



ASSOCIATED
ENVIRONMENTAL
GROUP, LLC

**Draft Site Remedial Action,
Groundwater Summary Report,
and
“No Further Action” Request**

**Former Brumfield-Twidwell
Ecology Agreed Order DE2953
301 East Pioneer Avenue
Montesano, Washington 98563**

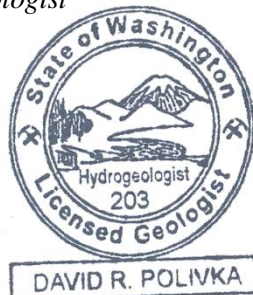
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1.0 INTRODUCTION

Associated Environmental Group, LLC (AEG) has completed the Final Site Remedial Action and Groundwater Evaluation at the former Brumfield-Twidwell facility, located at 301 East Pioneer Avenue in Montesano, Grays Harbor County, Washington (the Site). The Remedial Action was performed in general accordance with the Final Corrective Action Plan (CAP) submitted to the Washington State Department of Ecology (Ecology) dated September 26, 2011 (AEG, 2011a). The CAP and a Remedial Investigation and Feasibility Study (RI/FS), documented in a report dated October 6, 2011 (AEG, 2011b), were completed in accordance with the State of Washington Department of Ecology (Ecology) Agreed Order (AO) DE2953 (Ecology, 2006) between Ecology and Mr. Bryan Kolb, the Site former property owner, under Ecology Model Toxics Control Act (MTCA) *Chapter 173-340 of the Washington Administrative Code (WAC) (Ecology, 2001 and revised 2007)*.

This report documents the remedial action activities and the confirmation groundwater monitoring that has occurred at the Site and requests a “Letter of Satisfaction”/“No Further Action” from Ecology.

1.1 Site History

The Site, located at the southeast intersection of Sylvia Street and Pioneer Avenue in Montesano, Washington, is currently occupied by Anchor Bank (Figure 1 – *Site Vicinity Map*). It is 0.21 acre in size and corresponds to Grays Harbor County Parcel No. 079000400100 (in Section 7, Township 17 North, and Range 7 West). South of the Site is a Grays Harbor PUD power substation; west of the Site across Sylvia Street is the Pick-Rite Thriftway property (also known as the Montesano Thriftway) which historically contained fueling stations. To the north of the Site across Pioneer Avenue is the City of Montesano Fire Station.

Pioneer Avenue was once the main thoroughfare through the City prior to construction of Washington Highway 8 and therefore was lined with numerous fueling stations. The Site was occupied by the Shell Oil Company in 1928 as a gasoline service station and was steadily occupied by retail gasoline stations and auto repair shops until 2005. Brumfield-Twidwell acquired the property in 1966 and added an automotive dealership. Mr. Bryan Kolb purchased the property from Brumfield-Twidwell in 1997. At the time, the Site had a mixed use single story structure that was leased to the Campbell Group and Ken’s Automotive Repair Shop. Mr. Kolb leased the building spaces to various tenants until 2005 when the structure was demolished to make way for a proposed new development.

Previous UST System Decommissioning and Investigations

In 1991, a Phase I & II Environmental Site Assessment investigation was performed by KD&S Environmental Services (KD&S). According to the KD&S report, four underground storage tanks (USTs) that were associated with Brumfield/Twidwell operation were properly

decommissioned at the Site. Two tanks were decommissioned in place by filling them with sand slurry; one tank was filled with a concrete mixture, and one tank was removed. No soil samples were taken for chemical analysis during the decommissioning process. Soil field screening was performed and the results were below MTCA Method-A cleanup levels. It is not known how the soil was screened or how a determination was made that the results were below the MTCA cleanup levels.

In 1995, potentially up gradient from the Brumfield/Twidwell property, two 300-gallon unleaded gasoline tanks were decommissioned at the Montesano Fire Department by Northwest Testing Company (Northwest Testing). The location of the tanks was in the northeast corner of the fire department property immediately adjacent to a pressurized water line and a City of Montesano sewer line. It has been reported that the sewer line may have actually been partially exposed along the eastern sidewall of the excavation.

Northwest Testing reported that contaminated soil which contained gasoline-range petroleum hydrocarbons as well as benzene, toluene, ethylbenzene, and total xylenes (BTEX), exceeding the MTCA Method-A cleanup levels, was left in place. A composite soil sample from the east sidewall of the tank excavation and composited from the surface to a depth of 19 feet below ground surface (bgs) contained gasoline-range petroleum hydrocarbons at 15,800 mg/kg. Northwest Testing indicated that samples from the base of the excavation were not able to be obtained but that the soil appeared to be contaminated. Groundwater was assumed to be affected but no testing was conducted.

In 2000, Northwest Testing Company completed a "Level II Site Characterization Study" for the Montesano Fire Department. In that study, eight "strata-probe" borings were installed and sampled surrounding the fire department property. One sample from each boring was collected for analysis at a depth of 12 to 15 feet bgs. In addition, a second sample was also collected at a depth of 9 to 12 feet bgs from two borings in the southwest portion of the property which was thought to be down gradient from the former tank location. Groundwater samples were also collected in the two borings in the southwest portion of the property.

The sample analyses in the 2000 study did not detect petroleum hydrocarbons. However, samples were not collected in or adjacent to the sewer line or in the former tank excavation area where contamination had previously been documented. Because of the presence of the sewer and water lines, contamination may have migrated along preferential pathways created by those utilities toward the Brumfield/Twidwell property. This potential pathway was not investigated. To our knowledge, no additional groundwater sampling, characterization, monitoring or treatment has been initiated on the Fire Department site as of the date of this report.

Ecology Area-wide Investigation

In 2005 and 2007, because of the reports of wide-spread contamination in the area, GeoEngineers, under contract to Ecology, began a soil and groundwater assessment in the City of Montesano downtown commercial area. The preliminary results indicated that there was a widespread area of soil and groundwater contamination from a cluster of contaminated sites along Main Street and Pioneer Avenue. The former Brumfield-Twidwell site was one of six confirmed contaminated sites, along with ten suspected sites, within this cluster.

Amongst the findings, GeoEngineers concluded that the former gravity-flow sanitary sewer system (which was replaced with a pressurized step-up system) along with the City of Montesano (City) storm drainage system:

“...may be providing preferential pathways for petroleum-related contamination to spread from downtown Montesano towards the waterway to the south...” (GeoEngineers, 2005 and 2007)

GeoEngineers also reported that during installation of the new system:

“...it was observed that some of the subsurface soil and groundwater in Montesano contained petroleum contamination; although a complete investigation was not undertaken at that time. The gravity flow sanitary sewer was not abandoned by backfilling, so groundwater continues to infiltrate and flow within the former sanitary sewer pipes. Additionally, groundwater leaks into the City’s stormwater system.” (GeoEngineers, 2007).

As part of that investigation, GeoEngineers installed four “Geoprobe[®]” borings in the vicinity of the Montesano Fire Department and Brumfield/Twidwell property. They also sampled the former sewer line water at the intersection of Pioneer Avenue and Sylvia Street.

Of the soil samples collected from the borings, only one sample collected adjacent to or in the former tank location of the fire department detected petroleum hydrocarbons. However, it should be noted that the backfill of the sewer line was not sampled. If the sewer backfill was acting as a preferential contaminant migration pathway, it would have been contaminated and not the areas outside of it unless there was another potential migration pathway intersecting it.

The analysis of water samples collected from inside the former sewer line did not detect petroleum hydrocarbons. This may be because contamination either had not infiltrated the sewer piping or as a result of dilution of any contamination that may have infiltrated. The potential for dilution can be seen in other samples collected in areas known to have free product on the groundwater but petroleum hydrocarbons were either not detected or detected at relatively low levels in the sewer water samples adjacent to those areas.

Subsurface Investigation -2005

In June 2005, a series of test pits were excavated along the west side of the Site to delineate the extent of soil contamination. The results indicated that clean soil extended from ground surface to depths of between four feet at the northeast corner of the property to approximately eight feet in the middle of the property. Below these depths, to the ground water table, the soil appeared to contain petroleum hydrocarbons at concentrations greater than MTCA Method-A cleanup levels. Groundwater depths ranged from approximately 11.5 feet to 12.3 feet below ground surface.

Interim Remedial Action (Soil Excavation and UST Decommissioning) – 2005

In September 2005, AEG directed the excavation and disposal of approximately 2,079 tons of petroleum contaminated soil (PCS) from the Site. The contaminated soil was identified at approximately four feet below ground surface (bgs) to a total depth of 19 feet bgs. After excavation samples collected from the sidewalls and base of the excavation indicated that residual contamination was present at a depth of 10 to 19 feet bgs. Samples from the sidewalls collected did not reveal contamination shallower than 10 feet bgs. The contamination found in the sidewalls at a depth of 10 to 15 feet bgs appeared to be present under the sidewalk along the western wall of the excavation and along the eastern sidewall under a driveway. The north, northwest, northeast and southern sidewalls samples did not reveal contamination. The excavation extended from the northwestern corner of the property approximately 37 feet to the east and 130 feet to the south. Figure 2 – *Site Plan* shows the limits of the excavation.

During the excavation, another UST, approximately 10,000 gallons in capacity, was discovered on the Site. It was determined that this tank may have been a “waste oil” tank. The tank was decommissioned by removing it from the ground. The soils beneath the tank showed signs of being heavily impacted by petroleum contamination and were subsequently excavated for disposal. After excavation of the soil, clearance samples of soil were collected and analyzed from beneath the former “waste oil” tank and were reported as non-detect.

Supplemental Site & Offsite Remedial Investigation – 2005 & 2006

In November and December of 2005, additional test pits were excavated at the Site in search of additional PCS. PCS was identified at the southern edge of the September 2005 excavation, to a depth of 12 feet bgs. However, laboratory analysis of soil samples indicated that the soils contained low concentrations of gasoline range hydrocarbons below the MTCA Method-A cleanup level and benzene concentrations slightly above the Method-A cleanup levels. Based on the laboratory results, a determination was made that the benzene levels were inconsistent and that the contamination was not widespread enough to warrant additional excavation of the soils. Figure 2 – *Site Plan* shows the extent of the September 2005 excavation.

In February 2006, groundwater from four existing monitoring wells at the Site and two off-site wells located in the middle of Pioneer Street in front of the fire station known as the Stemen

wells was sampled. Laboratory results showed that monitoring well MW-2 in the northwest corner of the former Brumfield-Twidwell property was impacted by petroleum hydrocarbons, specifically gasoline and BTEX, above the MTCA Method-A cleanup levels. The samples from the Stemen wells, and the on-site MW-1, and MW-4 contained no detectable concentrations of gasoline or BTEX. (Note: because of the area-wide contamination, the Site wells are now designated BTMW-*x* in order to be consistent with the designation used by Ecology during the regional investigations.) It should be noted that the Stemen wells are located north of the City of Montesano sewer line. In addition, the construction and installation of those wells has not been documented and the usefulness of those wells has been questioned by the department of Ecology.

In March of 2006, nine “Geoprobe[®]” borings were advanced along Sylvia Street to further characterize subsurface conditions in the area. Analytical results of soils collected from the borings indicated that east side of Sylvia Street was impacted to the north of the PUD and the west side of Sylvia Street was impacted to the Pick-Rite Thriftway driveway. It was also likely that the soils under the west sidewalk and the Thriftway parking lot to the west were also impacted. A separate investigation of the Thriftway property along with monitoring wells has been undertaken by Pick-Rite Thriftway. Because of the findings from the “Geoprobe[®]” borings, two additional groundwater monitoring wells (BTMW-5 and BTMW-6) were installed on the west side of Sylvia Street to supplement the four existing on-site wells.

Agreed Order – 2006

In 2006, subsequent to the source removal of the PCS at the Site and the soil investigations, Mr. Kolb entered an Agreed Order with Ecology (Ecology, 2006). As part of the Agreed Order, groundwater monitoring/sampling events at the Site were to be continued on an annual basis to monitor the constituents of concern (gasoline range Total Petroleum Hydrocarbons (TPH) and BTEX) and would involve the monitoring and sampling at only wells BTMW-2, BTMW-5, and BTMW-6.

In addition to the groundwater monitoring, an RI/FS was to be completed and a CAP prepared for the Site. The final RI/FS report was submitted to Ecology on October 6, 2011 and a CAP submitted to Ecology on September 26, 2011.

Annual Groundwater Monitoring

Annual groundwater monitoring/sampling activities began in 2006 and continued until post-remedial action quarterly monitoring was begun in April 2012. Two additional wells not specified in the required annual monitoring (PRMW-9 and PRMW-10) were added to the quarterly monitoring in 2012 as part of the confirmation monitoring following the remedial actions at the Site.

