ASSOCIATED ENVIRONMENTAL GROUP, LLC

November 20, 2015

Mr. Christophe Allen
Acme Fuel Company
416 State Avenue NE
Olympia, Washington 98501-1135

RE: **Cleanup Action Plan**
Acme Bulk Fuel Plant
303 Thurston Avenue NE
Olympia, Washington

Dear Mr. Allen:

Associated Environmental Group, LLC (AEG) has prepared this Cleanup Action Plan (CAP) for the Acme Bulk Fuel Plant located at 303 Thurston Avenue NE Olympia, Washington 98501 (Site). The CAP describes the Site, environmental conditions, cleanup objectives, and the appropriate cleanup standards selected under the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA).

SITE DESCRIPTION

The Acme property is listed with the Thurston County Assessor as Parcel Number 78503100300, which is a triangular-shaped parcel and is about 0.60 acres. A general location map, illustrating approximate parcel boundaries, is provided as Figure 1, *Site & Vicinity Aerial Photo*. A Site diagram is included as Figure 2, *Site Map*.

The Site is currently occupied by a Fast Fuel retail fuel station and is also the location of Acme Fuel Companies bulk fuel terminal for their delivery service. The Fast Fuel retail fueling station serves unleaded, mid-grade, premium gasoline fuel, and diesel fuel. Three aboveground storage tanks (ASTs) are present on Site and are utilized for Acme’s delivery services. A 30,000-gallon propane tank is located near the western side of the Site within a fenced-off area used also for general storage. One 30,000-gallon diesel/heating oil AST is located near the northwest corner of the Site along with a loading rack used for transferring fuel from the AST to trucks. The AST and loading rack canopy are fenced off and a concrete berm (about 4 feet high) encircles the AST.

According to Ecology, six underground storage tanks (USTs) were installed at the Site in 1986. Four have a capacity of 8,000 gallons each (historical contents included leaded and unleaded gasoline and diesel); one is a 500-gallon waste oil UST; and one is 1,000 gallons and is utilized as an oil-water separator for both the AST pump dispenser and UST dispenser. The oil-water separator is connected to sanitary sewer. Two pump island canopies and associated dispensers are located near the northeast area of the Site (approximate location of the 8,000-gallon USTs). Near the southeast corner of the Site is a fenced enclosure utilized for drum and dumpster storage (location of the 500-gallon waste oil UST). A railroad track borders the western boundary of the Site and runs southeast to northwest. In addition to the six USTs described above, a 1,000-gallon gasoline UST was installed around the early to mid-1970s and closed-in-place around the mid-1980s, around the time the four 8,000-gallon USTs were installed.

The majority of the Site is covered in asphalt. Gravel and soil surrounds the area near the AST and loading dock. Vegetation at the property is minimal, confined to an island at the northeast corner. The Site and immediate area has been used for commercial and light industrial purposes since the late 1980s. The Site is zoned Urban Waterfront.

MTCA defines a Site/Facility as:

> *"…any building, structure, installation, equipment, pipe or pipeline…well, pits, pond, lagoon, impoundment, ditch, landfill, storage container…or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located." (WAC 173-340-200)*

Under this definition, a Site is not limited to the legal property boundaries and can extend to other properties, both private and public, if contamination has migrated to them. For this Site, based on the data collected to date, the "Site" includes the Acme property along with areas under the right-of-way (ROW) for Thurston Avenue NE to the north. The extent of contamination beneath the ROW has been fully defined.

SITE HISTORY

Acme Fast Fuel (automated fueling) is listed in the 1995 Polk City Directory for Olympia, Washington. Ecology records show that in 1998, Joe Hall Construction retrofitted five USTs to comply with upgrading requirements, and that a 2,000-gallon gasoline UST was closed-in-place. The UST was used for Acme Fuel Company's delivery service fleet around the late 1960s and early 1970s. According to Acme Fuel Company, the UST was closed-in-place around 1975, at which time an UST was installed near the loading rack at the Site as a replacement.

Ecology issued the Site a notice of non-compliance (NONC) on April 3, 2003 for not properly monitoring leaks and cathodic protection. Following the NONC, Acme Fuel Company contracted Associated Environmental Services, Inc. to conduct a tightness and cathodic protection test.

On April 27, 2003, the four 8,000-gallon USTs passed both the tightness and cathodic protection test; however, the waste oil UST failed the cathodic protection test. On April 29, 2003, the waste oil UST was retrofitted with sacrificial anodes and a subsequent cathodic protection test passed. Passing tightness tests on the four 8,000-gallon USTs occurred on February 12, 2008, March 1, 2010, and May 30, 2011.

PREVIOUS ENVIRONMENTAL WORK SUMMARY

Diesel Fuel Spill – 2011

On September 17, 2011, an employee with Kenan Advantage Group, Inc. (KAG) was delivering fuel and started pumping diesel fuel oil into a 70,000-gallon AST, formerly located adjacent to the 30,000-gallon AST at the northwestern area of the Site. Approximately 2,600 gallons of diesel fuel spilled out of the open manhole cover at the bottom of the AST. According to Acme Fuel Company, prior to the incident, the AST was placed out of service due to a small leak at the bottom of the tank. While estimating the cost of repair, the manhole cover had been removed by a contractor and was loosely fitted back on. The majority of the spill percolated into the soil within the secondary containment surrounding the AST.

Immediately following the release, the National Response Corporation (NRC) used vacuum trucks to attempt to recover the free product. The initial emergency response started with recovery of the remaining surface liquid (free product) followed by limited soil excavation around the immediate area of the AST. Following the release, a total of 51 recovery wells and two recovery trenches were installed at the Site (AECOM, 2011). Groundwater was encountered at approximately 5 feet below ground surface (bgs). Free product was predominately observed in the recovery wells located within the secondary containment. Recovery wells where free product was not observed and free product was no longer being recovered were removed. By November 2011, 34 recovery wells had been removed while "*recovery wells that continue to produce diesel for recovery have been retained and continue to be vacuumed*" (AECOM, 2011).

The spill was found to have migrated east through the vadose zone to outside the secondary containment. AECOM reported that as of December 7, 2011, approximately 37,020 gallons of petroleum-impacted water and 1,950 gallons of diesel had been recovered. Further excavation in the area of the spill extending down to the water table resulted in the removal of about 140 tons of soil. On behalf of KAG, AECOM conducted a subsurface investigation at the Site on November 1, 2011 where six borings were advanced via a direct-push probe at locations outside the secondary containment. The following day, five monitoring wells (MW-1 through MW-5) were installed.

