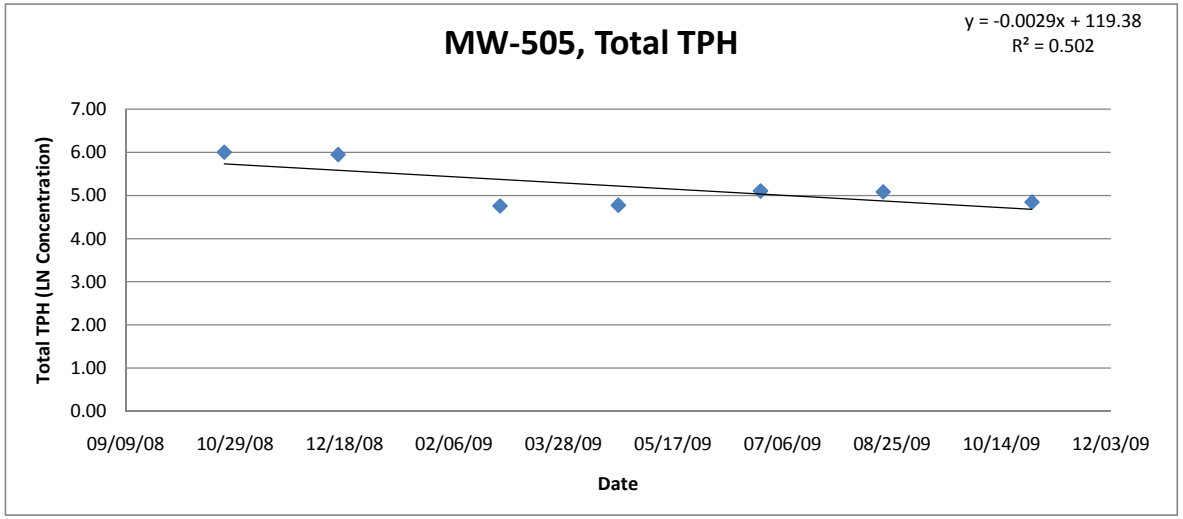
Sample Information

Sample Location **MW-505, East Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	404	6.00
12/15/08	382	5.95
02/27/09	116	4.75
04/22/09	118	4.77
06/26/09	164	5.10
08/21/09	161	5.08
10/28/09	127	4.84



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.708491414
R Square	0.501960083
Adjusted R Square	0.4023521
Standard Error	0.415221395
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.868829348	0.86882935	5.03935594	0.074758187
Residual	5	0.862044036	0.17240881		
Total	6	1.730873384			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	119.3810671	50.85763645	2.34735775	0.06577575	-11.35264927	250.1147835
X Variable 1	-0.00285941	0.001273764	-2.24485098	0.07475819	-0.006133725	0.000414904

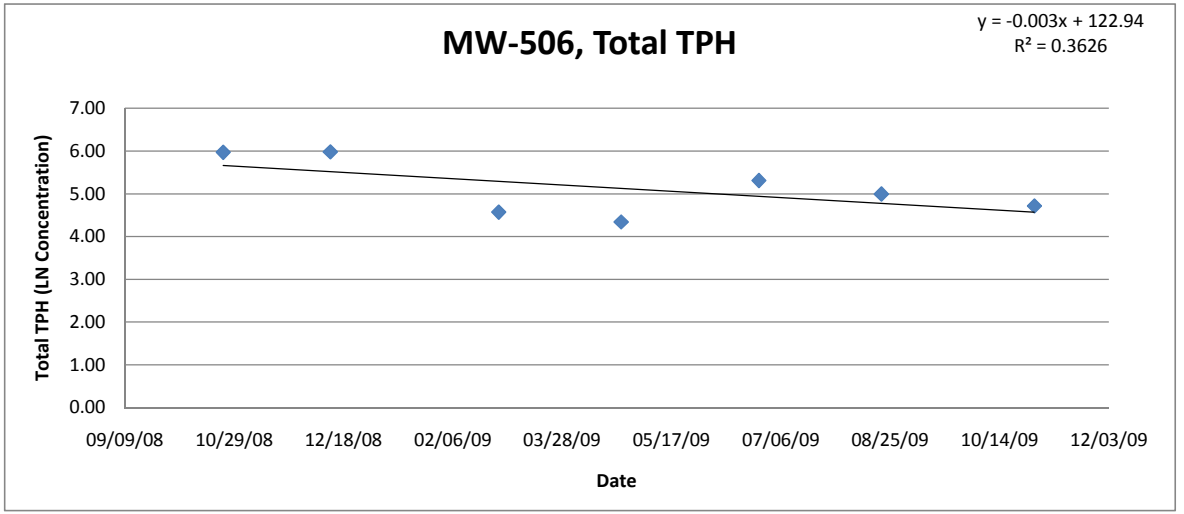
Sample Information

Sample Location **MW-506, East Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	393	5.97
12/12/08	397	5.98
02/27/09	97	4.57
04/24/09	77	4.34
06/26/09	203	5.31
08/21/09	148	5.00
10/30/09	112	4.72



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.602190702
R Square	0.362633642
Adjusted R Square	0.23516037
Standard Error	0.574391746
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.938567128	0.93856713	2.84478179	0.152478965
Residual	5	1.649629387	0.32992588		
Total	6	2.588196515			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	122.9414308	69.85018926	1.76007298	0.13871028	-56.61419687	302.4970585
X Variable 1	-0.002950688	0.001749439	-1.68664809	0.15247897	-0.007447764	0.001546388