Table 1, *Summary of Groundwater Analytical Results – Former Brumfield-Twidwell & Pick Rite*, presents analytical results for all monitoring wells at the Site and the two offsite wells at the Pick Rite Property (PRMW-9 and PRMW-10). Elevated concentrations of gasoline range TPH and selected volatile organic compounds (VOC) are above Ecology MTCA Method-A groundwater cleanup levels at only BTMW-2 as of January 2013. These constituents of concern were previously above cleanup levels at BTMW-5, BTMW-6, and PRMW-9.

Corrective Action Plan (CAP) - 2011

The CAP presented a conceptual model for the release and distribution of the contamination at the Site and off-site areas. Based on the conceptual model, the CAP proposed remedial actions that were to take place at the Site. The objective of the remedial actions was to:

- Remediate and restore the groundwater quality at the northwest corner of the Site (well BTMW-2) and associated off-property downgradient areas (as represented by wells BTMW-5, BTMW-6, and the Pick-Rite Well PRMW-9) to concentrations below Ecology MTCA Method-A groundwater cleanup levels; and
- Minimize the potential for exposure to humans and the environment.

The wells were chosen based on the groundwater flow direction at the site and at the adjacent Pick-Rite site which showed groundwater converging toward the sewer line that runs along Sylvia Street. Figures 3 and 4 present the groundwater flow directions at the two sites.

Based on the conceptual site model, the proposed remedial actions at the Site involved a staged approach to in-situ bioremediation comprising of chemical oxidation and aerobic biodegradation of petroleum hydrocarbon. The primary components of the proposed remedial actions were as follows:

- In-Situ chemical oxidation using Regenesi's RegenOx[®] to release and oxidize sorbed and soil-matrix bound petroleum hydrocarbon in the vadose zone and saturated zone, as well as the dissolved phase in groundwater;
- Using Regenesi's Oxygen Releasing Compound (ORC[®]) to accelerate the microbial degradation of remaining petroleum hydrocarbon in the impacted vadose zone and groundwater; and
- Monitoring the groundwater for compliance with the cleanup standards.

As per an agreement with the Ecology Site Manager, four groundwater sampling events were proposed after the completion of in-situ bioremediation activities. Completion of the fourth groundwater monitoring and sampling event would represent the final activities for the proposed remedial action and also as the final environmental investigation activities conducted for the Site and for associated off-property areas. The five core wells (BTMW-2, BTMW-5, BTMW-6, PRMW-9, and PRMW-10) would be monitored and sampled for four quarterly compliance groundwater monitoring/sampling events after the completion of bioremediation.

The CAP was implemented in January 2012. The activities and results of implementing the CAP are discussed below.

2.0 REMEDIAL ACTIONS

In January 2012, AEG implemented the remedial actions proposed in the CAP. In discussions with Regenesis, the manufacturer of RegenOx[®] and ORC[®], it was decided that because of the declining contaminant concentrations found in the annual groundwater monitoring that only the ORC[®] was needed to obtain the objectives of the remedial action.

2.1 Remedial Action Summary

AEG completed the In-Situ Bioremediation Remedial Action on January 5th, 2012 in order to remediate and restore the groundwater quality at the northwest corner of the Site (well BTMW-2) and associated off-property downgradient areas (as represented by wells BTMW-5, BTMW-6, PRMW-9, and PRMW-10) to concentrations below Ecology MTCA Method-A groundwater cleanup levels and minimize the potential for exposure to humans and the environment.

The remedial technology for the cleanup action at the Site involved in-situ bioremediation comprised of aerobic biodegradation of petroleum hydrocarbon. The primary component of this remedial action was as follows:

- Regenesis Oxygen Releasing Compound (ORC[®]) was used to accelerate the microbial degradation of remaining petroleum hydrocarbon impacted vadose zone and groundwater. This compound is a proprietary mixture that slowly releases oxygen into the subsurface producing an oxidizing environment and allows the natural biological activity to degrade the TPH.

A total of 1,000 pounds of ORC[®] was evenly divided between 10 injection points and injected subsurface into the areas of concern as listed above. A product mix ratio of 10 pounds of product to every 4 gallons of water resulted in the total injection of approximately 400 gallons of water (100 lbs. of product per 40 gallons of water per injection point). Three injections were conducted near well PRMW-9, two near well BTMW-5, three near well BTMW-2, and the remaining two were injected near well BTMW-6. Figure 5 - *ORC[®] Injection Points* shows the locations of the injection points. The ORC[®] mixture was injected in one foot increments beginning at a depth of 15 feet bgs and ending at a depth of 5 feet bgs.

2.2 Post-Remedial Action Groundwater Monitoring

Following the injection of the ORC[®], AEG implemented quarterly groundwater monitoring sampling events. The events occurred in April 2012, August 2012, October 2012, and January 2013. The sampling events and the results are discussed below.

2.2.1 Sampling Activities

At each sampling event AEG:

- Obtained depth-to-water measurements at monitoring wells BTMW-2, BTMW-5, BTMW-6, PRMW-9, and PRMW-10 at the Site;
- Assessed for potential presence of light non-aqueous phase liquid (LNAPL), i.e., free product, at all monitoring wells. An EnviroTech Interface Probe (Model H01L/SM01L) was used to determine if LNAPL was present, and if detected, LNAPL presence was verified with a disposable bailer;
- Conducted limited well development/purge via a peristaltic pump at a low-flow purge rate (less than 0.5 liters per minute) utilizing dedicated polyethylene tubing;
- Recorded field parameters including pH, conductivity, temperature, dissolved oxygen, total dissolved solids (TDS), and salinity during purging activities;
- Collected a representative groundwater sample from monitoring wells BTMW-2, BTMW-5, BTMW-6, PRMW-9, and PRMW-10 in laboratory provided containers. The containers were labeled and placed in a portable chilled ice chest and transported to the analytical laboratory, Libby Environmental Inc. following industry standard chain-of-custody procedures; and
- Compared the analytical results to Ecology MTCA Method-A groundwater cleanup levels for the constituents of concern.

All of the groundwater samples were analyzed using the following methods:

- Gasoline range TPH by Northwest Method NWTPH-Gx;
- VOCs including benzene, toluene, ethylbenzene, total xylenes (BTEX) by EPA Method 8260C; and
- Total lead by EPA Method 7421.

2.2.2 Analytical Results

Figure 2 - *Site Plan*, presents the Site layout and locations of all groundwater monitoring wells. Table 1 - *Summary of Quarterly Groundwater Analytical Results*, presents the laboratory results for all groundwater sampling events. Table 2 - *Summary of Quarterly Groundwater Elevations*, presents the monitoring well/groundwater summary elevation data, and Table 3 - *Summary of Water Quality Indicator Parameters*, presents the field parameters recorded. It should be noted that in Table 3, the August 2012 pH readings were reported as negative numbers. This is because at the time of the readings, the pH meter was malfunctioning and the recorded readings are not valid. The laboratory analytical documents for the April 2012, August 2012, October 2012, and January 2013 quarterly events are included in Appendix A - *Analytical Laboratory Results*.

Monitoring Well BTMW-2

During the April 2012 monitoring event, gasoline range TPH was detected at 1,860 micrograms per liter (ug/L) in the water from monitoring well BTMW-2, located in the northwestern portion of the Site. This is above the Ecology MTCA Method-A cleanup level of 1,000 ug/L for samples that do not contain benzene. However, it is significantly lower than the highest concentration measured at 58,000 ug/L in 2006. Other constituents of concern were also detected at BTMW-2 (ethylbenzene at 7.2 ug/L and total xylenes 99.1 ug/L). However, these concentrations are below their respective groundwater cleanup levels of 700 ug/L and 1,000 ug/L respectively.

In the August 2012 event, no constituents of concern were detected in the samples from monitoring well BTMW-2.

During the October 2012 event, gasoline range TPH was detected in the water from monitoring well BTMW-2 at 1,510 ug/L. This is above Ecology MTCA Method-A groundwater cleanup level (1,000 ug/L). Other constituents of concern were detected in the sample from BTMW-2 (toluene at 1.11 ug/L, ethylbenzene at 8.49 ug/L, and total xylenes at 105 ug/L). These concentrations are below their groundwater cleanup levels of 1,000 ug/L, 700 ug/L and 1,000 ug/L respectively.

During the January 2013 sampling event, Gasoline range TPH was detected at 871 ug/L. This is below the Ecology MTCA Method-A cleanup level of 1,000 ug/l for samples that do not contain benzene. Ethylbenzene and total xylenes were also detected below the respective MTCA Method-A cleanup levels at 4.4 and 52.4 ug/L respectively.

Monitoring Well BTMW-5

In monitoring well BTMW-5, none of the organic constituents of concern were detected in any of the groundwater monitoring events conducted after injection of the ORC[®].

Total lead was observed in the April 2012 and the January 2013 sampling events. In April 2012, lead was detected at a concentration of 5.4 ug/L which is below the MTCA Method-A cleanup level of 15 ug/L. In the January 2013 sampling event, total lead was observed above the MTCA Method-A cleanup level at 23 ug/L. In both of those sampling events, field observations noted that the water from monitoring well BTMW-5 was turbid at the time of sampling. In addition, the measurements of total dissolved solids (TDS) were higher than in the other two sampling events (Table 3, *Summary of Water Quality Indicator Parameters*). Based on these observations, it is thought that the total lead observed is from fine grained silty material suspended in the water during purging and are not representative of the lead concentrations actually in the water.

Monitoring Well BTMW- 6

In April 2012, gasoline range TPH was detected in the water at monitoring well BTMW-6 below the MTCA Method-A cleanup level at 540 ug/L. The concentrations dropped to being non-

detectable during the August and October 2012 sampling events. In January 2013, gasoline range TPH was again detected below the MTCA Method-A cleanup level at 253 ug/L.

Total lead was detected in the water sample collected from monitoring well BTMW-6 during the August 2012 sampling event. Total lead was detected at 5.1 ug/L below the MTCA cleanup level of 15 ug/L.

Toluene was detected in the sample collected during the October 2012 sampling event at 1.43 ug/L. This is significantly below the MTCA Method-A cleanup level of 1,000 ug/L. It was not detected in any of the other sampling events conducted after injection of the ORC[®].

Other than those previously noted, none of the other constituents of concern were observed during the sampling events at monitoring well BTMW-6.

Monitoring Well PRMW-9

In monitoring well PRMW-9, gasoline range TPH, ethylbenzene, and total xylenes were detected in each of the sampling events conducted since the injection of the ORC[®]. However, only gasoline range TPH exceeded the MTCA Method-A cleanup levels.

In April 2012, gasoline range TPH was detected at 1,430 ug/L. The concentration decreased to below the MTCA Method-A cleanup level of 1,000 ug/l for samples not containing benzene at 894 ug/L in August 2012 and then increased to 1,120 ug/L in October 2012. In the January 2013 sampling event, the gasoline range TPH decreased to below the MTCA Method-A cleanup level at 482 ug/L.

Ethylbenzene concentrations decreased consistently each sampling event from 13.9 ug/L in April 2012 to 2.0 ug/L in January 2013. Total xylenes decreased in concentration from 45 ug/L in the April 2012 sampling event to 9.4 ug/L in the January 2013 sampling event. These are significantly below the MTCA Method-A cleanup levels of 700 ug/L and 1,000 ug/L respectively.

Total naphthalenes were also detected below the MTCA Method-A cleanup level of 160 ug/L in the August 2012, October 2012, and the January 2013 sampling events at 16.5 ug/L, 29.8 ug/L, and 9.2 ug/L respectively. Unless discussed here, none of the other constituents of concern were detected in the sampling events.

Monitoring Well PRMW-10

None of the constituents of concern were detected in the samples collected from monitoring well PRMW-10 during the sampling events conducted after the injection of the ORC[®] at the Site.

3.0 DISCUSSION

The results from the groundwater sampling events conducted at the Site in April 2012, August 2012, October 2012, and January 2013 show that after the injection of the ORC[®] into the subsurface, the concentrations of the constituents of concern have decreased significantly. There appears to be some fluctuation in the gasoline concentrations possibly due to a “rebound effect” where the gasoline range TPH near the injection points are degraded quickly and then as contaminants migrate from areas not affected by the ORC[®] into the “treatment area” the concentrations increase until degradation occurs. The fluctuation may be also be occurring as contaminants migrate along the preferential pathways (i.e. utilities) identified by GeoEngineers.