AECOM indicated that soil at monitoring well MW-4 (located adjacent northeast and downgradient of the spill area) was impacted by diesel- and gasoline-range petroleum hydrocarbons (TPH) at

2,600 milligrams per kilogram (mg/Kg) and 580 mg/Kg, respectively. These concentrations are above the MTCA Method A soil cleanup levels of 2,000 mg/Kg and 30 mg/Kg, respectively. With respect to groundwater, elevated concentrations of diesel-range TPH (1,700 micrograms per liter [µg/L]) and benzene (1,600 µg/L) were present in MW-4. These concentrations are above their respective MTCA Method A groundwater cleanup levels of 500 µg/L and 5 µg/L.

Diesel-range TPH at concentrations above Method A cleanup levels was also reported in monitoring wells MW-3 and MW-5. These wells are located within 60 feet and 40 feet, respectively, to the northeast and north of the former spill area and were placed near the northern property boundary.

The highest concentration of diesel-range TPH was exhibited at MW-5 (refer to AECOM report dated December 14, 2011). However, AECOM presents that the contamination exhibited at MW-5 "*do not originate from the spill*". In addition, AECOM states that "*well MW-3 is strongly cross-gradient from the spill area and groundwater flow regime and is unlikely to be impacted by potential migration from the spill location*". AECOM concluded that "*petroleum constituents, either from on-site or up-gradient off-site sources, already existed at the site prior to the spill event. The data does not indicate significant spill migration beyond the contained spill area or at the site boundary*".

The diesel fuel spill at the Site in 2011 by KAG has impacted both soil and groundwater within the AST berm area and nearby locales to the north and potentially northeast. However, data indicate that the subsurface at the Site is also impacted by gasoline-range TPH. This constituent of concern is not related to the 2011 diesel fuel spill. Elevated concentrations of volatile organic compounds (VOCs) reported by AECOM may partially be related to the spill and to other on-Site and/or off-Site migration of TPH from adjoining and nearby confirmed contaminated facilities to the north, south, and northwest of the Site.

Supplemental Site Characterization, AEG – September 2012

Bulk Plant Facility

AEG advanced a total of seven borings (refer to Figure 3, *Site Plan & Borings Location Map*), four within the containment area [B-2, B-4, B-5, and B-7] and three outside of the containment area [B-1, B-3, and B-6]), to assess the following: 1) whether residual TPH contamination exists at the fuel spill area beneath and in vicinity area adjacent to the former 70,000-gallon AST; 2) further characterize areas immediately outside the containment wall area to assess whether the subsurface (soil and groundwater) remains impacted by diesel-range TPH (as formerly reported and confirmed by AECOM); and 3) the potential for migration of TPH and associated VOCs (from the diesel fuel spill on September 17, 2011) to migrate off property.

Laboratory analytical results for groundwater samples collected from within the containment area, specifically below the former 70,000-gallon AST at boring B-2, indicated the presence of diesel-range TPH (75,000 µg/L), carcinogenic polycyclic aromatic hydrocarbons (cPAHs) (3.3 µg/L), and benzene (35 µg/L). At boring B-4, adjacent south of the former AST, diesel-range TPH (28,000 µg/L) and cPAHs (3.0 µg/L) were also detected. These concentrations are above their respective MTCA Method A groundwater cleanup levels of 500 µg/L for diesel-range TPH, 0.1 µg/L for total cPAHs, and 5 µg/L for benzene.

Diesel-range TPH was not detected in groundwater collected at borings B-1 and B-3, immediately adjacent north and east, respectively, of the former fuel spill area (outside the containment wall). However, gasoline-range TPH (2,600 µg/L at B-1 and 1,700 µg/L at B-3) and benzene (16 µg/L at B-1) were detected. These concentrations are above their respective MTCA Method A groundwater cleanup levels of 800 µg/L and 5 µg/L.

Laboratory analytical results for soil samples collected from boring B-6, located east and downgradient of the former spill area, indicated the presence of diesel-range TPH (4,600 mg/Kg), gasoline-range TPH (830 mg/Kg), and benzene (0.06 mg/Kg). These detections are above their respective MTCA Method A cleanup levels of 2,000 mg/Kg, 30 mg/Kg, and 0.03 mg/Kg.

Refer to Tables 1 and 2 on Figure 3, *Site Plan & Borings Location Map* for a summary of the soil and groundwater data collected by AEG.

Groundwater analytical results for AECOM's monitoring wells showed the presence diesel-range TPH and/or benzene at MW-3 (northeast), MW-4 (directly adjacent east-northeast), and MW-5 (north of the containment area) above MTCA Method A cleanup levels during AECOM's September 2011 Groundwater Event. In comparison, during AEG's September 2012 Groundwater Event, only benzene was detected at concentrations above the MTCA Method A cleanup level in MW-4 and MW-5.

The direction of groundwater flow for the Site based on AECOM's and AEG's monitoring events is generally to the north with components to the northeast and east.

Fast Fuel Facility

AEG advanced a total of five borings (B-8 through B-12) to assess the subsurface conditions (soil and groundwater media) at the Fast Fuel facility, adjacent to the dispenser islands and USTs, to assess the fuel station's integrity as an operational retail fuel dispensing facility.

Laboratory analytical results indicated no detectable concentrations of all constituents of concern (COCs) (gasoline-, diesel-, and heavy oil-range TPH; and associated VOCs) in all soil and groundwater samples collected in this area of the Site. Refer to Tables 1 and 2 on Figure 3, *Site Plan & Borings Location Map* for a summary of the soil and groundwater data collected by AEG.

Conclusions

The Supplemental Site Characterization for both areas concluded that groundwater beneath the former spill area/former 70,000-gallon AST showed significant impact due to the former fuel spill on September 17, 2011. The concentrations of diesel-range TPH (up to 75,000 µg/L) and cPAHs (up to 6.5 µg/L) are likely associated with the fuel spill because of the type of contaminants detected (associated with the fuel spilled) and the high concentrations reported (i.e., not indicative of weathered/older fuel). A slight to moderate sheen with strong diesel fuel odor was also observed during groundwater sampling activities at borings B-2 and B-4.

Contamination above MTCA Method A cleanup levels remains at the former fuel spill area beneath the former 70,000-gallon AST despite the fuel recovery and remedial action efforts completed by AECOM. AECOM reported that "*diesel collection via the recovery wells, excavation of impacted soil from all accessible impacted areas has also been completed (except directly beneath the AST and associated piping)*" (AECOM, 2011). Hence, in AEG's professional opinion, the high level of contamination currently present in this area is not unexpected. Additional cleanup action/remedial action is necessary to remediate the impacted soil and groundwater to concentrations below MTCA Method A cleanup levels.