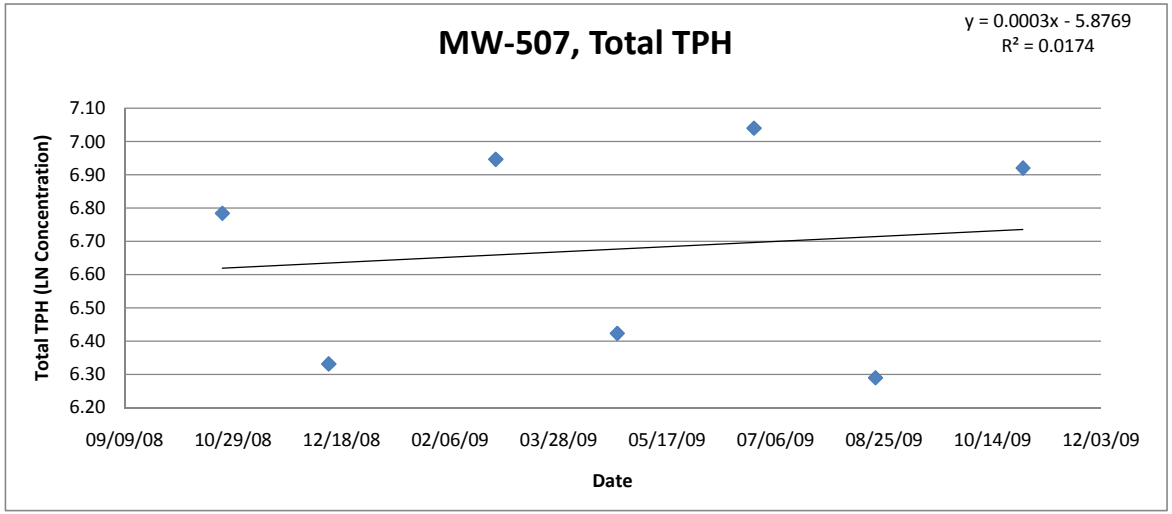
Sample Information

Sample Location **MW-507, East Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	884	6.78
12/12/08	562	6.33
02/27/09	1,040	6.95
04/24/09	616	6.42
06/26/09	1,142	7.04
08/21/09	539	6.29
10/28/09	1,013	6.92



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.131743196
R Square	0.01735627
Adjusted R Square	-0.179172476
Standard Error	0.346160208
Observations	7

ANOVA

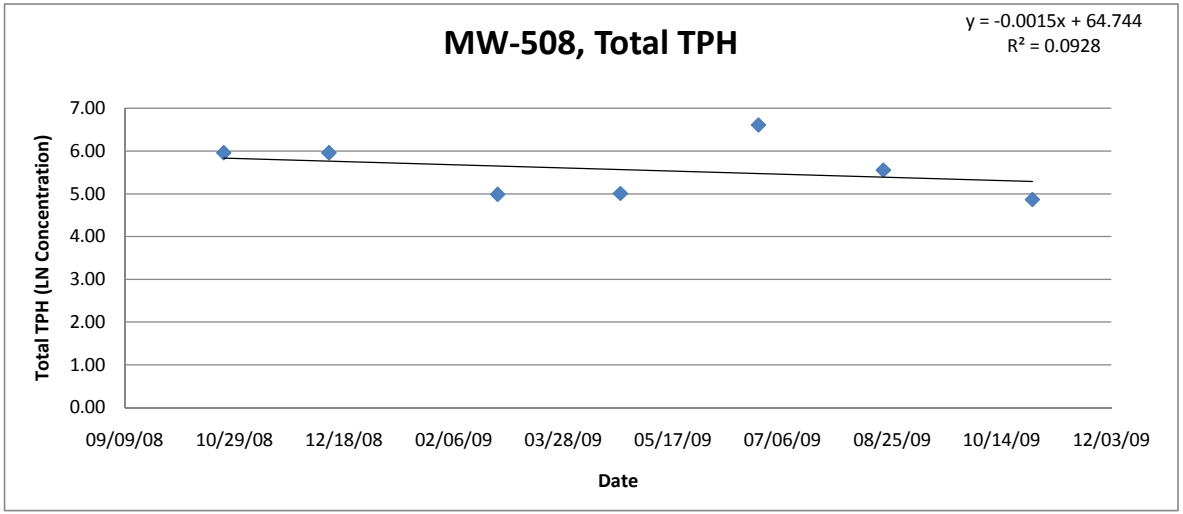
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.01058241	0.01058241	0.08831415	0.778281642
Residual	5	0.599134447	0.11982689		
Total	6	0.609716857			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-5.876855107	42.24299269	-0.13912024	0.89478502	-114.4659248	102.7122146
X Variable 1	0.000314416	0.001058008	0.29717697	0.77828164	-0.002405281	0.003034112

Sample Information
Sample Location **MW-508, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	389	5.96
12/11/08	389	5.96
02/26/09	147	4.99
04/23/09	150	5.01
06/25/09	745	6.61
08/21/09	259	5.56
10/28/09	130	4.87



Abbreviations and Notes
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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.304587478
R Square	0.092773532
Adjusted R Square	-0.088671762
Standard Error	0.678981227
Observations	7