A groundwater contour map was not prepared for the quarterly groundwater monitoring/sampling events due to the “linearity” locations of the monitoring wells monitored (BTMW-2, BTMW-5, BTMW-6, PRMW-9, and PRMW-10 as per Ecology Agreed Order). However, based on previous site work at the Site and at neighboring sites, the direction of shallow groundwater migration in the region appears to be generally to the south with some variations to the southeast and southwest. These variations may be due to topography and the influence of utility corridors.

Based on previous work at the Site, the groundwater beneath the Site appears to be flowing to the south-southwest (Figure 3 - *Groundwater Contour Map former Brumfield-Twidwell – January 2007*). This flow direction is toward a sewer line that runs north-south along Sylvia Street as well as a slightly lower topographic elevation in that direction. To the west at the Pick-Rite Thriftway site, the groundwater appears to be flowing to the south-southeast toward the sewer line (Figure 4 - *Groundwater Contour Map Pick-Rite Thriftway – June 2011*). It appears that the sewer line may be acting like a “French drain” for groundwater in this area.

Based on the locations of the wells with the highest concentrations of the constituents of concern (BTMW-2 and PRMW-9), it appears that the contamination found in these wells may be from off-site sources and not the former Brumfield-Twidwell Site.

Monitoring well BTMW-2 is the most upgradient well at the Site. It is downgradient from a potential source of contamination that has not been fully investigated. The Montesano Fire Station is located in what appears to be upgradient to the north of the Site, across Pioneer Avenue. In addition, a sewer line runs between the Fire Station and the Brumfield-Twidwell property. This sewer line may be acting as a preferential migration pathway for petroleum hydrocarbon contamination documented by Northwest Testing in 1995 at the Fire Station. Petroleum hydrocarbon contamination associated with this property has not been fully investigated. Although some additional work has been performed at the Fire Station and in the area, investigation of the sewer line backfill has not been performed. Ecology has acknowledged this situation exists due to Ecology’s lack of budget for subsurface investigative work. It appears that the City of Montesano Fire Department has also not followed up on the necessary subsurface

investigation on the property or in areas adjacent to the Fire Station. It is not known definitively if the Fire Station property may be affecting Well BTMW-2 or not.

The contamination found in Well BTMW-2 may be a result of contamination migrating along the sewer line. It should also be noted that it has been reported that at one time, a historic gasoline dispenser was located in this area of the Site. This too may have contributed to the contamination found in Well MW-2. A great deal of excavation and remedial activities have occurred in this portion of the property. This area was part of the 2005 soil excavation area.

A soil sample collected at 5 feet bgs in the excavation sidewall adjacent to Well BTMW-2 and under where the dispenser may have presumably been located only detected ethylbenzene at 0.07 mg/kg and total xylenes at 0.16 mg/kg. Benzene and gasoline range petroleum hydrocarbons were not detected. However, a sample further to the south collected from the sidewall of the excavation at 10 feet bgs did detect gasoline at 171 mg/kg and benzene at 0.21 mg/kg. Figure 2 – *Site Map* presents the location of the excavation soil samples. Table 4 presents the analytical results from the excavation soil samples.

Monitoring well PRMW-9 appears to be on the west side of the sewer line. Based on the groundwater flow direction observed at the Pick-Rite site (south-southeast), the groundwater found in monitoring well PRMW-9 is coming from the Pick-Rite site and is migrating toward the sewer line and not coming from the direction of the former Brumfield-Twidwell Site. The contaminants of concern found in monitoring well PRMW-9 most likely are from known and potential sources to the west and northwest.

Also, the bulk of the contamination at the former Brumfield-Twidwell Site was primarily in the central and southern portions of the property where the fuel tanks were located. These areas are located downgradient of well BTMW-2. Over-excavation of petroleum contaminated soil and Site remediation occurred in 2005. Monitoring wells BTMW-5 and PRMW-10, located downgradient from where this contamination was remediated, have not detected the contaminants of concern. Although monitoring well BTMW-4 has not been monitored since 2007, historical sampling at that well which is also downgradient from the soil excavation area at the Site did not detect the contaminants of concern above the MTCA Method-A cleanup levels.

4.0 SUMMARY AND CONCLUSIONS

AEG has performed remedial actions at the former Brumfield-Twidwell Site. These actions have included:

- In 2005, excavation of contaminated soil found on the Site following decommissioning of underground storage tanks; and
- In January 2012, the injection of 1,000 pounds Regenesys's Oxygen Releasing Compound (ORC[®]) near monitoring wells BTMW-2, BTMW-5, BTMW-6, and PRMW-9 to enhance bioremediation at the Site.

Following the remedial action in January 2012, quarterly groundwater monitoring was undertaken in wells that were specified in a 2006 Agreed Order with Ecology. Groundwater sampling has occurred in April 2012, August 2012, October 2012, and January 2013. This groundwater monitoring has shown that concentrations of gasoline range TPH and associated volatile constituents have decreased significantly. It is our professional opinion that the significant decrease is due to the ORC[®] injection work performed in January 2012 and used to accelerate the microbial degradation of remaining petroleum hydrocarbons in the impacted vadose zone and groundwater.

The two wells that are being monitored (monitoring wells BTMW-2 and PRMW-9) currently do not have concentration of gasoline range TPH above the MTCA Method-A cleanup levels, but periodically exceed the cleanup levels. However, based on the location of Well BTMW-9 and the groundwater flow direction, it is believed that the contaminants found in that well are from an off-site source and not related to the former Brumfield-Twidwell Site.

For Well BTMW-2, the source of the contamination is not definitively known and may be a result of an off-site source and the city sewer line or it may be residual contamination from a reported historical gasoline dispenser that was reportedly located in that area of the site. However, given the remedial actions previously taken at the site and the overall contribution that may be occurring to the regional groundwater contamination and that the concentrations are not consistently above the cleanup levels, it is our opinion that contamination found does not pose a significant risk to human health and the environment.

5.0 RECOMMENDATIONS

In a meeting that was held between the Ecology site manager for this Site and adjacent sites (Mr. Marv Coleman), AEG, and Mr. Bryan Kolb who formerly owned the former Brumfield-Twidwell Site, it was agreed that following the implementation of the Corrective Action Plan (CAP), (the use of the ORC and four quarters of groundwater monitoring), that additional work at the Site would not be necessary. This has occurred.

Because the CAP has been completed and it is our professional opinion that the groundwater contamination found in monitoring well PRMW-9 is from an off-site source, and that the contamination periodically found in monitoring well BTMW-2 does not appear to pose a significant risk, we recommend that Ecology issue a "Letter of Satisfaction" and terminate the 1996 Agreed Order. In addition, because there does not appear to be contamination at the Site that is related to current or former on-site activities we also recommend that Ecology issue a "No Further Action" determination for this Site.

6.0 REFERENCES

AEG, 2011a, *Final Cleanup Action Plan Former Brumfield – Twidwell Site (Ecology Agreed Order AE DE2953)*, Associated Environmental Group, LLC., September 26, 2011.

AEG, 2011b, *Final Remedial Investigation Report – Former Brumfield/Twidwell Kolb Property*, Associated Environmental Group, LLC., October 6, 2011.

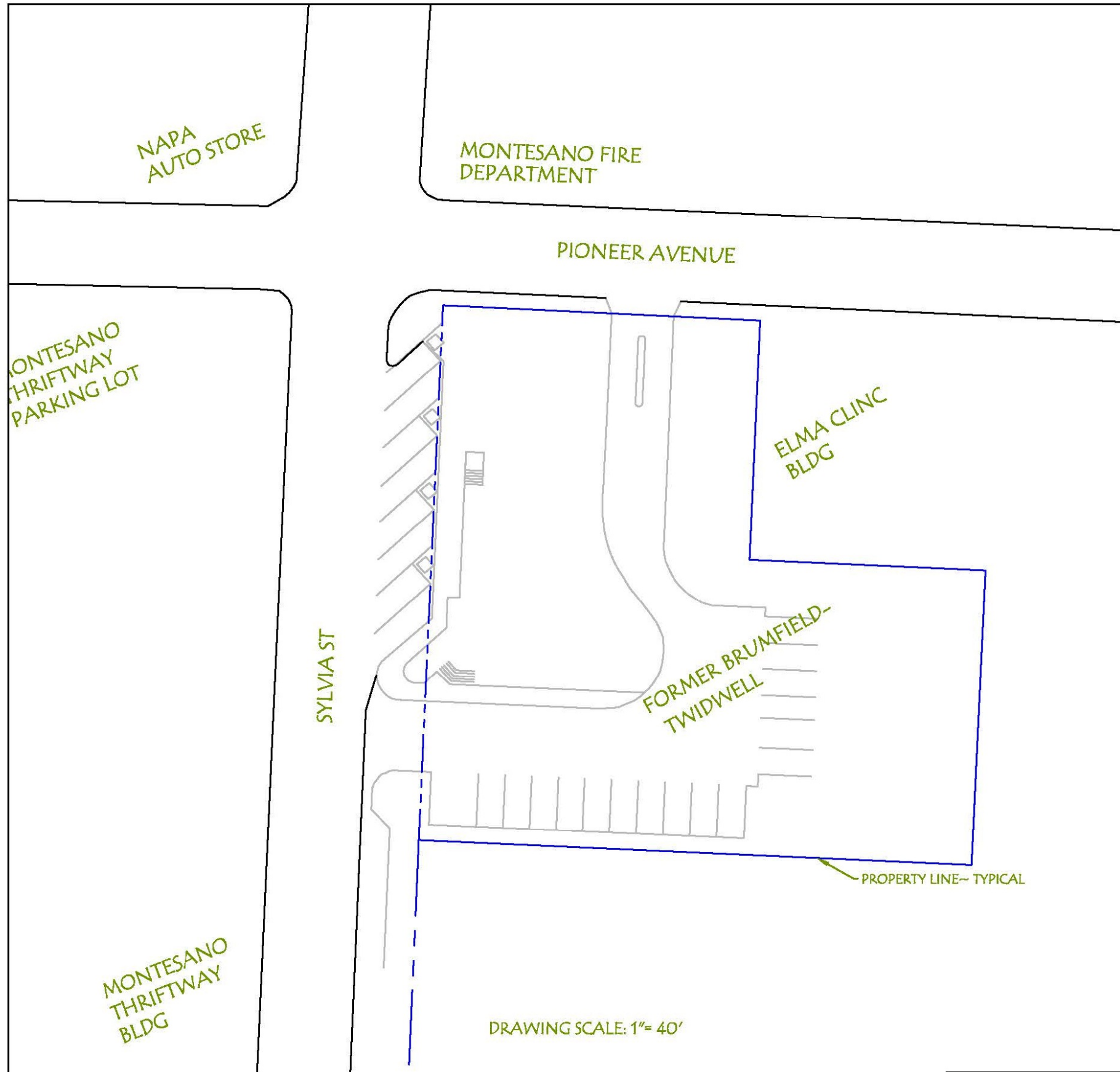
Ecology, 2001, *Model Toxics Control Act Chapter 173-340 of the Washington Administrative Code (WAC)*, Washington State Department of Ecology, 2001 and revised 2007.

Ecology, 2006, *Agreed Order No. AE DE2953* Washington State Department of Ecology, 2006.