The elevated diesel-range TPH concentration detected at boring B-6 (located downgradient and east of the former fuel spill area) may be associated with the former fuel spill that had occurred on September 17, 2011.

Laboratory analytical results indicated elevated concentrations of gasoline-range TPH in groundwater at borings B-1 and B-3. The potential sources of this contamination were unclear at this point of investigation since gasoline-range TPH was not detected in groundwater in B-6 or B-8 through B-12.

Based on this data, AEG concluded the potential for off-property migration of the COCs (TPH, benzene, and/or cPAHs) existed due to the direction of groundwater flow and elevated TPH and benzene concentrations detected at perimeter monitoring wells MW-3, MW-4, and MW-5 (AECOM's September 2011 Event).

Turbine Pump and Dispenser Sump Soil Sampling, AEG – July 2013

In July 2013, the Acme Fuel Company observed that compression fittings on two of the gasoline turbines were leaking and that a compression fitting on one of the dispensers was also leaking. To evaluate the potential impacts that may have had occurred to the exposed soil beneath the leakage, and to determine if other turbines and dispensers had leaked, AEG:

- Sampled the exposed soil beneath all of the dispensers and the backfill material adjacent to all of the UST turbine pumps (refer to Figure 4, *Turbine Boring Locations*) at depths ranging from 6 to 12 inches bgs. The backfill material beneath the dispensers and surrounding the turbine pumps was silty sand with some gravel.
- Analyzed the soil samples for gasoline-range TPH, diesel- and oil-range TPH, and benzene, toluene, ethylbenzene, and xylenes (BTEX).

The sample results indicated that:

- Diesel-range TPH was present **above** the MTCA Method A cleanup levels in three of the samples collected. Two of the samples with results above the cleanup levels were collected beneath the dispensers in what is currently the gasoline fueling area, and one sample was from the backfill soil adjacent to the turbine pump located in the southern portion of the UST nest.
- Gasoline-range TPH and total xylenes were present **above** the MTCA Method A cleanup levels in the backfill soil adjacent to the turbine pump located in the northwestern portion of the UST nest.
- Benzene was present **above** the MTCA Method A cleanup level in the backfill soil adjacent to the turbine pump in the southeastern portion of the UST nest.
- Petroleum hydrocarbons were **not detected above** the MTCA Method A cleanup levels in the samples collected from beneath the dispensers in the diesel fueling area located in the northeastern portion of the Site.

Based on the analytical results, AEG concluded that:

- The soil beneath the dispensers and adjacent to the turbine pumps in the gasoline fueling area of the Fast Fuel facility had been contaminated above the MTCA Method A cleanup levels by the leaks observed from the compression fittings and from historical leakage and de minimis drippage.
- The soil beneath the dispensers in the diesel fueling area had been minimally impacted by de minimis drippage and leakage but not above the MTCA Method A cleanup levels.

Remedial Investigation, AECOM – November 2014

In November 2014, AECOM collected additional soil and groundwater samples from 12 borings (GP-1 through GP-12) advanced throughout the Site as part of a Remedial Investigation. Based on the analytical results, AECOM determined the extent of diesel- and gasoline-range TPH in soil and groundwater as illustrated in Figure 6, *TPH-Gx (Diesel) Concentrations in Groundwater*, Figure 7, *TPH-Gx (Gasoline) Concentrations in Groundwater*, Figure 8, *TPH-Dx (Diesel) Concentrations in Soil*, and Figure 9, *TPH-Gx (Gasoline) Concentrations in Soil*.

Off-Property Investigation, AEG – October 2015

In October 2015, AEG collected additional soil and groundwater samples from 13 borings (B-1 through B-7 and MW-6 through MW-11) advanced along the Thurston Ave NE ROW. Based on the analytical results, AEG determined the extent of diesel- and gasoline-range TPH in soil and in groundwater throughout the Site as illustrated in Figure 6, *TPH-Gx (Diesel) Concentrations in Groundwater*, Figure 7, *TPH-Gx (Gasoline) Concentrations in Groundwater*, Figure 8, *TPH-Dx (Diesel) Concentrations in Soil*, and Figure 9, *TPH-Gx (Gasoline) Concentrations in Soil*.

Because of the facility's location near Puget Sound, AEG also continuously logged water levels in monitoring wells MW-1, MW-2, and MW-3 over a two week period to determine whether local groundwater gradients are influenced by the diurnal tidal cycle in nearby Budd Inlet. The data obtained from this study recorded groundwater elevation changes over time, with maximum groundwater elevation peaks recorded on September 26, 2015, October 2, 2015, and October 7, 2015. The maximum amplitude of the signal was less than 0.2 meters (8 inches). Minor fluctuations were superimposed on the major signal.

These logged water level data provide some evidence that groundwater may be influenced by the local tidal cycle, but that the response may be dampened significantly by the Site's location, 800 feet from the nearest shoreline. A more likely explanation is that the changes in groundwater elevations reflect a response to local rainfall patterns influencing shallow groundwater, or other industrial processes nearby. A total of 0.2 inches of rainfall was recorded on September 25, and 0.46 inches was recorded October 7. However, rainfall alone does not explain the peak detected on October 2, 2015, when no rainfall was recorded nearby, supporting some dampened response to tidal influence at the Site. Groundwater elevation changes may also be related to the Site's proximity to the LOTT Wastewater Treatment Facility, immediately across Thurston Ave.

SITE GEOLOGY AND HYDROGEOLOGY

The Site is located within the southern area of the Puget Lowland in western Washington. The Puget Lowland is a north-south trough that lies from the Canadian Border south to the Willapa

Hills and between the Olympic Mountains to the west and the Cascade Mountains to the east. The topography is dominated by north-south trending valleys and low, nearly flat-topped terraces that are less than 1,000 feet in elevation. Terraces are deep and eroded by streams and rivers. The topographic surface of northern Thurston County is largely the result of erosion since the most recent glacial events (Easterbrook, 1970).

According to the *Geologic Map of the Tumwater 7.5-minute Quadrangle, Thurston County, Washington,* the surficial geology at the Site is comprised of fill material. Historical Sanborn Insurance Maps show that several fill events occurred along East Bay of Budd Inlet throughout the late 1800s and early 1900s. Typically, the fill consists of *"clay, silt, sand, gravel, organic matter, shells, rip-rap, and debris emplaced to elevate the land surface and reshape surface morphology; includes engineered and non-engineered fills; shown only where fill placement is relatively extensive, sufficiently thick to be of geotechnical significance, and readily verifiable"* (Walsh, T.J., Logan, R.L., et al., 2003). This fill is underlain by native soils consisting of sands, silts, and clays, and at deeper depths a regional confining layer, which creates artesian groundwater conditions in Olympia (Pioneer, 2011).