ANOVA

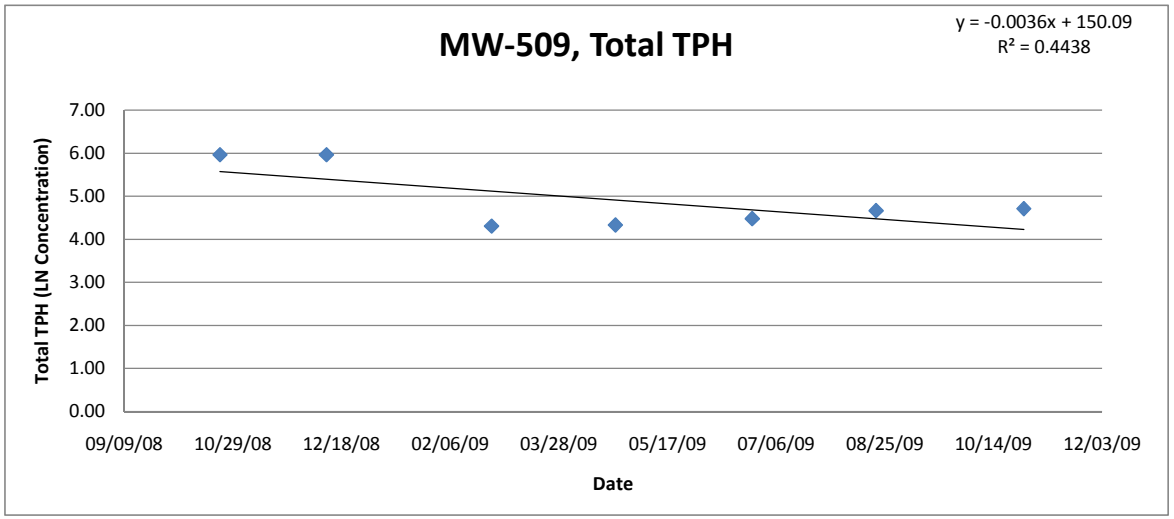
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.235718634	0.23571863	0.51130305	0.506564503
Residual	5	2.305077533	0.46101551		
Total	6	2.540796167			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	64.74408833	82.75984392	0.78231284	0.46944053	-147.9968631	277.4850398
X Variable 1	-0.001482175	0.002072813	-0.71505458	0.5065645	-0.006810511	0.003846162

Sample Information
Sample Location **MW-509, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/23/08	389	5.96
12/11/08	389	5.96
02/25/09	74	4.30
04/23/09	76	4.33
06/25/09	88	4.48
08/21/09	106	4.66
10/28/09	111	4.71



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.666162847
R Square	0.443772939
Adjusted R Square	0.332527527
Standard Error	0.597640668
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.424816684	1.42481668	3.98913475	0.102293972
Residual	5	1.785871841	0.35717437		
Total	6	3.210688525			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	150.0854158	72.68382273	2.06490812	0.0938454	-36.75429862	336.9251301
X Variable 1	-0.003635974	0.001820461	-1.99728184	0.10229397	-0.008315618	0.00104367

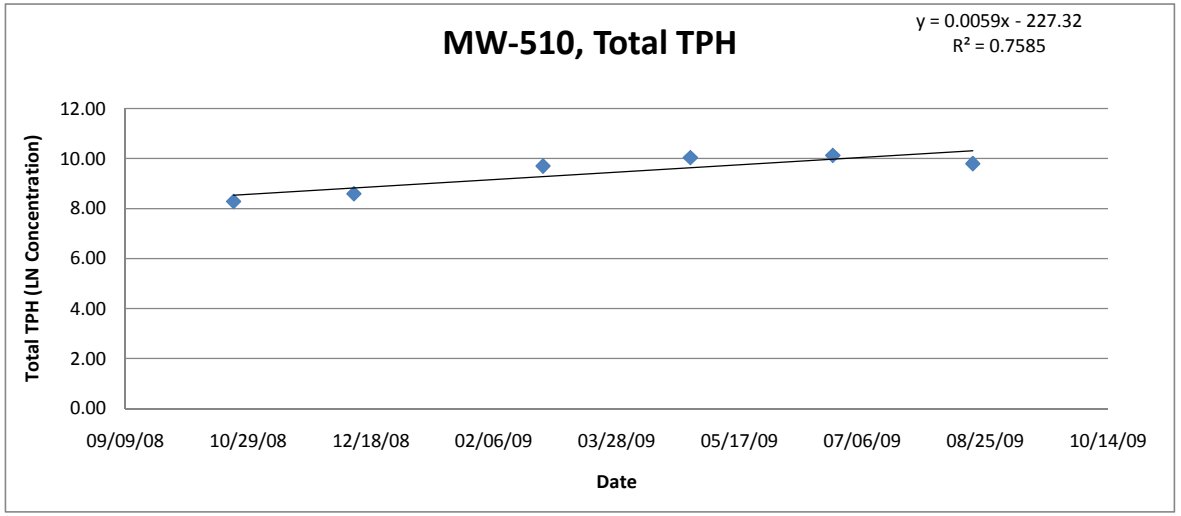
Sample Information

Sample Location **MW-510, East Side**

Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/23/08	3,980	8.29
12/11/08	5,410	8.60
02/26/09	16,380	9.70
04/27/09	22,930	10.04
06/24/09	25,090	10.13
08/20/09	18,080	9.80
10/28/09	LNAPL	



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.870910924
R Square	0.758485837
Adjusted R Square	0.698107296
Standard Error	0.430798339
Observations	6