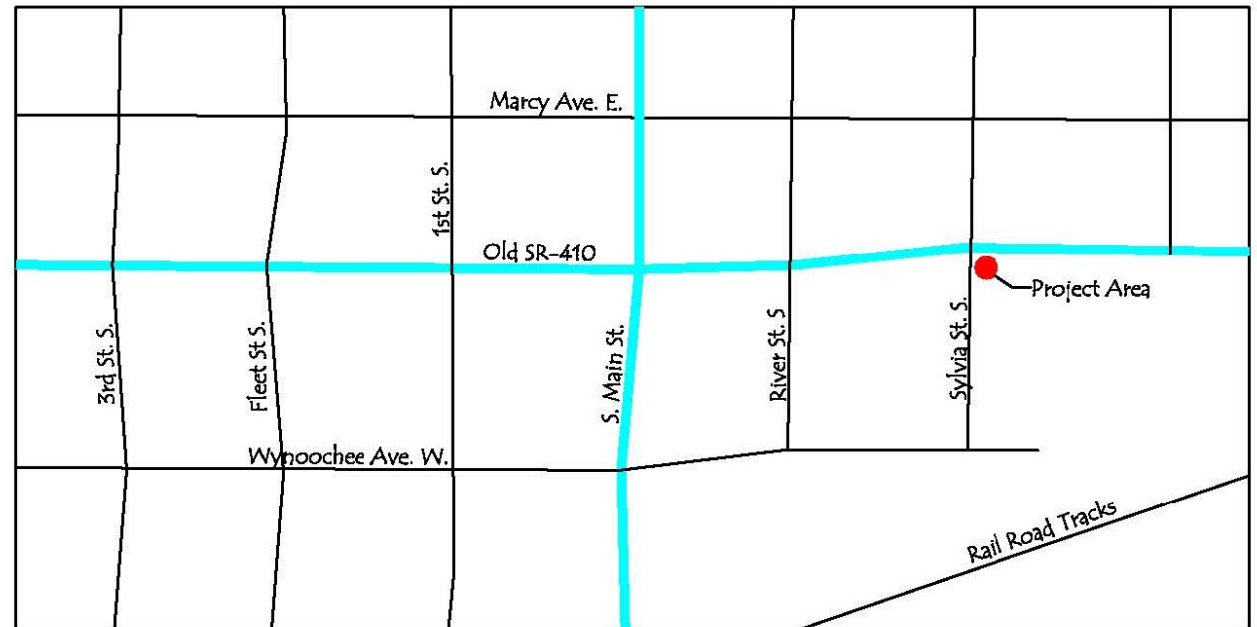
GeoEngineers, 2007, *White Paper – Leaking Underground Storage Tanks, Montesano, Washington File No. 0504-038-00*.

GeoEngineers, 2005, *Groundwater Investigation Downtown Montesano Data Management, Montesano, Washington*

FIGURES



DRAWING SCALE: 1"= 40'



SITE VICINITY MAP (Not to Scale)



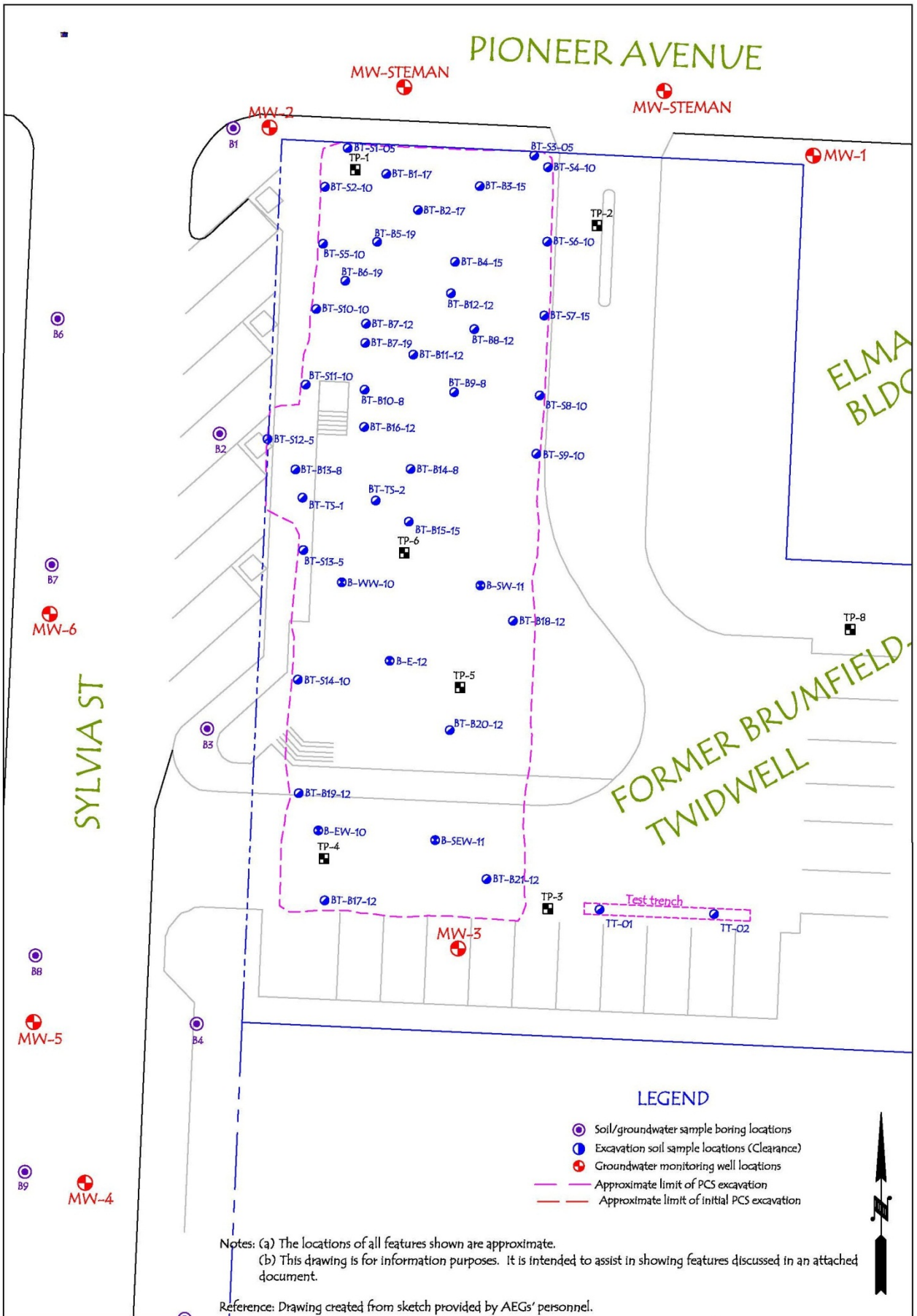
Notes: (a) The locations of all features shown are approximate.
 (b) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from sketch provided by AEGs' personnel.

AE ASSOCIATED ENVIRONMENTAL GROUP, LLC
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FIGURE 1
SITE VICINITY MAP

Former Brumfield-Twidwell 301 E. Pioneer Ave. MONTESANO, WA	
Project: 05-200	Date: 4/1/13



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**FIGURE 2
 SITE MAP**

Former Brumfield--Twidwell 301 E. Pioneer Ave. MONTESANO, WA	
Project: 05-200	Date: 6/29/11

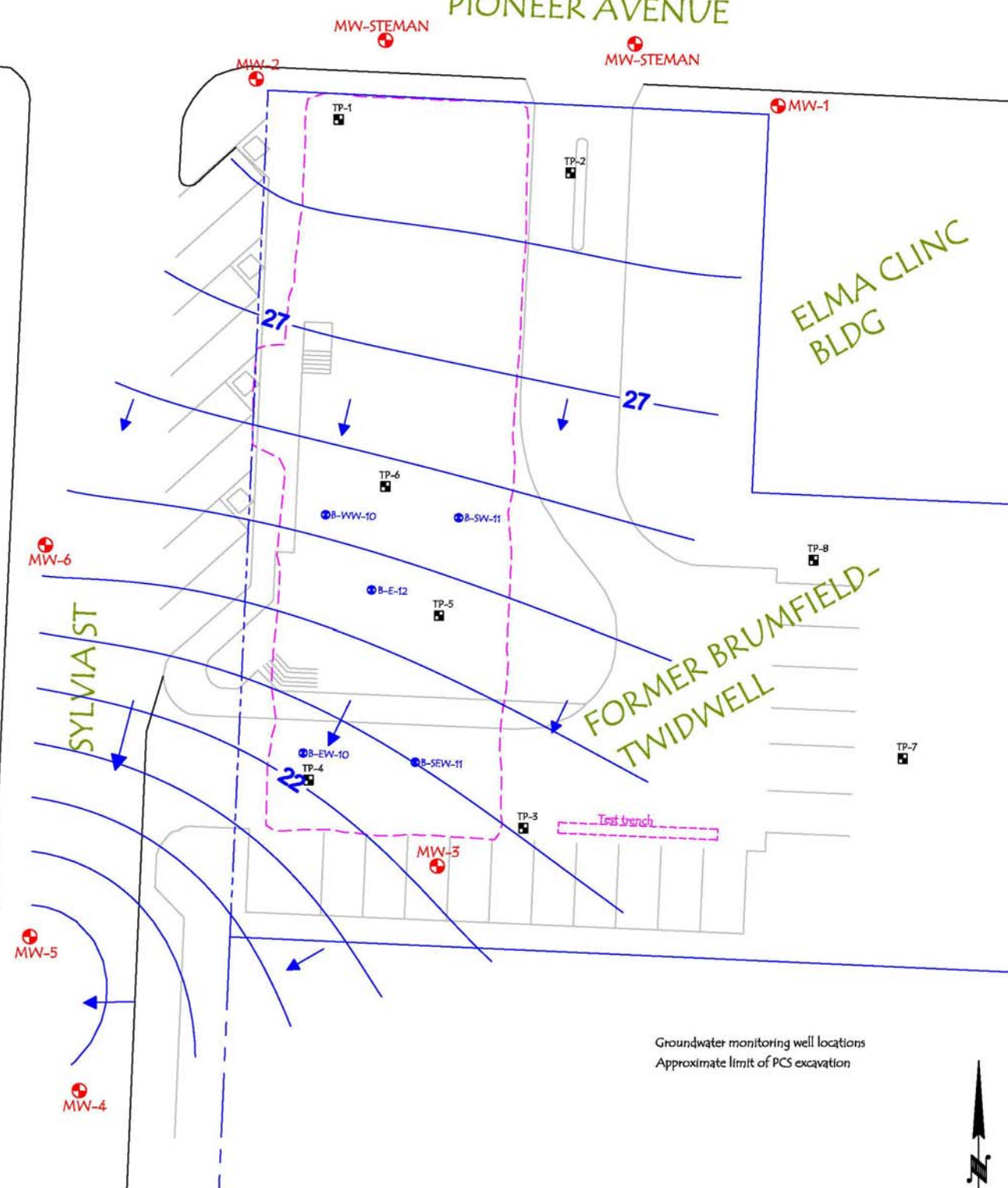
MONTESANO FIRE DEPARTMENT

PIONEER AVENUE

ELMA CLINC BLDG

FORMER BRUMFIELD-TWIDWELL

SYLVIA ST



Groundwater monitoring well locations
Approximate limit of PCS excavation



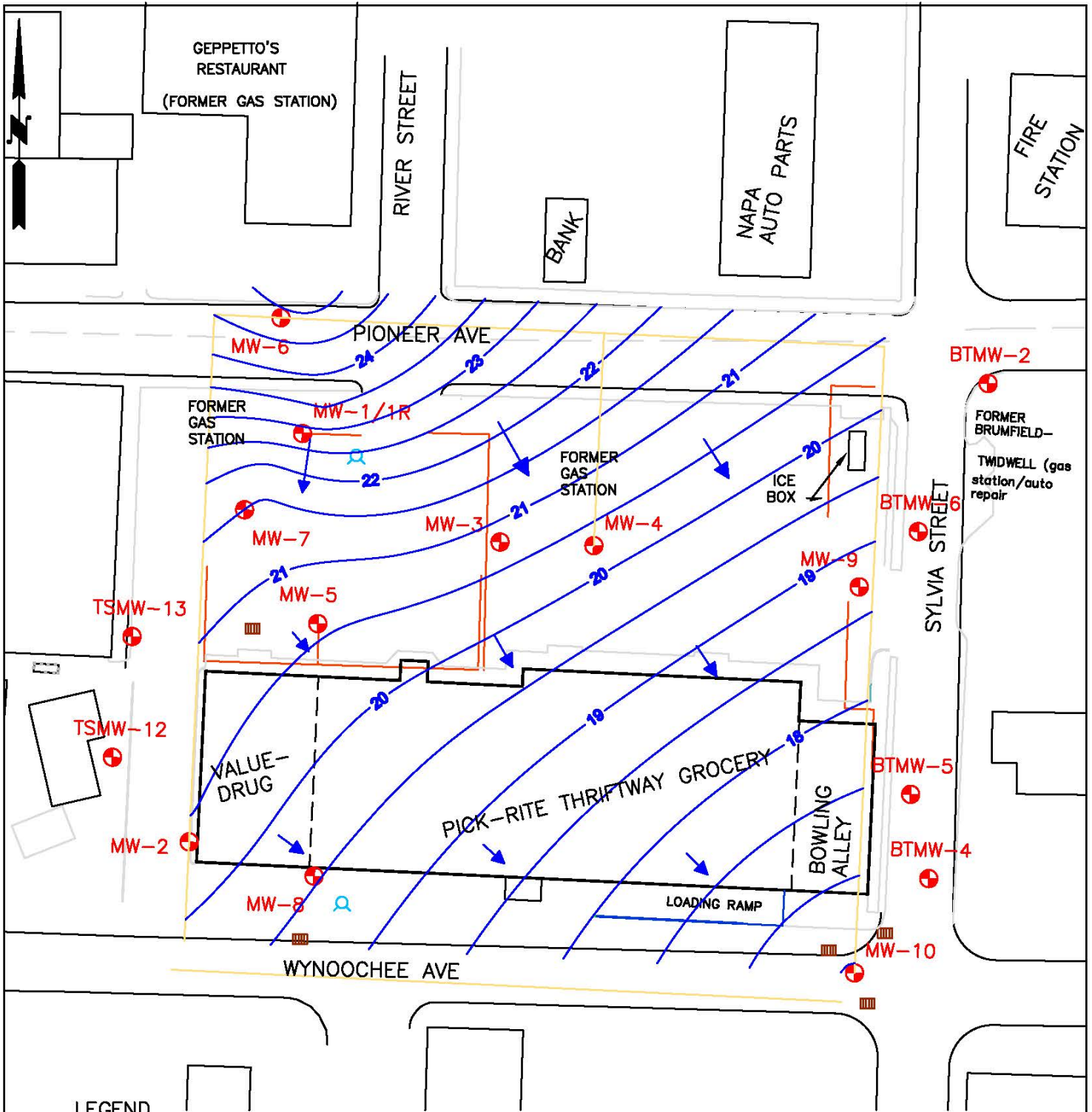
(b) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from sketch provided by AEGs' personnel.