The subsurface conditions at the Site generally consist of fill deposits ranging from medium dense, poorly graded sand to silty sand to medium stiff clay to approximately 10 feet bgs. Weathered wood debris/fragments ranging from several inches to at least 2 feet thick were also observed below the clayey soil at depths of approximately 8 to 10 feet bgs. The nature of the soils in the water-bearing zone appears to be the poorly graded sand (medium grained) to silty sand within the fill deposits. Groundwater is present at about 5 to 7 feet bgs throughout the Site.

The direction of shallow groundwater flow at the Site, as measured during AEG's August 2014 and February 2015 groundwater event based on professional surveyed elevations, was generally to the east-northeast and north, respectively (refer to Figure 11 – *August 2014 Groundwater Contour Map,* and Figure 12 – *February 2015 Groundwater Contour Map*). In comparison, AECOM reported that the general direction of groundwater flow was northerly, and "*there are also indications of north-easterly and north-westerly flow*" (AECOM, 2011).

The direction of shallow groundwater flow can be highly variable due to the presence of varying depths to shallow groundwater, and tidal influences in the vicinity. In our professional opinion, the direction of regional groundwater flow in the area will likely fluctuate from generally north to northeast and northwest with tangents to the east, based on surface topography and regional discharge points towards the East Bay (approximately 800 feet east of the Site) and the West Bay of Budd Inlet (approximately 1,300 feet west of the Site).

CONCEPTUAL SITE MODEL

This section provides a conceptual understanding of the Site, derived from the results of the subsurface investigations performed at the Site. The CSM is dynamic and may be refined as additional information becomes available.

Constituents of Concern and Affected Media

Soil and groundwater are the media at the Site currently affected by the constituents of concern (COCs) identified at the Site. The COCs at this Site are gasoline- and diesel-range TPH, cPAHs, and BTEX compounds. The primary conceptual release model for the Site is the 2,600-gallon diesel fuel spill that occurred from the former 70,000-gallon AST. Despite the fuel recovery and remedial action efforts completed by AECOM, residual impacts are still detected in this area. In addition, the soil beneath the dispensers and adjacent to the turbine pumps in the gasoline fueling area of the Fast Fuel facility has been contaminated above the MTCA Method A cleanup levels by the leaks observed from compression fittings, historical leakage, and de minimis drippage. Additional cleanup action/remedial action is necessary to remediate the impacted soil and groundwater to concentrations below MTCA Method A cleanup levels.

Based on the depth of the soil contamination observed and its location downgradient from the source area, it is thought that the deeper and downgradient soil contamination is a result of migration of the TPH with the groundwater away from the release locations. This migration most likely included advective transport as well as dispersion and diffusion in the soil and groundwater.

Environmental Fate of TPH in the Subsurface

TPH constituents are soluble in groundwater and will migrate with the water. As the more soluble components of TPH are dissolved, the heavier components of the TPH remain in the soil. At this Site, groundwater is generally moving to the north, towards Thurston Avenue.

Some TPH constituents are also volatile and can be volatilized under the appropriate conditions. In the subsurface, this volatilization releases contaminants into the soil vapor where, if conditions are right, it can migrate beneath or into structures. As the more volatile components of TPH are volatilized, the heavier components of the TPH remain in the soil. These degraded components are less volatile, and less likely to impact soil vapors.

TPH constituents are also readily biodegraded in the subsurface by naturally occurring aerobic and anaerobic bacteria. The aerobic biodegradation is the most efficient of the biological activities.

Potential Exposure Pathways

As defined in WAC 173-340-200, an exposure pathway describes the mechanism by which a hazardous substance takes or could take a pathway from a source or contaminated medium to an exposed receptor.

Potential Soil Exposure Pathways

Direct ingestion of, or dermal contact with, soil containing COCs is considered a potential exposure pathway. Soil impacts are generally present around the former 70,000-gallon AST and the gasoline dispensers. These areas are currently covered by asphalt, gravel, and/or Site structures and, unless disturbed, are not available for potential direct contact or ingestion.

Potential Groundwater Exposure Pathways

The groundwater in the area of the Site is not used for drinking water. Water is supplied by the City of Olympia. However, direct contact with the groundwater is considered a potential exposure pathway as groundwater levels can seasonally be as shallow as 2 to 3 feet bgs.

Potential Air Exposure Pathways

Concentrations of benzene have been detected in soil and groundwater beneath the Site, and groundwater concentrations of benzene have, at times, exceeded the MTCA Method B Groundwater Screening Level (2.4 µg/L) considered protective of indoor air. As such, inhalation exposure via the soil-to-vapor pathway is considered a potentially complete pathway.

Potential Human Receptors and Terrestrial Ecological Evaluation

Exposure to COCs in the soil is considered a potential risk to human receptors, including employees, and incidental receptors such as utility workers or Site visitors who may be exposed to soil from the Site.

The majority of the Site is covered by asphalt, gravel, or Site structures, and it is not anticipated that ecological receptors would be at risk. Further, there is currently less than 1.5 acres of contiguous undeveloped land on or within 500 feet of any area of the Site, which would exclude the Site from further terrestrial ecological evaluation under MTCA.

CLEANUP STANDARDS

Remedial Action Objectives

Remedial action objectives (RAOs) define the overall goals of the remedial effort and act as benchmarks for comparative evaluation of any remedial alternative. The RAOs are specific to each site and each of the contaminants and media affected at a site. The general RAOs for this Site are as follows:

Petroleum-Contaminated Soil

- Control and remove the potential for direct contact to humans and the environment from residual PCS and associated substances, and remediate the impacted soils to concentrations below MTCA Method A soil cleanup levels.
- Reduce the potential for the soils to continue to impact the groundwater via leaching.

Petroleum-Contaminated Groundwater

- Remediate and restore the groundwater quality to concentrations below MTCA Method A groundwater cleanup levels, and minimize the potential for exposure to humans and the environment.

Cleanup Levels

MTCA defines cleanup levels as:

> *"…the concentration of a hazardous substance in soil, water, air or sediment that is determined to be protective of human health and the environment under specified exposure conditions.*"

These levels combined with the location where these cleanup levels must be met (point of compliance [POC]), and other regulatory requirements that apply to a site, define the cleanup standards for a site.