ANOVA

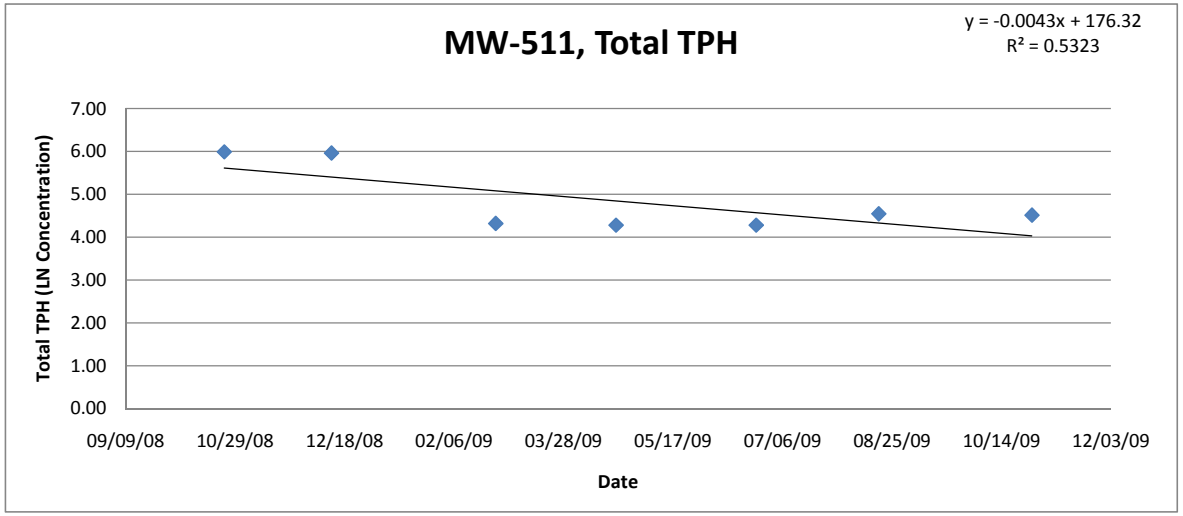
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.331379119	2.33137912	12.5621757	0.023920415
Residual	4	0.742348834	0.18558721		
Total	5	3.073727953			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-227.3191106	66.79621895	-3.40317333	0.02719772	-412.7751457	-41.86307544
X Variable 1	0.005934229	0.001674295	3.54431597	0.02392041	0.001285642	0.010582817

Sample Information
Sample Location **MW-511, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	400	5.99
12/12/08	389	5.96
02/25/09	75	4.32
04/21/09	72	4.28
06/24/09	72	4.28
08/19/09	94	4.54
10/28/09	91	4.51



Abbreviations and Notes

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CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.729614071
R Square	0.532336692
Adjusted R Square	0.438804031
Standard Error	0.587671579
Observations	7

ANOVA

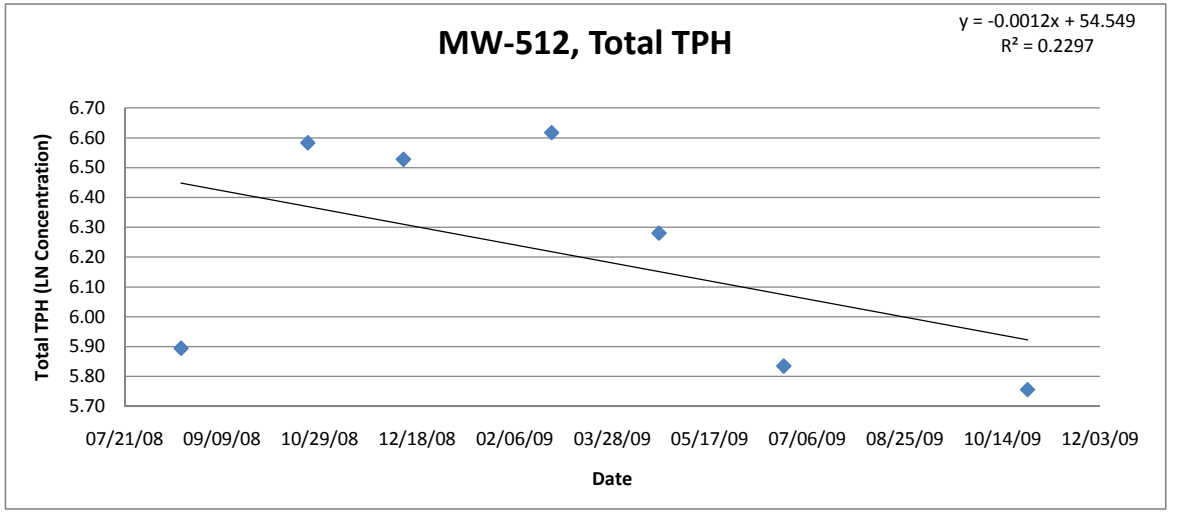
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.965587966	1.96558797	5.69145241	0.062722471
Residual	5	1.726789423	0.34535788		
Total	6	3.69237739			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	176.3240639	71.88102795	2.45299864	0.05772317	-8.452000843	361.1001286
X Variable 1	-0.004295109	0.001800374	-2.38567651	0.06272247	-0.008923116	0.000332899

Sample Information
Sample Location **MW-512, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/23/08	723	6.58
12/11/08	684	6.53
02/25/09	748	6.62
04/21/09	534	6.28
06/24/09	342	5.83
08/19/08	363	5.89
10/27/09	316	5.76



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.479255486
R Square	0.229685821
Adjusted R Square	0.075622986
Standard Error	0.363594996
Observations	7