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FIGURE 3
GROUNDWATER
CONTOUR MAP
January 2007

Kolb/Twidwell 301 E. Pioneer Ave. MONTESANO, WA	
Project: 05-200	Date: 7/17/13



LEGEND

- ⊕ MW-1 MONITORING WELLS BY AEG
- GROUNDWATER FLOW DIRECTION
- POTENTIAL ABANDONED UST LOCATIONS

Notes:

- (1) The locations of all features shown are approximate.
- (2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

DRAWING SCALE: 1" = 80'

Reference: Drawing created from surveyor's drawing by PACIFIC GEOMATIC SERVICES, Inc and notes provided by AEG, LLC.



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**FIGURE 4
GROUNDWATER CONTOUR MAP**

JUNE 2011

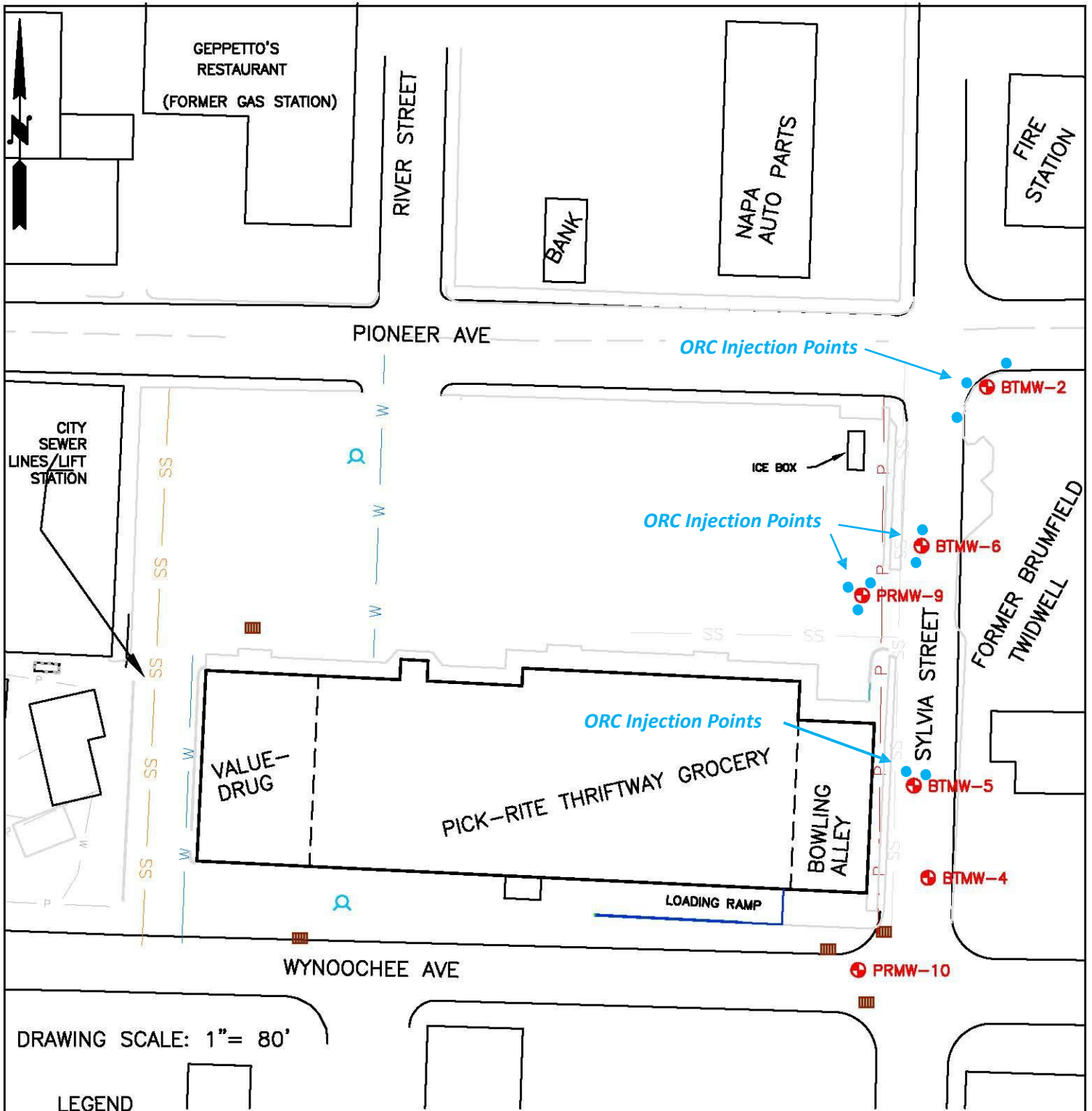
BRUMFIELD-TWIDWELL
301 E PIONEER AVE
MONTESANO, WA

Project# 05-200

Date: 7/13/17

File: PICKERING FAMILY LP

Sheet 3 OF 3



DRAWING SCALE: 1" = 80'

LEGEND

- ⊕ BTMW-2 Monitoring Well on B-Twidwell Site
- ⊕ PRMW-9 Monitoring Well on Pick Rite Site
- P — POWER (UNDERGROUND)
- W — WATER LINE
- SS — SEWER LINE

Notes:

- (1) The locations of all features shown are approximate.
- (2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from surveyor's drawing by PACIFIC GEOMATIC SERVICES, Inc and notes provided by AEG, LLC.



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FIGURE 5
ORC® INJECTION POINTS

FORMER BRUMFIELD-TWIDWELL
 301 E PIONEER AVE
 MONTESANO, WA

Project# 05-200

Date: 7/20/2011

File:

Sheet 2 OF 3

TABLES

**Table 1 Summary of Quarterly Groundwater Analytical Results - Former Brumfield-Twidwell & Partial Pick-Rite
Former Brumfield-Twidwell Property & Off-Property Monitoring Wells
Montesano, WA**

Sample Number ¹	Date	BTEX ² (µg/L)				Gasoline ³ (µg/L)	Table 830-1 Constituents ² (µg/L)				
		Benzene	Toluene	Ethylbenzene	Total Xylenes		1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Total Naphthalenes	MTBE	Total Lead ⁴
BTMW-1*	2/8/2006	<1.0	<1.0	<1.0	<1.0	<100	--	--	--	--	--
	8/17/2006	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<1.0
	1/9/2007	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<1.0
	3/15/2007	<1.0	<1.0	<1.0	<1.0	<100	--	--	--	--	--
BTMW-2	2/8/2006	550	810	1,280	10,100	58,000	--	--	--	--	--
	8/17/2006	136	176	323	1,570	1,970	<1.0	<0.01	101	<5.0	21
	1/9/2007	357	482	1,430	9,400	7,820	<1.0	<0.01	88.5	<5.0	9
	3/15/2007	355	495	828	4,970	24,600	--	--	--	--	--
	4/1/2008	12.8	211	503	4,040	7,730	<1.0	<0.01	73.5	<5.0	7.3
	4/9/2009	LNAPL present									
	5/12/2010	<1.0	<1.0	<1.0	6.4	160	<1.0	<0.01	<5.0	<5.0	<5.0
	5/12/2011	1.1	5.8	36.5	477	2,650	<1.0	<0.01	11.6	<5.0	<5.0
	4/11/2012	<1.0	<1.0	7.2	99.1	1,860	<1.0	<0.01	<5.0	<5.0	<5.0
	8/16/2012	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0
10/31/2012	<1.0	1.11	8.49	105	1,510	<1.0	<0.01	<5.0	<5.0	<5.0	
1/31/2013	<1.0	<1.0	4.4	52.4	871	<1.0	<0.01	<5.0	<5.0	<5.0	
BTMW-3*	2/8/2006	<1.0	<1.0	2.7	24	120	--	--	--	--	--
	8/17/2006	<1.0	<1.0	4.4	17	175	<1.0	<0.01	<5.0	<5.0	<1.0
	1/9/2007	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<1.0
	3/15/2007	<1.0	<1.0	<1.0	<1.0	<100	--	--	--	--	--
BTMW-4*	2/8/2006	<1.0	<1.0	<1.0	<1.0	<100	--	--	--	--	--
	8/17/2006	<1.0	<1.0	2.1	12	100	<1.0	<0.01	<5.0	<5.0	10
	1/9/2007	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<1.0
3/15/2007	<1.0	<1.0	<1.0	<1.0	<100	--	--	--	--	--	
BTMW-5	4/26/2006	4.0	10.2	5.3	25	1,100	--	--	--	--	--
	8/17/2006	<1.0	<1.0	1.3	20	101	<1.0	<0.01	<5.0	<5.0	<1.0
	1/9/2007	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<1.0
	3/15/2007	<1.0	<1.0	<1.0	<1.0	<100	--	--	--	--	--
	4/1/2008	1.2	12.3	33.2	284	1,040	<1.0	<0.01	<5.0	<5.0	6.0
	4/8/2009	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0
	5/12/2010	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0
	5/12/2011	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0
	4/11/2012	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	5.4
	8/16/2012	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0
10/31/2012	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0	
1/31/2013	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	23	
BTMW-6	4/26/2006	45	41	170	365	3,390	--	--	--	--	--
	8/17/2006	7.1	7.9	1.5	116	611	<1.0	<0.01	8.0	<5.0	13
	1/9/2007	4.0	3.9	37	107	380	<1.0	<0.01	<5.0	<5.0	<1.0
	3/15/2007	4.99	7.3	33	70	450	--	--	--	--	--
	4/1/2008	1.8	8.5	143	211	1,500	<1.0	<0.01	8.2	<5.0	<1.0
	4/8/2009	1.3	4.1	168	120	2,060	<1.0	<0.01	55.5	<5.0	<5.0
	5/12/2010	<1.0	<1.0	11.5	16.3	320	<1.0	<0.01	16.3	<5.0	<5.0
	5/12/2011	<1.0	<1.0	<1.0	1.8	498	<1.0	<0.01	14	<5.0	<5.0
	4/11/2012	<1.0	<1.0	<1.0	<1.0	540	<1.0	<0.01	<5.0	<5.0	<5.0
	8/16/2012	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	5.1
10/31/2012	<1.0	<1.0	<1.0	1.43	<100	<1.0	<0.01	<5.0	<5.0	<5.0	
1/31/2013	<1.0	<1.0	<1.0	<1.0	253	<1.0	<0.01	<5.0	<5.0	<5.0	
PRMW-9 ⁵	12/1/2010	43.6	75.8	232	413	4,133	--	--	--	--	--
	3/8/2011	35.8	63.2	500	13,300	5,180	--	--	--	--	--
	6/9/2011	<1.0	34.4	450	1,460	9,240	--	--	--	--	--
	4/11/2012	<1.0	<1.0	13.9	45	1,430	<1.0	<0.01	<5.0	<5.0	<5.0
	8/16/2012	<1.0	<1.0	9.1	41.8	894	<1.0	<0.01	16.5	<5.0	<5.0
	10/31/2012	<1.0	<1.0	6.02	28.7	1,120	<1.0	<0.01	29.8	<5.0	<5.0
1/31/2013	<1.0	<1.0	2.0	9.4	482	<1.0	<0.01	9.2	<5.0	<5.0	
PRMW-10 ⁶	12/1/2010	<1.0	<2.0	<1.0	<3.0	<100	--	--	--	--	--
	3/8/2011	<1.0	<2.0	<1.0	<3.0	<100	--	--	--	--	--
	6/9/2011	<1.0	<2.0	<1.0	<3.0	<100	--	--	--	--	--
	4/11/2012	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0
	8/16/2012	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0
	10/31/2012	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0
1/31/2013	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<0.01	<5.0	<5.0	<5.0	
PQL	1.0	1.0 or 2.0	1.0	1.0 or 3.0	100	1.0	0.01	5.0	5.0	1.0 or 5.0	
Method A Cleanup Levels	5	1,000	700	1,000	800/1000 ⁵	5	0.01	160	20	15	

Notes:

¹Approximate monitoring well locations are shown in Figure 1

²Analyzed by EPA Method 8021B.