For this Site, AEG intends to use MTCA Method A cleanup levels. The conditions for using the MTCA Method A cleanup levels are met at this Site because numerical standards are available for all indicator hazardous substances in all media of concern [WAC 173-340-704(1)(b)]. In addition, Method A cleanup levels are appropriate because only a few petroleum-related hazardous substances have been found.

The MTCA Method A cleanup levels for the Site COCs are:

Soil:	TPH-Gasoline	30 mg/kg
	TPH-Diesel	2,000 mg/kg
	Total cPAHs	0.1 mg/kg
	Benzene	0.03 mg/kg
	Toluene	7 mg/kg
	Ethylbenzene	6 mg/kg
	Total xylenes	9 mg/kg
Groundwater:	TPH-Gasoline	800 µg/L
	TPH-Diesel	500 µg/L
	Total cPAHs	0.1 µg/L
	Benzene	5 µg/L
	Toluene	1,000 µg/L
	Ethylbenzene	700 µg/L
	Total xylenes	1,000 µg/L

Points of Compliance

For this Site, it is assumed that the standard point of POC will be applied.

- Soil – Direct Contact: For soil cleanup levels based on human exposure via direct contact, the POC is throughout the Site from the ground surface to 15 feet bgs.
- Soil – Leaching: For soil cleanup levels based on protection of groundwater, the POC is throughout the Site.
- Groundwater: For groundwater, the POC is throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by the Site.
- Indoor Air/Soil Gas: The POC is ambient and indoor air throughout the Site.

PROPOSED CLEANUP ACTION PLAN

To achieve cleanup standards, AEG is proposing the efforts to be completed in three phases for the Site. The phased approach is summarized as follows:

- Phase #1 – Removal of USTs, including the pump island and dispensers.
- Phase #2 – Select excavation of PCS to a depth of 5.5 feet bgs.
- Phase #3 – In-situ heat-enhanced bioremediation to treat any residual PCS and groundwater following excavation.

The scope of work (SOW) presented below is based on the most effective and economical cleanup option for the Site, taking into account: contamination levels, property size, locales of impacted soil/groundwater throughout the Site, current Site usage, as well as future use. The USTs and associated equipment will be decommissioned, and PCS will be excavated to the extent practicable. Excavated soil will be transported off Site for disposal at a regulated landfill. A Site map showing the approximate limits of the soil to be excavated is provided as Figure 5, *Proposed Excavation Limits*. In addition, generally the same volume of soil hauled off Site for disposal or treatment must be hauled back to the Site as backfill for the excavation.

Once the final soil results are evaluated, the next phase of remediation will be a staged approach to in-situ bioremediation comprising of augmented in-situ bioremediation to enhance aerobic biodegradation of TPH. At this phase, AEG is recommending a *Heat-Enhanced In-Situ Bioremediation* process as the proposed remedial alternative; however, a review of available and practical remediation technologies will be completed in final Cleanup Action Plan (CAP) for the Site.

Phase #1 & Phase #2 SOW

AEG SOW for the UST Decommissioning and Soil Removal:

- Provide consulting services related to Site cleanup and Ecology's Voluntary Cleanup Program (VCP) process.

- Custodian of any and all permits, notifications, and approvals applicable to the project including all local, state, and federal requirements.
- Prepare a Site Health & Safety Plan (HASP) to establish policies and procedures to protect all personnel from the potential hazards posed by handling of contaminated soils and/or groundwater during Site cleanup work. The HASP will also detail traffic control provided on Thurston/Adams Avenues and the sidewalks of these streets to ensure safety of local citizens/businesses/and personnel associated with the Site work.
- Prepare and submit a SEPA permit.
- Provide oversight to excavate PCS to the maximum extent practicable. PCS removal is being limited to a depth of 5.5 feet bgs or when groundwater is encountered.
- Collect soil samples as necessary to adequately characterize the extent of contamination and evaluate the extent of the excavation area.
- Submit the soil samples to a Washington State-accredited analytical mobile laboratory for laboratory analyses in accordance with MTCA, *Table 830-1: Required Testing for*

Petroleum Releases. Immediate laboratory results will be available to provide direction on the characterization of the PCS and extent of excavation.

- If needed, dewater the excavation pit during excavation activities and prior to backfilling to remove accumulated groundwater from the excavation using pumps or other means.
- Contain any groundwater removed on Site in Baker Tanks. Water samples will be collected and analyzed for the Site COCs to determine the final disposition of the water.
- Collect sidewall confirmation soil samples to ensure that, to the extent possible, there are no detectable concentrations or the concentrations of the COCs are below MTCA Method A soil cleanup levels. The potential exists that underground utilities and/or the adjacent ROWs will limit the extent of the excavation pit.
- Collect soil samples from the bottom or near bottom of the excavation pit for laboratory analysis. The moisture content (wet to saturated) in these samples will likely be reflective of the groundwater component of the dissolved phase petroleum hydrocarbons in groundwater and therefore the laboratory analytical results will not be indicative of representative base confirmation soil samples.
- Collect and submit all confirmation soil samples to a Washington State-accredited analytical laboratory using laboratory-provided containers. The containers will be labeled and placed in a portable chilled ice chest and transported to the laboratory following standard chain-of-custody procedures.
- Perform data analysis of laboratory analytical results in comparison to MTCA Method A cleanup levels for soil.
- Backfill the excavation pits with clean fill and resurface the Site.
- Prepare a *UST Decommissioning and Remedial Action Report* documenting the field activities and methodologies, summarizing the analytical results, and conclusions.
- Submit all subsurface investigation data and laboratory data into Ecology's Environmental Information Management (EIM) System.
- Submit documentation to Ecology in accordance with WAC 173-340-840 in both written and electronic format. All reports generated by AEG will be reviewed by a WA State licensed hydrogeologist.

Subcontractor's SOW for the UST Decommissioning and Soil Removal:

- Decommission three 8,000-gallon gasoline USTs.
- Decommission one 8,000-gallon diesel UST.

- Remove two existing canopies and store on Site for reinstallation.
- Demolition and removal of existing concrete containment area around the 30,000-gallon AST.
- Demolition and disposal of existing bulk fuel load rack.
- Remove all existing underground product lines and oil/water separator.
- Facilitate transport and disposal of PCS to a regulated landfill. An estimated 4,600 tons of soil may be removed from the subsurface following the USTs removal. The visibly contaminated soil will be removed to the extent practicable to not compromise the sidewalks or other Site structures (see the attached figures).
- Place excavated soil in temporary stockpiles on the Site or in awaiting trucks and pups for disposal off Site at a regulated landfill. If stockpiled, soils will be placed on top of two layers of chemically resistant polyethylene sheeting.