ANOVA

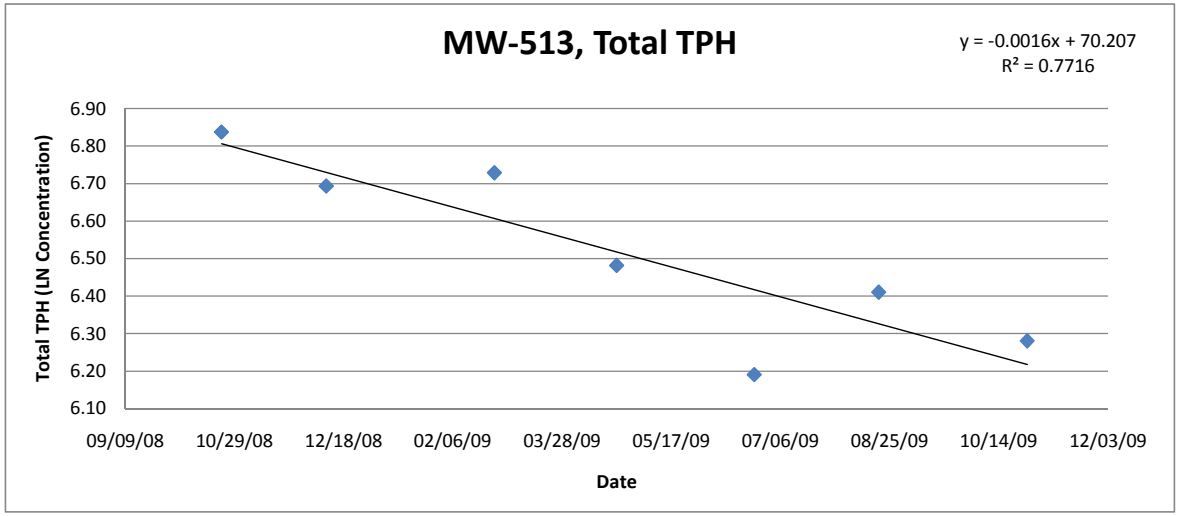
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.197093406	0.19709341	1.49085807	0.276514158
Residual	5	0.661006607	0.13220132		
Total	6	0.858100013			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	54.54919826	39.58703268	1.37795623	0.22669182	-47.21250884	156.3109054
X Variable 1	-0.001212247	0.000992826	-1.22100699	0.27651416	-0.003764387	0.001339892

Sample Information
Sample Location **MW-513, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/23/08	932	6.84
12/10/08	807	6.69
02/25/09	836	6.73
04/22/09	653	6.48
06/24/09	488	6.19
08/20/09	608	6.41
10/27/09	534	6.28



Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.878417554
R Square	0.771617399
Adjusted R Square	0.725940879
Standard Error	0.127134061
Observations	7

ANOVA

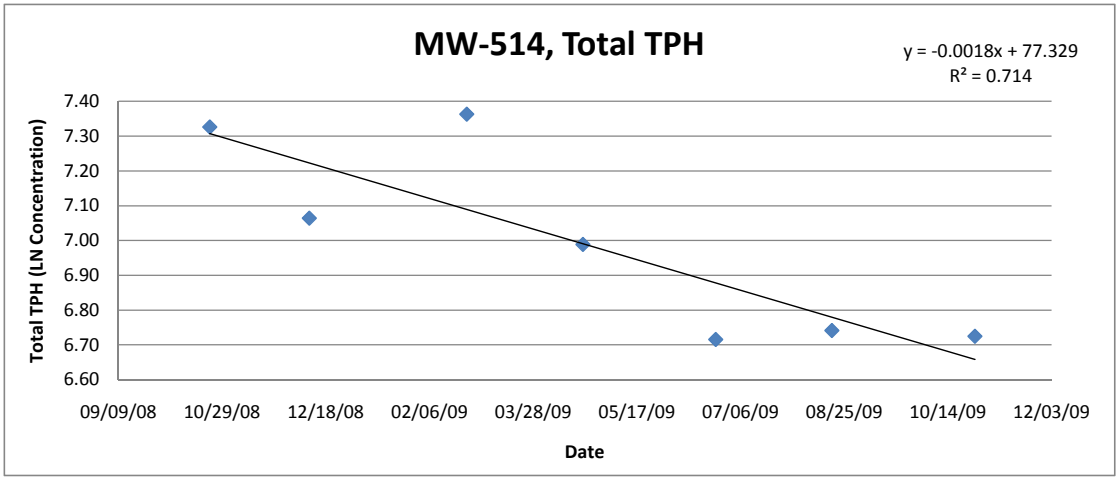
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.27304413	0.27304413	16.8930864	0.009262777
Residual	5	0.080815348	0.01616307		
Total	6	0.353859478			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	70.20652795	15.49576208	4.53069217	0.00622154	30.37340343	110.0396525
X Variable 1	-0.001595214	0.000388119	-4.11011999	0.00926278	-0.002592904	-0.000597523

Sample Information
Sample Location **MW-514, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/23/08	1,520	7.33
12/10/08	1,170	7.06
02/24/09	1,578	7.36
04/21/09	1,085	6.99
06/24/09	825	6.72
08/19/09	847	6.74
10/27/09	833	6.73



Date CUL Reached

CUL (ug/L)	506
LN CUL	6.2
Intercept	77.32909757
Slope	-1.76E-03
Date to CUL	6/28/2010

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.845013266
R Square	0.71404742
Adjusted R Square	0.656856905
Standard Error	0.163230016
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.332661919	0.33266192	12.4854167	0.01667802
Residual	5	0.133220191	0.02664404		
Total	6	0.46588211			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	77.32909757	19.9067501	3.88456665	0.01158832	26.15716739	128.5010278
X Variable 1	-0.001761806	0.000498605	-3.53347091	0.01667802	-0.00304351	-0.000480101

Results

Natural Attenuation Rates in Groundwater (K) =	1.76E-03	$days^{-1}$
Correlation Coefficient (R^2) and p-Value =	7.14E-01	1.67E-02
Chemical Half Life in Groundwater ($t_{1/2}$) =	3.93E+02	days