³Analyzed by Northwest Method NWTPH-Gx

⁴Analyzed by EPA Method 7421

⁵Cleanup level with presence of benzene 800 ug/l; without benzene 1,000 ug/l

⁶PRMW-9 & PRMW-10: monitoring wells on Pick-Rite Thruway and Wynoochee Ave. ROW

µg/L = micrograms per liter

"<" not detected above laboratory detection limits.

MTBE = methyl tertiary-butyl ether

-- = not analyzed for this constituent

Bold indicates the detected concentration exceeds MTCA Method A cleanup levels

* = ceased groundwater monitoring/sampling activities at this well

**Table 2 Summary of Quarterly Groundwater Elevations
Former Brumfield-Twidwell Property & Off-Property Monitoring Wells
Montesano, WA**

Well Number/ TOC Elevation (feet)	Date of Measurement	DTW (feet)	DT LPH (feet)	LPH (feet)	GW Elevation (feet)	Change in GW Elevation (feet)
BTMW-1* 37.39	2/7/2006	9.26			28.13	--
	8/17/2006	15.05			22.34	-5.79
	1/9/2007	8.65			28.74	6.40
	3/15/2007	9.70			27.69	-1.05
BTMW-2 37.44	2/7/2006	9.73			27.71	--
	8/17/2006	15.09			22.35	-5.36
	1/9/2007	9.10			28.34	5.99
	3/15/2007	10.16			27.28	-1.06
	4/1/2007	11.44			26.00	-1.28
	4/8/2009	12.59	12.57	0.02	24.87	-1.13
	5/12/2010	11.89			25.55	0.68
	5/12/2011	11.46			25.98	0.43
	4/11/2012	10.49			26.95	0.97
	8/16/2012	12.68			24.76	-2.19
	10/31/2012	9.00			28.44	3.68
1/31/2012	10.87			26.57	-1.87	
BTMW-3* 30.08	2/7/2006	10.78			19.30	--
	8/17/2006	12.68			17.40	-1.90
	1/9/2007	8.59			21.49	4.09
	3/15/2007	9.62			20.46	-1.03
	4/1/2007	--			--	--
	4/8/2009	11.02			19.06	-1.40
BTMW-4* 29.31	2/7/2006	9.15			20.16	--
	8/17/2006	13.61			15.70	-4.46
	1/9/2007	10.78			18.53	2.83
	3/15/2007	11.20			18.11	-0.42
BTMW-5 30.34	4/26/2006	13.20			17.14	--
	8/17/2006	13.91			16.43	-0.71
	1/9/2007	13.27			17.07	0.64
	3/15/2007	13.50			16.84	-0.23
	4/1/2007	13.62			16.72	-0.12
	4/8/2009	13.68			16.66	-0.06
	5/12/2010	13.93			16.41	-0.25
	5/12/2011	13.90			16.44	0.03
	4/11/2012	11.45			18.89	2.45
	8/16/2012	14.03			16.31	-2.58
	10/31/2012	13.67			16.67	0.36
1/31/2012	10.98			19.36	2.69	
BTMW-6 34.04	4/26/2006	11.70			22.34	--
	8/17/2006	13.60			20.44	-1.90
	1/9/2007	9.59			24.45	4.01
	3/15/2007	10.32			23.72	-0.73
	4/1/2007	11.03			23.01	-0.71
	4/8/2009	11.60			22.44	-0.57
	5/12/2010	11.99			22.05	-0.39
	5/12/2011	11.35			22.69	0.64
	4/11/2012	11.78			22.26	-0.43
	8/11/2012	12.02			22.02	-0.24
	10/31/2012	12.12			21.92	-0.10
1/31/2012	13.18			20.86	-1.06	
PRMW-9 33.93	4/11/2012	11.11			22.82	--
	8/16/2012	12.71			21.22	-1.60
	10/31/2012	11.42			22.51	1.29
	1/31/2012	11.31			22.62	0.11
PRMW-10 24.85	4/11/2012	9.09			15.76	--
	8/16/2012	9.51			15.34	-0.42
	10/31/2012	7.26			17.59	2.25
	1/31/2012	8.59			16.26	-1.33

TOC = Top of casing elevation relative to NAVD88

DTW = Depth to water below top of casing.

DT LPH = Depth to liquid phase hydrocarbons (i.e., free product)

LPH = Liquid phase hydrocarbons thickness.

GW Elevation = Groundwater Elevation

* = ceased groundwater monitoring/sampling activities at this well

**Table 3 Summary of Water Quality Indicator Parameters
Former Brumfield-Twidwell Property & Off-Property Monitoring Wells
Montesano, WA**

Well Number ¹	Date Analyzed	pH ²	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp (°C)	Salinity (%)	ORP	TDS (g/L)	
BTMW-1*	8/18/2006	7.42	0.113	104	11.86	14.70	0.00	--	--	
	1/9/2007	5.89	0.073	-10	-0.31	12.90	0.00	--	--	
	3/15/2007	5.70	0.086	62	5.28	11.70	0.00	--	--	
BTMW-2	8/18/2006	6.79	0.231	358	2.27	14.00	0.00	--	--	
	1/9/2007	6.24	0.303	-10	-0.14	12.80	0.01	--	--	
	3/15/2007	6.27	0.402	33	0.06	12.90	0.00	--	--	
	4/1/2008	6.01	0.109	33	-0.04	12.70	0.00	--	--	
	4/8/2009	LPH present								
	5/12/2010	6.17	0.106	--	0.28	13.16	0.05	-6.4	0.069	
	5/12/2011	7.27	0.121	--	1.31	12.79	0.06	-105.4	0.079	
	4/11/2012	4.67	0.117	--	0.21	12.70	0.05	1366.7	0.076	
	8/16/2012	-9.99	0.106	--	0.7	13.61	0.05	1084.8	0.069	
	10/31/2012	10.04	0.106	--	0.32	13.25	0.05	-67.4	0.068	
1/31/2013	14.10	0.114	--	1.77	12.07	0.05	-228.4	0.075		
BTMW-3*	8/18/2006	6.75	0.164	999	2.92	13.30	0.00	--	--	
	1/9/2007	6.56	0.173	-10	-0.16	11.90	0.00	--	--	
	3/15/2007	6.32	0.180	24	0.11	10.60	0.00	--	--	
BTMW-4*	8/18/2006	7.14	0.114	949	4.76	13.80	0.00	--	--	
	1/9/2007	6.72	0.116	-10	-0.17	11.70	0.00	--	--	
	3/15/2007	6.67	0.120	6	0.15	12.50	0.00	--	--	
BTMW-5	8/18/2006	7.08	0.120	577	2.56	12.90	0.00	--	--	
	1/9/2007	6.69	0.114	-10	-0.17	12.20	0.00	--	--	
	3/15/2007	6.62	0.118	7	0.03	11.60	0.00	--	--	
	4/1/2008	6.35	0.127	18	-0.18	12.20	0.00	--	--	
	4/8/2009	7.26	0.102	66.27	0.1	12.35	0.03	--	--	
	5/12/2010	6.47	0.130	--	0.39	13.13	0.06	1.9	0.084	
	5/12/2011	6.31	0.156	--	0.56	12.73	0.07	-53.6	0.101	
	4/11/2012	8.57	0.244	--	6.93	12.44	0.12	831.1	0.158	
	8/16/2012	-3.51	0.138	--	0.65	13.94	0.07	672.3	0.090	
	10/31/2012	11.74	0.154	--	1.02	13.13	0.07	-121.1	0.099	
1/31/2013	15.17	0.184	--	8.99	12.23	0.09	-227.6	0.120		
BTMW-6	8/18/2006	6.77	0.285	25	3.00	14.80	0.01	--	--	
	1/9/2007	6.38	0.188	-10	-0.20	13.50	0.00	--	--	
	3/15/2007	6.36	0.197	3	0.22	12.90	0.00	--	--	
	4/1/2008	6.15	0.204	13	-0.31	12.30	0.00	--	--	
	4/8/2009	6.98	0.152	98.74	0.1	12.74	0.06	--	--	
	5/12/2010	6.36	0.151	--	0.29	13.24	0.07	-60.3	0.098	
	5/12/2011	7.10	0.158	--	0.77	12.55	0.07	-143.1	0.103	
	4/11/2012	10.58	1.344	--	10.42	12.74	0.68	744.8	0.874	
	8/16/2012	-1.15	0.570	--	12.99	16.14	0.28	516.6	0.374	
	10/31/2012	11.08	0.565	--	13.39	14.56	0.28	-66.5	0.367	
	1/31/2013	17.96	0.775	--	18.92	13.10	0.38	-231.1	0.504	
PRMW-9	4/11/2012	10.75	9.797	--	22.10	12.18	5.83	776.7	5.027	
	8/16/2012	Insufficient water for monitoring activities								
	10/31/2012	24.08	8.98	--	15.84	19.55	5.03	-290.4	5.834	
	1/31/2013	16.70	9.265	--	50.08	13.20	5.24	-169.5	6.032	
PRMW-10	4/11/2012	3.53	0.183	--	0.18	13.39	0.09	1337.5	0.120	
	8/16/2012	-1.97	0.189	--	0.61	15.75	0.09	529.3	0.123	
	10/31/2012	8.16	0.161	--	0.23	14.97	0.08	0.1	0.125	
	1/31/2013	11.89	0.181	--	1.01	13.54	0.09	-195.1	0.118	