Phase #3 – In-Situ Heat-Enhanced Bioremediation

This phase will be designed and implemented after a complete review of the conditions following the excavation activities. The proposed soil removal depth is the groundwater level and is a variable based on the time of year the work is completed. From the existing data, the local water table fluctuates between 1 to 9 feet bgs with a mean value of 5.5 feet bgs. PCS within the saturated zone or the *"smear zone"* is estimated to be from 5 to 9 feet bgs. To treat this smear zone soil and reduce future groundwater impact, an option for bioremediation is proposed for the *Phase #3* of the project. The size of the treatment system, including number of wells, pumping rate, and inoculant rates, will be part of the final design before implementation.

Biodegradation/Bioremediation is defined as use of biological processes to degrade, break down, transform, and/or essentially remove contaminants or impairments of quality from soil and water. Biodegradation/Bioremediation is a natural process that relies on bacteria, fungi, and plants to alter contaminants as these organisms carry out their normal life functions. Metabolic processes of these organisms are capable of using chemical contaminants as an energy source, rendering the contaminants harmless or less toxic products in most cases.

Temperature influences the rate of biodegradation by controlling the rate of enzymatic reactions within microorganisms. Generally, "*…speed of enzymatic reactions in the cell approximately doubles for each 10^{o} C* [degrees Celsius (50 degrees Fahrenheit (^{o} F)] *rise in temperature…*" (Nester et al., 2001).

There is an upper limit to the temperature that microorganisms can withstand. Most bacteria found in soil, including many bacteria that degrade petroleum hydrocarbons, have an optimum temperature ranging from 25° C (77° F) to 45° C (113° F) (Nester et al., 2001). Thermophilic bacteria (those that survive and thrive at relatively high temperatures), which are normally found in hot springs and compost heaps, exist indigenously in cool soil environments and can be activated to degrade hydrocarbons with an increase in temperature to 60° C (140° F).

For the Site, thermally enhanced bioremediation/biodegradation would use a commercially available treatment system called the "*Dissolved Oxygen In-Situ Treatment (DO-IT™) system*". This system utilizes extracted groundwater as a carrier for high levels of dissolved oxygen (>35 ppm) and biological enhancements. The DO-IT™ system recovers groundwater from the contaminant plume area and downgradient of the plume. Oxygen is added to the water by using small amounts of peroxide or ozone and then oxygenated treatment water is re-distributed to the subsurface to support high rates of in-situ microbial degradation. In this way, the bioremediation methods can work efficiently to degrade TPH/BTEX, while also facilitating hydraulic control and capture of the contaminant plume.

The system would be coupled with a boiler, an inoculant tank and a heat exchanger to heat the extracted groundwater to 90° F prior to re-injection into the injection wells (see *Figure 10 – In-Situ Heat Enhanced Bioremediation Process Flow Schematic*). It is expected that the groundwater in the treatment zone will increase in temperature by 10 to 30° F. This increased temperature will enhance desorption, increase solubility, and increase biodegradation rates by an order of magnitude, resulting in a significantly faster remedial timeframe capable of reaching low concentration goals (i.e., MTCA Method A cleanup levels).

Site Application Procedure

The DO-IT™ technology is a very effective soil and groundwater treatment system, especially when utilized in a closed-loop remediation process. By utilizing the Super-Ox™ mixing unit in combination with specifically installed extraction wells, artificial groundwater gradients can be produced within the on-Site plume area to induce convective cycling of biologically active treatment water through the treatment area. Advantages to this approach include hydraulic control of the leading plume edge, treatment of both dissolved and adsorbed contamination, and maximum contact between the treatment water and the contaminants.

Groundwater Extraction System: Install new extraction wells in locations downgradient of remaining PCS with the proper depths and screened intervals. Typically, a Grundfos Rediflow 3 Environmental "run-dry" submersible pump is used as the extraction pump for this type of project. The motor leads, distribution manifolds, flow meters, sample ports, and control panel will be protected from damage in an equipment trailer.

Groundwater Pre-Treatment: The extracted water is processed through two 500-pound granular activated carbon (GAC) vessels (high pressure) with all piping, transfer pump, and sample ports needed for compliance sampling and re-injection to the subsurface.

Groundwater Re-injection: Install new, 4-inch diameter injection wells upgradient of the PCS area and screened in the unsaturated zone. These injection wells will be screened above and below the groundwater table to allow infiltration through the formation with minimal pressure.

Heat-Enhanced Super-Ox™ Model 10-Custom (10-C): This system is housed in a 20-foot long, modified shipping container along with the boiler, the heat exchanger, and all controls. The 10-C unit will pull water from an adjacent holding tank (~500-1000 gallons), oxygenate it, and then re-inject into available subsurface piping. The holding tank will be connected to the adjacent heat exchanger component so that the holding tank can be heated to 90° F prior to re-injection. Biological products can be added manually to the holding tank on a scheduled basis. The Model 10-C is capable of a maximum process rate of 10 gallons per minute (gpm), and generates high levels of dissolved oxygen (>35 parts per million [ppm]) in the process water using its unique pure oxygen mixing system. The 10-C unit is fully automated and programmable, and includes a standard 6-station injection manifold. This unit is very efficient, requiring only a single-phase 110V, 30-Amp power source. The additional groundwater extraction component will require a 220V, 30 amp power source. Amperage to be used for building electricity and the heating component should be accounted for.

The container will serve as a self-contained, insulated housing for all equipment and controls as well as providing a storage for consumable items. It will require a single point of electrical power supply, 100 amp of 115/230 volt, single phase power. It will have security lighting, hatches for all well and injection piping, as well as a natural gas connection.

The boiler will be piped to the heat exchange, including all pumps, controls, and safety components. The boiler vent stack will be provided and is to be installed on Site. The boiler operation is fully automatic and will conform to State of Washington boiler requirements. This low pressure boiler is recommended for this application as it will not require attendance but will have remote call capability if it goes off line.

The boiler and accompanying heat exchange system will be matched to meet the requirements of the groundwater extraction system with a safety factor of two.