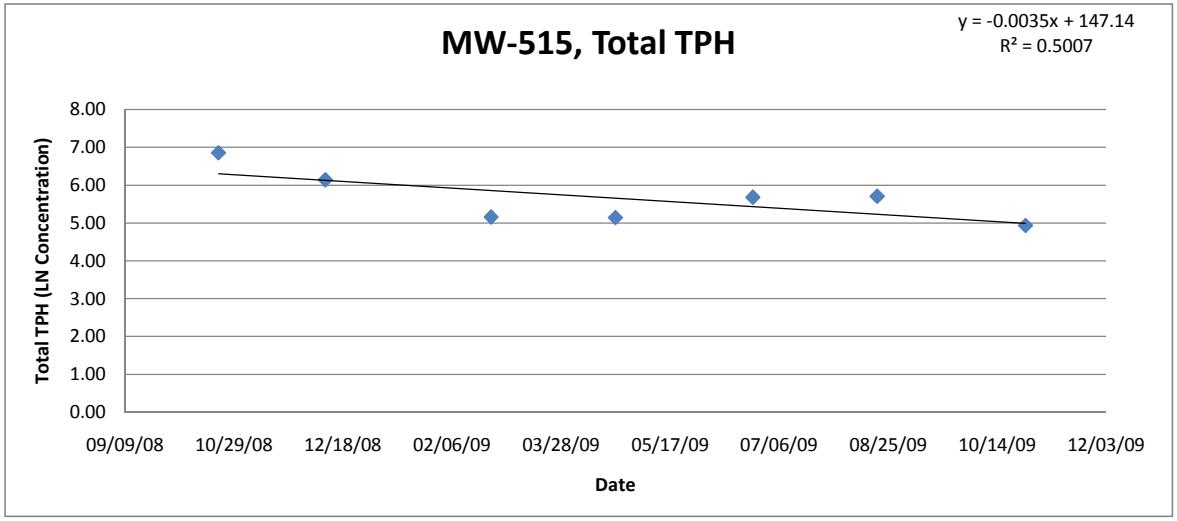
Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm
CUL = Cleanup Level

Sample Information
Sample Location **MW-515, East Side**
Constituent **Total TPH**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	947	6.85
12/10/08	464	6.14
02/24/09	174	5.16
04/22/09	171	5.14
06/24/09	293	5.68
08/20/09	301	5.71
10/27/09	139	4.93



Abbreviations and Notes
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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.707632385
R Square	0.500743592
Adjusted R Square	0.40089231
Standard Error	0.519505744
Observations	7

ANOVA

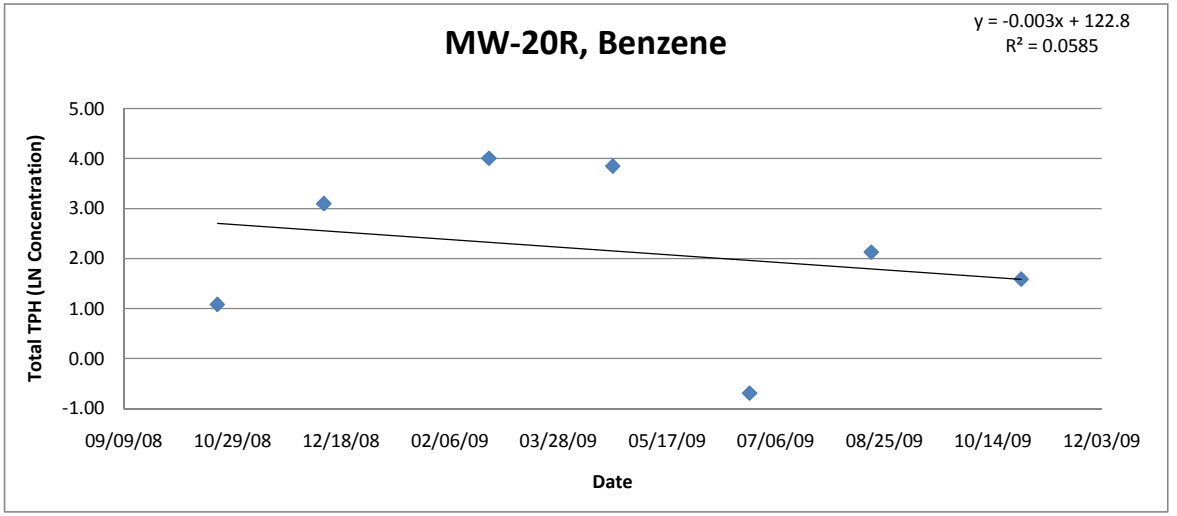
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.353450773	1.35345077	5.01489398	0.075271697
Residual	5	1.349431092	0.26988622		
Total	6	2.702881864			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	147.1429061	63.17963234	2.3289611	0.06729826	-15.26550916	309.5513213
X Variable 1	-0.003543745	0.001582456	-2.2393959	0.0752717	-0.007611578	0.000524087

Sample Information
Sample Location **MW-20R, West Side**
Constituent **Benzene**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/22/08	2.95	1.08
12/10/08	22.2	3.10
02/24/09	55	4.01
04/22/09	47	3.85
06/24/09	1	-0.69
08/19/09	8.4	2.13
10/27/09	4.9	1.59



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.241886474
R Square	0.058509066
Adjusted R Square	-0.129789121
Standard Error	1.777660132
Observations	7