¹Groundwater monitoring well locations are shown on Figure 1

²August 2012 pH readings not valid. pH meter malfunctioning

* = ceased groundwater monitoring/sampling activities at this well

-- Not tested for specific parameter

Table 4. Summary of Excavation Soil Sample Analytical Results

**Kolb Property
Montesano, WA
Project # 05-200**

Well Numbers	Sample Date	BTEX (mg/kg)				Gasoline (mg/kg)
		Benzene	Toluene	Ethylbenzene	Xylenes	
ST001	9/21/2005	0.63	0.15	nd	0.65	55
ST002	9/21/2005	nd	0.12	nd	0.61	nd
ST002 DUP	9/21/2005	nd	0.11	nd	0.06	nd
ST003	9/21/2005	0.04	0.21	0.41	4.87	235
ST004	9/21/2005	nd	nd	nd	nd	nd
ST005	9/21/2005	nd	nd	nd	nd	nd
ST006	9/21/2005	nd	0.06	nd	0.12	48
BT-B1-17'	9/21/2005	0.29	1.05	0.31	17.1	377
BT-B2-17'	9/21/2005	0.03	0.79	0.45	2.08	51
BT-B3-15'	9/21/2005	0.37	2.06	2.30	10.7	137
BT-B4-15'	9/21/2005	0.33	2.33	1.02	6.91	65
BT-S1-5'	9/21/2005	nd	0.07	nd	0.16	nd
BT-S2-10'	9/21/2005	0.21	0.41	0.68	3.50	171
BT-S3-5'	9/21/2005	0.06	0.60	0.19	1.38	nd
BT-S4-10'	9/21/2005	nd	0.21	0.06	0.85	nd
BT-S5-10'	9/21/2005	7.5	34.7	34.9	120.0	1550
BT-S6-10'	9/21/2005	5.1	40.1	int	118.0	1790
BT-B5-19'	9/22/2005	nd	0.47	0.18	1.22	nd
BT-B6-19'	9/22/2005	nd	0.23	0.17	1.05	15
BT-S7-15'	9/22/2005	0.43	15.1	4.8	25	250
BT-TS-1	9/22/2005	nd	0.29	nd	0.57	nd
BT-TS-2	9/22/2005	nd	0.18	nd	0.45	nd
BT-TS-2 DUP	9/22/2005	nd	0.14	nd	0.44	nd
BT-ST007	9/22/2005	nd	0.07	nd	0.21	nd
BT-ST008	9/22/2005	nd	nd	nd	0.31	nd
BT-B7-12'	9/22/2005	nd	0.21	0.09	0.83	nd
BT-B8-12'	9/22/2005	0.022	0.11	nd	0.41	nd
BT-B9-8'	9/22/2005	nd	0.09	nd	0.32	nd
BT-B10-8'	9/22/2005	nd	0.11	nd	0.44	nd
BT-S-8-10'	9/22/2005	9.43	2.67	0.65	9.8	165
BT-S-9-10'	9/22/2005	nd	0.11	nd	0.64	nd
BT-S-10-10'	9/22/2005	nd	0.08	0.06	0.43	nd
BT-S-11-10'	9/22/2005	nd	0.36	0.14	1.25	11
BT-S-12-5'	9/23/2005	nd	nd	nd	nd	nd
BT-S-13-5'	9/23/2005	nd	0.07	nd	0.13	nd
BT-B11-12'	9/23/2005	0.27	0.18	0.065	0.85	14
BT-B12-12'	9/23/2005	0.065	0.7	0.41	7.3	120
BT-B13-8'	9/23/2005	nd	nd	nd	0.1	nd
BT-B14-8'	9/23/2005	nd	nd	nd	nd	nd
ST-9	9/23/2005	nd	nd	nd	nd	nd
ST-10	9/23/2005	nd	nd	nd	0.54	nd
BT-B16-12'	9/23/2005	nd	2	11	35	1600
BT-B7-19'	9/23/2005	nd	0.65	0.6	2.3	nd
BT-B7-19' DUP	9/23/2005	nd	0.75	0.65	2.2	nd
ST-11	11/29/2005	nd	nd	nd	nd	nd
ST-12	11/29/2005	nd	nd	nd	nd	nd
ST-13	11/29/2005	nd	nd	nd	nd	nd
BT-S14-10'	11/29/2005	nd	nd	nd	nd	nd
BT-S14-10' Dup	11/29/2005	nd	nd	nd	nd	nd
BT-B15-15'	11/29/2005	nd	0.08	0.26	0.75	149
TT-01	12/15/2005	nd	nd	nd	nd	nd
TT-02	12/15/2005	nd	nd	nd	nd	nd
ST-14	12/15/2005	0.031	nd	nd	nd	12
ST-15	12/15/2005	0.032	nd	nd	nd	17
BT-B17-12	1/3/2006	nd	0.14	nd	nd	nd
BT-B18-12	1/3/2006	0.054	0.12	0.15	0.26	12
BT-B19-12	1/3/2006	0.10	0.13	0.12	0.29	14
BT-B20-12	1/3/2006	0.055	0.14	0.18	0.36	42
BT-B21-12	1/3/2006	0.16	0.13	0.13	0.31	11
BT-B21-12 Dup	1/3/2006	0.13	0.094	0.11	0.26	11
B1-12	4/1/2006	nd	nd	nd	nd	nd
B2-12	3/31/2006	1.08	3.78	11.2	32.5	393
B3-16	4/4/2006	0.28	1.45	1.34	8.0	50
B4-12	4/1/2006	nd	nd	nd	nd	nd
B4-16	4/1/2006	nd	nd	nd	nd	nd
B5-12	4/1/2006	nd	nd	nd	nd	nd
B6-12	4/1/2006	nd	nd	nd	nd	nd
B7-15	4/1/2006	nd	nd	nd	nd	nd
B8-16	4/3/2006	7.07	38.5	nd	51.5	1740
B8-18	4/3/2006	2.38	6.11	6.13	25.5	326
B8-19	4/4/2006	nd	nd	nd	nd	nd
B9-15	4/4/2006	nd	nd	nd	nd	nd
MW5-16	4/6/2006	nd	0.32	0.71	1.01	28
MW5-20	4/6/2006	1.58	2.31	10.3	26.5	810
MW6-16	4/6/2006	0.26	0.085	0.55	1.01	19
PQL		0.02	0.05	0.05	0.05	10
Method A		0.03	7.0	6.0	9.0	100

Note:

mg/Kg = milligrams per kilogram.

Bold indicates result is above MCTA Method A cleanup levels.

APPENDIX A

Supporting Documents

(Laboratory Analytical Results)

Libby Environmental, Inc.

Chain of Custody Record

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Olympia, WA 98506

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Fax: 360-352-4154

Date: 04/13/12

Page: 1 of 1

Client: AEQ

Project Manager: YEN-VY

Address: 1018 CAPITOL WAY S. OLYMPIA

Project Name: FORMER BRUNSFIELD/TIDWELL PROPERTY

Phone: (360) 352-9835 Fax:

Location: 301 E. PIONEER AVE City: MONTESANO, WA.

Client Project # 05-200

Collector: L. CHAIDEZ Date of Collection: 04/11/12



Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	PAH 8270	PCB's 8082	MTCA 5 Metals	GRG 830-1	Field Notes
1 BTMW-2	—	10:02	WATER	VIALS/POLY												
2 BTMW-5	—	12:51	↓	↓												
3 BTMW-6	—	15:43	↓	↓												
4 PRMW-9	—	16:06	↓	↓												
5 PRMW-10	—	11:17	↓	↓												
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																

Relinquished by: <u>L. Chaidez</u>	Date / Time: <u>04/13/12</u>	Received by: <u>Emy R</u>	Date / Time: <u>4-13-12 9:00</u>	Sample Receipt:	Remarks: <u>NORMAL T.A.T.</u> <u>STO</u>
Relinquished by:	Date / Time:	Received by:	Date / Time:	Good Condition?	
Relinquished by:	Date / Time:	Received by:	Date / Time:	Cold?	
Relinquished by:	Date / Time:	Received by:	Date / Time:	Seals Intact?	
				Total Number of Containers:	

Libby Environmental, Inc.

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FORMER BRUNSFIELD/TIDWELL PROPERTY PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L120413-1
Client Project # 05-200

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline ($\mu\text{g/l}$)
Method Blank	4/16/12	113	nd
BTMW-2	4/16/12	106	1860
BTMW-5	4/16/12	102	nd
BTMW-6	4/16/12	102	540
PRMW-9	4/16/12	135	1430
PRMW-10	4/16/12	121	nd
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Trifluorotoluene): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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FORMER BRUNSFIELD/TIDWELL PROPERTY PROJECT
 AEG, LLC
 Montesano, Washington
 Libby Project # L120413-1
 Client Project # 05-20C

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description	Method Blank	BTMW-2	BTMW-5	BTMW-6	PRMW-9	PRMW-10
Date Sampled	N/A	4/11/12	4/11/12	4/11/12	4/11/12	4/11/12
Date Analyzed	PQL (µg/l)	4/16/12 (µg/l)	4/16/12 (µg/l)	4/16/12 (µg/l)	4/16/12 (µg/l)	4/16/12 (µg/l)
Benzene	1.0	nd	nd	nd	nd	nd
Toluene	1.0	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	7.2	nd	13.9	nd
Total Xylenes	1.0	nd	99.1	nd	45	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd
Total Naphthalenes	5.0	nd	nd	nd	nd	nd
Methyl <i>tert</i> - Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd
Surrogate Recovery						
Dibromofluoromethane	107	83	93	int	int	87
1,2-Dichloroethane-d4	74	67	66	int	71	68
Toluene-d8	113	106	102	102	135	121
4-Bromofluorobenzene	102	102	95	104	99	103
"nd" Indicates not detected at listed detection limit						
"int" Indicates that interference prevents determination						

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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FORMER BRUNSFIELD/TIDWELL PROPERTY PROJECT
 AEG, LLC
 Montesano, Washington
 Libby Project # L120413-1
 Client Project # 05-20C

QA/QC Data - EPA 8260C Analyses

Sample Identification: PRMW-9							
	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	(%)
Benzene	10	6.70	67	10	7.0	70	4.4
Toluene	10	11.20	112	10	12.3	123	9.4
Surrogate Recovery							
Dibromofluoromethane			int			int	
1,2-Dichloroethane-d4			68			69	
Toluene-d8			100			113	
4-Bromofluorobenzene			95			96	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	6.6	66
Toluene	10	10.0	100
Surrogate Recovery			
Dibromofluoromethane			107
1,2-Dichloroethane-d4			118
Toluene-d8			97
4-Bromofluorobenzene			113

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
 ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

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FORMER BRUNSFIELD/TIDWELL PROPERTY PROJECT

AEG, LLC

Montesano, Washington

Libby Project # L120413-1

Client Project # 05-200

Analyses of Total Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead $\mu\text{g/L}$
Method Blank	4/16/12	nd
BTMW-2	4/16/12	nd
BTMW-2 Dup	4/16/12	nd
BTMW-5	4/16/12	5.4
BTMW-6	4/16/12	nd
PRMW-9	4/16/12	nd
PRMW-10	4/16/12	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Dirk Peterson

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FORMER BRUNSFIELD/TIDWELL PROPERTY PROJECT

AEG, LLC

Montesano, Washington

Libby Project # L120413-1

Client Project # 05-200

QA/QC for Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	4/16/12	90%
BTMW-2 MS	4/16/12	97%
BTMW-2 MSD	4/16/12	101%
RPD	4/16/12	4%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%

ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506

Ph: 360-352-2110
Fax: 360-352-4154

Date: 8/16/12

Page: 1 of 1

Client: AEG

Project Manager: Ken-Vy

Address: 605 11th Ave. SE, Suite 201

Project Name: Former Brumfield

Phone: (360) 352-9835 Fax: (360) 352-8164

Location: 301 E Pioneer Ave City: Montesano, WA

Client Project # 05-200

Collector: Jeff Wilson Date of Collection: 8/16/12



Sample Number	Depth	Time	Sample Type	Container Type	Analytes											Field Notes											
					VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HC10	NWTPH-Gx	NWTPH-Dx	PAH 8270	PCB's 8082	MTCA 5 Metals	GR0 830-1												
1		11:26	Water	Vial/poly																							
2		14:12																									
3		12:49																									
4		13:20																									
5		12:06																									
6																											
7																											
8																											
9																											
10																											
11																											
12																											
13																											
14																											
15																											
16																											
17																											
18																											

Relinquished by: <u>Jeff Wilson</u>	Date / Time	Received by: <u>Eric [Signature]</u>	Date / Time <u>8-16-12</u>	Sample Receipt:	Remarks:
Relinquished by:	Date / Time	Received by:	Date / Time	Good Condition?	STD
				Cold?	
Relinquished by:	Date / Time	Received by:	Date / Time	Seals Intact?	
				Total Number of Containers	

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FORMER BRUMSFIELD PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L120816-1
Client Project # 05-200

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/l)
Method Blank	8/17/12	90	nd
BTMW-2	8/17/12	88	nd
BTMW-5	8/17/12	85	nd
BTMW-6	8/17/12	90	nd
BTMW-6 Dup	8/17/12	92	nd
PRMW-9	8/17/12	91	894
PRMW-10	8/17/12	87	nd
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY:

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FORMER BRUMSFIELD PROJECT
 AEG, LLC
 Montesano, Washington
 Libby Project # L120816-1
 Client Project # 05-200

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description	Method	BTMW-2	BTMW-5	BTMW-6	BTMW-6	PRMW-9
	Blank				Dup	
Date Sampled	N/A	8/16/12	8/16/12	8/16/12	8/16/12	8/16/12
Date Analyzed	PQL	8/17/12	8/17/12	8/17/12	8/17/12	8/17/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Benzene	1.0	nd	nd	nd	nd	nd
Toluene	1.0	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	9.1
Total Xylenes	1.0	nd	nd	nd	nd	41.8
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd
Total Naphthalenes	5.0	nd	nd	nd	nd	16.5
Methyl <i>tert</i> - Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd
Surrogate Recovery						
Dibromofluoromethane		106	102	int	int	int
1,2-Dichloroethane-d4		115	96	94	107	95
Toluene-d8		90	88	85	90	91
4-Bromofluorobenzene		95	93	89	95	93
"nd" Indicates not detected at listed detection limit.						
"int" Indicates that interference prevents determination						

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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FORMER BRUMSFIELD PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L120816-1
Client Project # 05-200

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		PRMW- 10
Date Sampled		8/16/12
Date Analyzed	PQL (µg/l)	8/17/12 (µg/l)
Benzene	1.0	nd
Toluene	1.0	nd
Ethylbenzene	1.0	nd
Total Xylenes	1.0	nd
1,2-Dichloroethane (EDC)	1.0	nd
1,2-Dibromoethane (EDB) *	0.01	nd
Total Naphthalenes	5.0	nd
MTBE	5.0	nd
Surrogate Recovery		
Dibromofluoromethane		99
1,2-Dichloroethane-d4		99
Toluene-d8		87
4-Bromofluorobenzene		90
"nd" Indicates not detected at listed detection limit. "int" Indicates that interference prevents determination		