Biological Amendments and Product Recommendations

For biological products at this Site, AEG would likely recommend TPH Bacterial Consortium (EZT-A2™) and PetroSolv surfactant. The CBN™ nutrients, which include macro- and micronutrients specially blended for in-situ bioremediation, will be necessary. These products work together to efficiently degrade TPH and their application will perform three critical in-situ functions, including:

1. Supply of a large population of pre-acclimated bacteria to optimize initial growth of a healthy, in-situ, hydrocarbon-degrading microbial population.
2. Maximize contact between the contaminants and the bacteria. Bioremediation is a contact technology – the bacteria must physically contact the hydrocarbon food source and the electron acceptors (oxygen, nitrate, and sulfate) to biochemically oxidize the petroleum to CO_2 and water.
3. Supply of critical nutrients like nitrogen, phosphorus, and potassium to support ongoing biological growth. The nitrogen compounds also act as secondary electron acceptors to ensure continuous contaminant degradation during temporary absences of dissolved oxygen.

To maximize the effectiveness of the proposed process, scheduled collection of some specific parameters is recommended. These parameters include field readings (DO, pH, ORP, conductivity, temperature) and inorganic parameters (ferrous iron, sulfate, nitrate, ammonia) to evaluate oxidative/reductive groundwater conditions and in-situ microbial growth. In general, these parameters should be collected from monitoring wells within the target plume zone on a quarterly basis, at a minimum.

Ability to meet MTCA Method A Cleanup Standards in Soil and Groundwater

- This alternative addresses gasoline- and diesel-range TPH and BTEX contamination in the saturated and unsaturated soil, which can act as an ongoing source of groundwater contamination.
- Over an extended period of time, this alternative should be able to meet MTCA Method A cleanup levels for groundwater and soil.
- Because this alternative destroys the contaminant, it is high on Ecology's "long-term effectiveness" scale.

Additional Considerations to Implement Phase #3

- Before full-scale implementation, a pilot test is recommended and should to be conducted properly design the system. This pilot test would last approximately six months.
- This remedial option will require the installation of hot water injection wells in addition to several downgradient extraction wells. The wells would then need to be connected to the treatment system through underground piping. It is estimated that it will take two weeks to

install the wells and to construct the associated piping system. Roughly one week will be needed for startup testing and system optimization.

- The certain portions of the Site's operations could be temporarily limited during the installation of the extraction and injection wells.
- It is possible that the final system may meet the cleanup levels for the Site within 6 to 12 months, and an NFA applied for after at least an additional four quarters of groundwater sampling.
- This alternative will require the contractor to obtain construction permits from local authorities. Site utilities will need to be carefully assessed prior to the start of construction.
- Additional electrical power may need to be brought to the Site by the PUD to run the treatment system.
- Natural gas will need to be connected to the treatment system boiler.

Based on the current data and the logistics to remove/treat groundwater to allow further excavation of PCS, *In-Situ Heat-Enhanced Bioremediation* best meets the criteria for selection of a remedy as outlined by MTCA for this Site. This approach complies with applicable regulations, is protective of human health and the environment, is reasonably practicable, and can be readily implemented at the Site.

COMPLIANCE MONITORING

MTCA identifies three types of compliance monitoring to be performed during and/or after a remedial action:

- Protection Monitoring.
- Performance Monitoring.
- Confirmational Monitoring.

According to MTCA:

Protection Monitoring confirms:

> "*…that human health and the environment are adequately protected during construction and the operation and maintenance period of an interim action or cleanup action…*"

Performance Monitoring confirms:

> "*…that the interim action or cleanup action has attained cleanup standards and, if appropriate, remediation levels…*"

> Confirmational Monitoring confirms:
>
> "*…the long-term effectiveness of the interim action or cleanup action once cleanup standards and, if appropriate, remediation levels or other performance standards have been attained.*"

During and following the remedial actions being taken at the Site, all three types of compliance monitoring will occur. At the conclusion of each phase of the CAP, AEG will prepare a report that summarizes the information from the Site activities.

Protection Monitoring and Reporting

Concurrent with the Performance Monitoring and subsequent Confirmational Monitoring, Protection Monitoring will occur. This monitoring will confirm that contamination, if present, is not leaving the property, and will use all wells on Site and will follow the analytical protocols of the specific monitoring program.

As part of the Protection Monitoring program, *Sampling Event Reports* documenting the depth-to-water, groundwater flow direction, analytical results of the groundwater monitoring/sampling activities, and any other activities pertinent to the cleanup at the Site will be prepared. All reports generated by AEG will be reviewed by a Washington State licensed hydrogeologist. All data generated will be submitted to Ecology in accordance with WAC 173-340-840(5) in both written and electronic format.

Performance Monitoring

Performance Monitoring will occur during and after the USTs have been removed, PCS excavation is completed, and (if applicable) the *In-Situ Heat-Enhanced Bioremediation* system is operational. This monitoring will monitor the effectiveness of the enhanced bioremediation from the additional oxygen. The Performance Monitoring will also monitor the natural attenuation of the residual contaminants after the treatment process is no longer active at the Site.

The Performance Monitoring wells will be selected and/or added to the Site, if needed, after the CAP Site work is completed, and will be sampled at least on a semi-annual basis (more frequently as needed) until the *In-Situ Heat-Enhanced Bioremediation* system is no longer active (or effective) at the Site, and the COC concentrations are below the MTCA Method A cleanup levels. It is anticipated that sampling will occur for at least four events.

Groundwater samples for the sampling events will be analyzed for the Site COCs as per MTCA Table 830-1, *Required Testing for Petroleum Releases.*

In addition, groundwater field parameters of temperature, pH, conductivity, dissolved oxygen, and oxygen reducing potential will be measured to assist in determining when the *In-Situ Heat-Enhanced Bioremediation* system is no longer effective at the Site.

Confirmational Monitoring (Groundwater and Soil)

Once contaminant concentrations have been remediated to below the MTCA Method A cleanup levels at the POCs as observed by the Performance Monitoring, Confirmation Monitoring will begin. This monitoring will confirm that the remedial action has performed as expected and confirm that the groundwater remains below the cleanup standards established for the Site.

The wells used for the Confirmational Monitoring are the same wells used for the Performance Monitoring. It is anticipated that this sampling will occur for a minimum of four additional quarters. Groundwater samples for the sampling events will be analyzed for the Site COCs as per MTCA Table 830-1, *Required Testing for Petroleum Releases.*

AEG will also perform a final phase of subsurface investigation at the Site for the purpose of collecting confirmational soil samples to ensure that COCs in the soil were successfully remediated via *In-Situ Heat-Enhanced Bioremediation* and are below MTCA Method A soil cleanup levels. It is proposed that at least 10 boreholes be advanced in areas, and confirmational soil samples be collected at depths, where soil contamination was encountered during the initial Site investigations and not excavated as part of the PCS excavation. AEG will work with Ecology to ensure proposed boring locations and sample depths are sufficient to address any previous COC detections in soil.