ANOVA

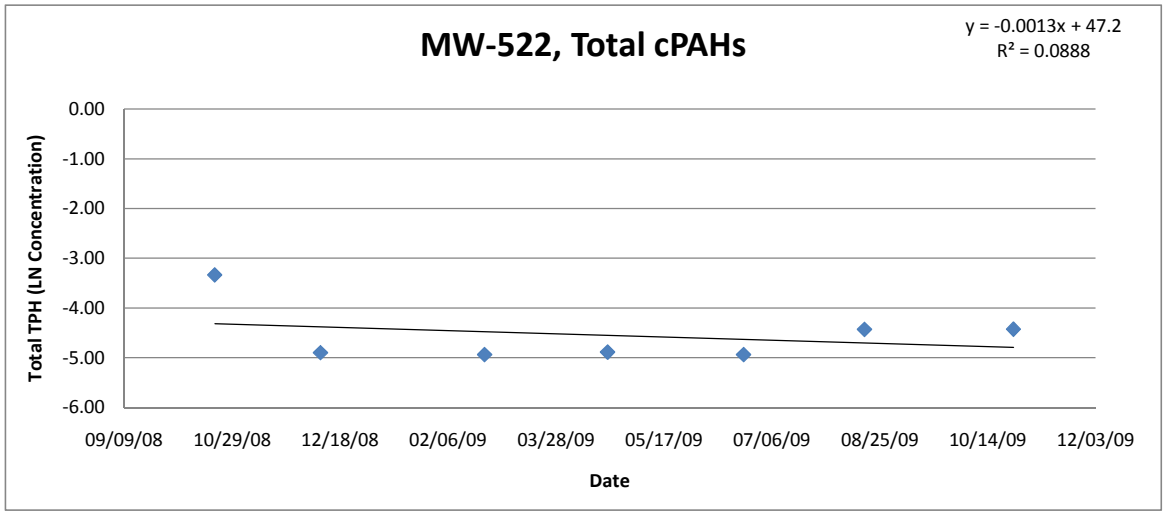
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.981916354	0.98191635	0.31072559	0.601267649
Residual	5	15.80037773	3.16007555		
Total	6	16.78229408			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	122.7952764	216.4296998	0.56736796	0.59498929	-433.5549784	679.1455311
X Variable 1	-0.00302177	0.005420919	-0.55742766	0.60126765	-0.016956687	0.010913146

Sample Information
Sample Location **MW-522, West Side**
Constituent **Total cPAHs**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/21/08	0.03560	-3.34
12/09/08	0.00747	-4.90
02/23/09	0.00719	-4.94
04/21/09	0.00755	-4.89
06/23/09	0.00719	-4.94
08/18/09	0.01192	-4.43
10/26/09	0.01197	-4.43



Abbreviations and Notes
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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.297910462
R Square	0.088750643
Adjusted R Square	-0.093499228
Standard Error	0.609112211
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.180675344	0.18067534	0.48697232	0.516392232
Residual	5	1.855088425	0.37101769		
Total	6	2.035763769			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	47.20022779	74.15740982	0.63648701	0.55245201	-143.4274628	237.8279184
X Variable 1	-0.001296205	0.001857469	-0.69783402	0.51639223	-0.00607098	0.003478571

Sample Information

Sample Location **MW-135, East Side**

Constituent **Total cPAHs**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/27/08	0.00740	-4.91
12/15/08	0.00712	-4.94
02/27/09	0.07928	-2.53
04/24/09	0.00712	-4.94
06/29/09	0.00740	-4.91
08/24/09	0.01197	-4.43
10/29/09	0.01190	-4.43

Abbreviations and Notes

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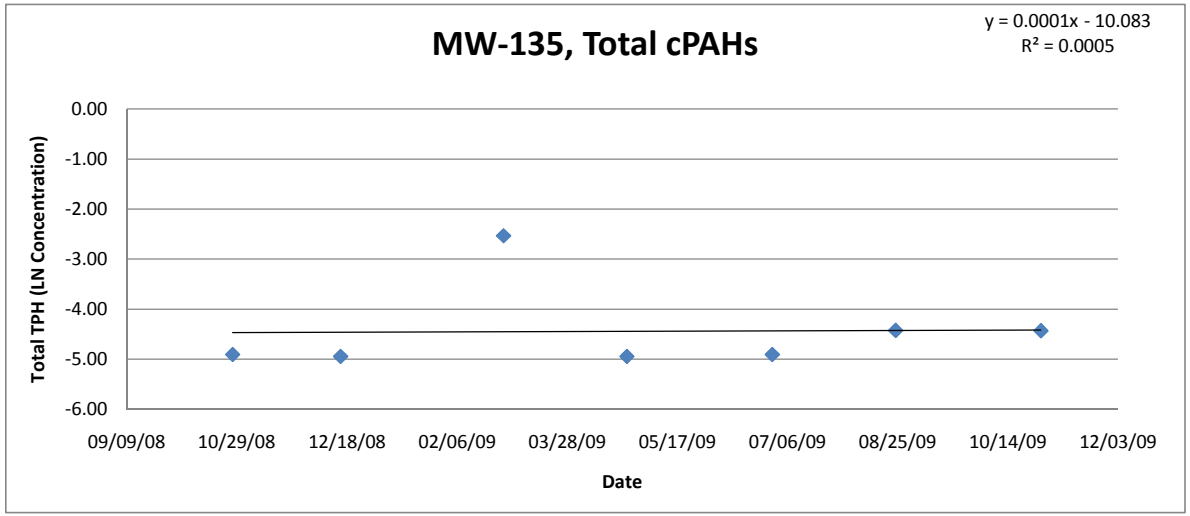


SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.021568877
R Square	0.000465216
Adjusted R Square	-0.19944174
Standard Error	0.956319828
Observations	7