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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FORMER BRUMSFIELD PROJECT
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 Montesano, Washington
 Libby Project # L120816-1
 Client Project # 05-200

QA/QC Data - EPA 8260C Analyses

Sample Identification: BTMW-5							
	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
Benzene	10	8.2	82	10	8.6	86	4.8
Toluene	10	7.2	72	10	7.5	75	4.1
Surrogate Recovery							
Dibromofluoromethane			int			int	
1,2-Dichloroethane-d4			88			95	
Toluene-d8			86			89	
4-Bromofluorobenzene			93			94	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	8.7	87.0
Toluene	10	7.8	78.0
Surrogate Recovery			
Dibromofluoromethane			99
1,2-Dichloroethane-d4			98
Toluene-d8			90
4-Bromofluorobenzene			93

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
 ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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FORMER BRUMSFIELD PROJECT

AEG, LLC

Montesano, Washington

Libby Project # L120816-1

Client Project # 05-200

Analyses of Total Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead $\mu\text{g/L}$
Method Blank	8/21/12	nd
BTMW-2	8/21/12	nd
BTMW-5	8/21/12	nd
BTMW-6	8/21/12	5.1
PRMW-9	8/21/12	nd
PRMW-10	8/21/12	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Dirk Peterson

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FORMER BRUMSFIELD PROJECT

AEG, LLC

Montesano, Washington

Libby Project # L120816-1

Client Project # 05-200

QA/QC for Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	8/21/12	98%
L120817-1 MS	8/21/12	97%
L120817-1 MSD	8/21/12	100%
RPD	8/21/12	3%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%

ACCEPTABLE RPD IS 20%

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

Chain of Custody Record

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 Olympia, WA 98506 Fax: 360-352-4154

Date: 10/31/12 Page: 1 of 1

Client: AEG

Project Manager: Yen-Vy Van

Address: 605 144th Ave SE, Suite 201, Olympia

Project Name: Former Brumfald

Phone: (360) 352-9835 Fax:

Location: 301 E Pioneer Ave City: Montesano, WA

Client Project # 05-200

Collector: Jeff Wilson Date of Collection: 10/31/12

Sample Number	Depth	Time	Sample Type	Container Type	Analytes												Field Notes							
					VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-GX	NWTPH-DX	PAH 8270	PCB's 8082	MTCA 5 Metals	GRO 830-1									
1		11:03	Water	VOA/poly																				
2		12:52																						
3		11:38																						
4		13:15																						
5		12:17																						
6																								
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								
16																								
17																								
18																								

Relinquished by: <u>Jeff Wilson</u>	Date / Time <u>10/31/12</u>	Received by: <u>Paul Bank</u>	Date / Time <u>10/31/12</u>	Sample Receipt:	Remarks: <u>STO</u>
Relinquished by:	Date / Time:	Received by:	Date / Time:	Good Condition?	
				Cold?	
				Seals Intact?	
Relinquished by:	Date / Time:	Received by:	Date / Time:	Total Number of Containers	

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FORMER BRUMSFIELD PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L121031-8
Client Project # 05-200

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C & Gasoline by NWTPH-Gx in Water

Sample Description		Method Blank	BTMW- 2W	BTMW- 2W Dup	BTMW- 5W	BTMW- 6W	PRMW- 9W
Date Sampled		N/A	10/31/12	10/31/12	10/31/12	10/31/12	10/31/12
Date Analyzed	PQL (µg/l)	11/1/12 (µg/l)	11/1/12 (µg/l)	11/1/12 (µg/l)	11/1/12 (µg/l)	11/1/12 (µg/l)	11/1/12 (µg/l)
Benzene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	1.07	1.11	nd	nd	nd
Ethylbenzene	1.0	nd	8.01	8.49	nd	nd	6.02
Total Xylenes	1.0	nd	105	105	nd	1.43	28.7
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd	nd
Methyl <i>tert</i> - Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd	nd
Total Naphthalenes	5.0	nd	nd	nd	nd	nd	29.8
Gasoline	100	nd	990	1510	nd	nd	1120
Surrogate Recovery							
Dibromofluoromethane		107	105	99	106	int	int
1,2-Dichloroethane-d4		100	102	82	104	98	103
Toluene-d8		100	98	103	102	98	99
4-Bromofluorobenzene		100	102	94	102	101	105
"nd" Indicates not detected at listed detection limit. "int" Indicates that interference prevents determination.							

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Kyle Williams

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FORMER BRUMSFIELD PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L121031-8
Client Project # 05-200

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C & Gasoline by NWTPH-Gx in Water

Sample Description		PRMW- 10W
Date Sampled		10/31/12
Date Analyzed	PQL (µg/l)	11/1/12 (µg/l)
Benzene	1.0	nd
Toluene	1.0	nd
Ethylbenzene	1.0	nd
Total Xylenes	1.0	nd
1,2-Dichloroethane (EDC)	1.0	nd
1,2-Dibromoethane (EDB) *	0.01	nd
Methyl <i>tert</i> - Butyl Ether (MTBE)	5.0	nd
Total Naphthalenes	5.0	nd
Gasoline	100	nd
Surrogate Recovery		
Dibromofluoromethane		104
1,2-Dichloroethane-d4		107
Toluene-d8		95
4-Bromofluorobenzene		102
"nd" Indicates not detected at listed detection limit.		
"int" Indicates that interference prevents determination.		

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Kyle Williams

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FORMER BRUMSFIELD PROJECT
 AEG, LLC
 Montesano, Washington
 Libby Project # L121031-8
 Client Project # 05-200

QA/QC Data - EPA 8260C Analyses

Sample Identification: BTMW-5W							
	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
Benzene	10	11.51	115	10	11.90	119	3.3
Toluene	10	11.03	110	10	11.26	113	2.1
Surrogate Recovery							
Dibromofluoromethane			85			115	
1,2-Dichloroethane-d4			77			99	
Toluene-d8			85			99	
4-Bromofluorobenzene			99			99	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	11.9	119
Toluene	10	11.1	111
Surrogate Recovery			
Dibromofluoromethane			90
1,2-Dichloroethane-d4			83
Toluene-d8			84
4-Bromofluorobenzene			105

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
 ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Kyle Williams

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FORMER BRUMSFIELD PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L121031-8
Client Project # 05-200

Analyses of Total Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead $\mu\text{g/L}$
Method Blank	11/4/12	nd
BTMW-2W	11/4/12	nd
BTMW-5W	11/4/12	nd
BTMW-6W	11/4/12	nd
PRMW-9W	11/4/12	nd
PRMW-10W	11/4/12	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Dirk Peterson

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FORMER BRUMSFIELD PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L121031-8
Client Project # 05-200

QA/QC for Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	11/4/12	109%
L121101-1 MS	11/4/12	102%
L121101-1 MSD	11/4/12	106%
RPD	11/4/12	4%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

Chain of Custody Record

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Date: 1/31/13 Page: 1 of 1

Client: AEG

Project Manager: Ken-Vy Van

Address: 605 11th Ave SE Suite 201

Project Name: Brunfield/Twidwell/Kalb Property

City: Olympia State: WA Zip: 98501

Location: 301 E Pioneer Ave City, State: Montesano, WA

Phone: 360 352-9835 Fax:

Collector: Matt Wilson Date of Collection: 1/31/13

Client Project # 05-200

Email:



Sample Number	Depth	Time	Sample Type	Container Type	Analytical Methods											Field Notes			
					VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	PAH 8270	PCB's 8082	MTCA 5 Metals	GR0 830-1				
1		1324	H ₂ O	Vans/Poly															Slight Odor
2		1114																	Slightly Turbid
3		1209																	
4		1034																	Turbid
5		1239																	
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

Relinquished by: <u>Valerie McMillin</u>	Date / Time: <u>02/01/2013 8:52am</u>	Received by: <u>[Signature]</u>	Date / Time: <u>2/1/13 8:52</u>	Sample Receipt:	Remarks: <u>STD TAT</u>
Relinquished by:	Date / Time:	Received by:	Date / Time:	Good Condition?	
				Cold?	
				Seals Intact?	
Relinquished by:	Date / Time:	Received by:	Date / Time:	Total Number of Containers	TAT: 24HR 48HR 5-DAY

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BRUMFIELD / TWIDWELL / KOLB PROPERTY PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L130201-1
Client Project # 05-200

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/l)
Method Blank	2/5/13	103	nd
BTMW-2-W	2/5/13	104	871
BTMW-5-W	2/5/13	113	nd
BTMW-6-W	2/5/13	113	250
BTMW-6-W Dup	2/5/13	104	253
PRMW-10-W	2/5/13	112	nd
PRMW-9-W	2/5/13	112	482
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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BRUMFIELD / TWIDWELL / KOLB PROPERTY PROJECT

AEG, LLC

Montesano, Washington

Libby Project # L130201-1

Client Project # 05-200

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description	Method	BTMW- Blank	BTMW- 2-W	BTMW- 5-W	BTMW- 6-W	BTMW- 6-W Dup	PRMW- 10-W
Date Sampled	N/A	1/31/13	1/31/13	1/31/13	1/31/13	1/31/13	1/31/13
Date Analyzed	PQL (µg/l)	2/1/13 (µg/l)	2/1/13 (µg/l)	2/1/13 (µg/l)	2/1/13 (µg/l)	2/1/13 (µg/l)	2/1/13 (µg/l)
Benzene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	4.4	nd	nd	nd	nd
Total Xylenes	1.0	nd	52.4	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd	nd
Total Naphthalenes	5.0	nd	nd	nd	nd	nd	nd
Methyl <i>tert</i> - Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		104	107	107	int	95	105
1,2-Dichloroethane-d4		116	116	115	114	109	114
Toluene-d8		103	104	113	113	104	112
4-Bromofluorobenzene		107	103	102	105	102	103

"nd" Indicates not detected at listed detection limit.

"int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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BRUMFIELD / TWIDWELL / KOLB PROPERTY PROJECT

AEG, LLC

Montesano, Washington

Libby Project # L130201-1

Client Project # 05-200

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description	PRMW- 9-W	
Date Sampled		1/31/13
Date Analyzed	PQL (µg/l)	2/1/13 (µg/l)
Benzene	1.0	nd
Toluene	1.0	nd
Ethylbenzene	1.0	2.0
Total Xylenes	1.0	9.4
1,2-Dichloroethane (EDC)	1.0	nd
1,2-Dibromoethane (EDB) *	0.01	nd
Total Naphthalenes	5.0	9.2
MTBE	5.0	nd
Surrogate Recovery		
Dibromofluoromethane		int
1,2-Dichloroethane-d4		113
Toluene-d8		112
4-Bromofluorobenzene		106

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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BRUMFIELD / TWIDWELL / KOLB PROPERTY PROJECT
 AEG, LLC
 Montesano, Washington
 Libby Project # L130201-1
 Client Project # 05-200

QA/QC Data - EPA 8260C Analyses

Sample Identification: PRMW-10							
	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
Benzene	10	6.6	66	10	6.5	65	1.5
Toluene	10	7.8	78	10	7.9	79	1.3
Surrogate Recovery							
Dibromofluoromethane			107			111	
1,2-Dichloroethane-d4			116			118	
Toluene-d8			111			118	
4-Bromofluorobenzene			102			102	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	6.7	67
Toluene	10	8.4	84
Surrogate Recovery			
Dibromofluoromethane			121
1,2-Dichloroethane-d4			130
Toluene-d8			126
4-Bromofluorobenzene			102

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
 ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

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BRUMFIELD / TWIDWELL / KOLB PROPERTY PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L130201-1
Client Project # 05-200

Analyses of Total Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead $\mu\text{g/L}$
Method Blank	2/3/13	nd
BTMW-2-W	2/3/13	nd
BTMW-5-W	2/3/13	23
BTMW-6-W	2/3/13	nd
PRMW-10-W	2/3/13	nd
PRMW-9-W	2/3/13	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

BRUMFIELD / TWIDWELL / KOLB PROPERTY PROJECT
AEG, LLC
Montesano, Washington
Libby Project # L130201-1
Client Project # 05-200

4139 Libby Road NE
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QA/QC for Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	2/3/13	117%
L130129-1 MS	2/3/13	103%
L130129-1 MSD	2/3/13	109%
RPD	2/3/13	6%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%

ANALYSES PERFORMED BY: Dirk Peterson