ANOVA

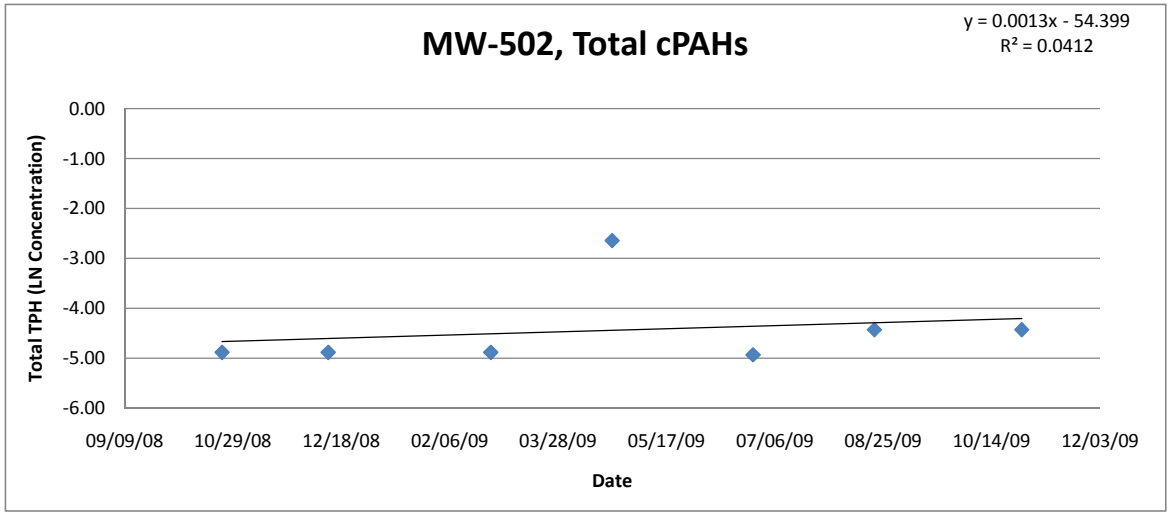
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.002128303	0.0021283	0.00232716	0.963392055
Residual	5	4.572738071	0.91454761		
Total	6	4.574866374			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-10.08265239	116.9287687	-0.08622901	0.93463096	-310.6576212	290.4923164
X Variable 1	0.00014127	0.002928435	0.0482407	0.96339205	-0.007386511	0.007669051

Sample Information
Sample Location **MW-502, East Side**
Constituent **Total cPAHs**

Data

Sample Date	Concentration (ug/L)	LN Concentration
10/24/08	0.00755	-4.89
12/12/08	0.00755	-4.89
02/25/09	0.00755	-4.89
04/22/09	0.07120	-2.64
06/26/09	0.00719	-4.94
08/21/09	0.01190	-4.43
10/28/09	0.01190	-4.43



Abbreviations and Notes

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.203017958
R Square	0.041216291
Adjusted R Square	-0.15054045
Standard Error	0.883938133
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.16794304	0.16794304	0.21494051	0.662404559
Residual	5	3.90673311	0.78134662		
Total	6	4.07467615			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-54.39894515	107.753737	-0.50484509	0.63512569	-331.3887442	222.5908539
X Variable 1	0.001251215	0.002698814	0.46361677	0.66240456	-0.005686306	0.008188737

Sample Information

Sample Location **MW-510, East Side**

Constituent **Total cPAHs**

Data

Sample Date	Concentration	LN Concentration
	(ug/L)	
10/23/08	0.14900	-1.90
12/11/08	0.07470	-2.59
02/26/09	0.03179	-3.45
04/27/09	0.00733	-4.92
06/24/09	0.01487	-4.21
08/20/09	0.01190	-4.43
10/28/09	LNAPL	

Abbreviations and Notes

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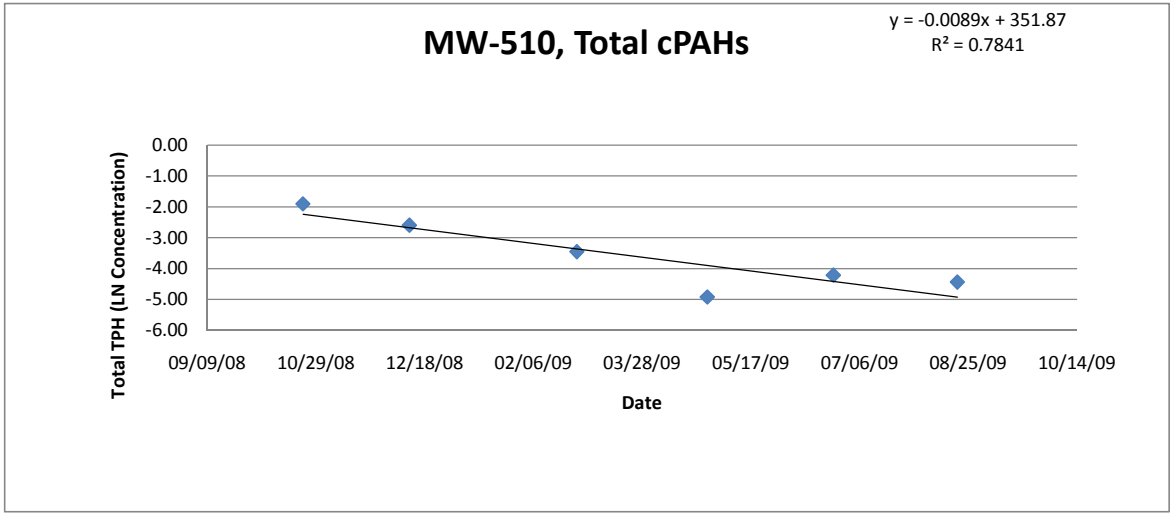
CUL = Cleanup Level



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.885477135
R Square	0.784069756
Adjusted R Square	0.730087195
Standard Error	0.601526255
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5.255455882	5.25545588	14.5245009	0.018922218
Residual	4	1.447335344	0.36183384		
Total	5	6.702791225			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	351.8687148	93.26795359	3.77266469	0.01955935	92.91536159	610.822068
X Variable 1	-0.0089097	0.002337828	-3.81110232	0.01892222	-0.01540055	-0.00241885