If the confirmation soil data and four consecutive quarters of Confirmational Monitoring of groundwater do not show contaminant concentrations greater than the MTCA Method A cleanup levels, AEG will request an NFA determination from Ecology.

POTENTIAL ADDITIONAL CLEANUP TASKS

In accordance with 40 CRF 280 parts 66 and 67(d), additional cleanup measures and/or a risk-based site closure may be necessary at this Site if cleanup goals are not met.

ANTICIPATED SCHEDULE

Following completion of the required Site permits, including local construction permits, SEPA determination with the City of Olympia, and UST Removal Notification to Ecology, the UST decommissioning can begin. The UST decommissioning and limited PCS removal is estimated to be completed within 5 weeks of authorization. Along with the UST-related permits, an electrical and Underground Injection Control permit will be submitted for the installation of the Heat-enhanced Bioremediation System. The system installation is anticipated to be completed within 8 weeks, weather permitting, and based on the amount of PCS removed. A portion of the infiltration conveyance piping may be placed during the Site backfill operations following the USTs decommissioning and limited PCS removal.

All work will be performed by an Environmental Professional, and a Principal of AEG will provide quality assurance. Any changes to the work plan or unforeseen costs that may incurred beyond the scope of this Proposal, the Client will be contacted for authorization to proceed.

If you have any questions, please contact our office at (360) 352-9835.

Regards,

State of Washington
Licensed Geologist
2635
SCOTT I ROSE

State of Washington
Licensed Geologist
Hydrogeologist
2612
ADAM H HARRIS

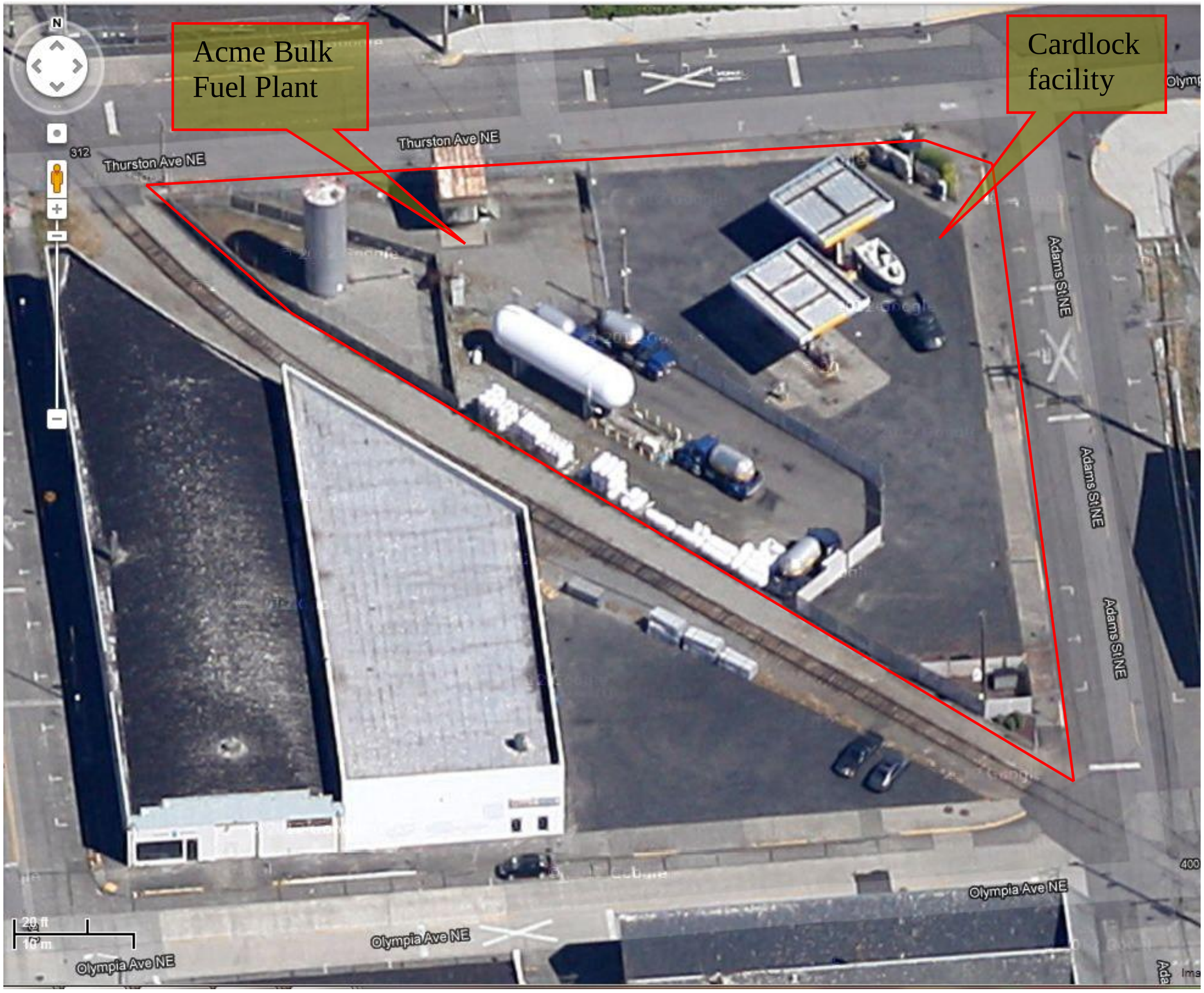
Charles S. Swift
Project Manager

Scott Rose, L.G.
Senior Geologist

Adam Harris, L.Hg
Senior Hydrogeologist

ATTACHMENTS:

Figure 1 – _Site & Vicinity Aerial Photo_
Figure 2 – _Site Map_
Figure 3 – _Site Plan & Boring Locations Map_
Figure 4 – _Turbine Boring Locations_
Figure 5 – _Proposed Excavation Limits_
Figure 6 – _TPH-Dx (Diesel) Concentrations in Groundwater_
Figure 7 – _TPH-Gx (Gasoline) Concentrations in Groundwater_
Figure 8 – _TPH-Dx (Diesel) Concentrations in Soil_
Figure 9 – _TPH-Gx (Gasoline) Concentrations in Soil_
Figure 10 – _In-Situ Heat Enhanced Bioremediation Process Flow Schematic_
Figure 11 – _August 2014 Groundwater Contour Map_
Figure 12 – _February 2015 Groundwater Contour Map_



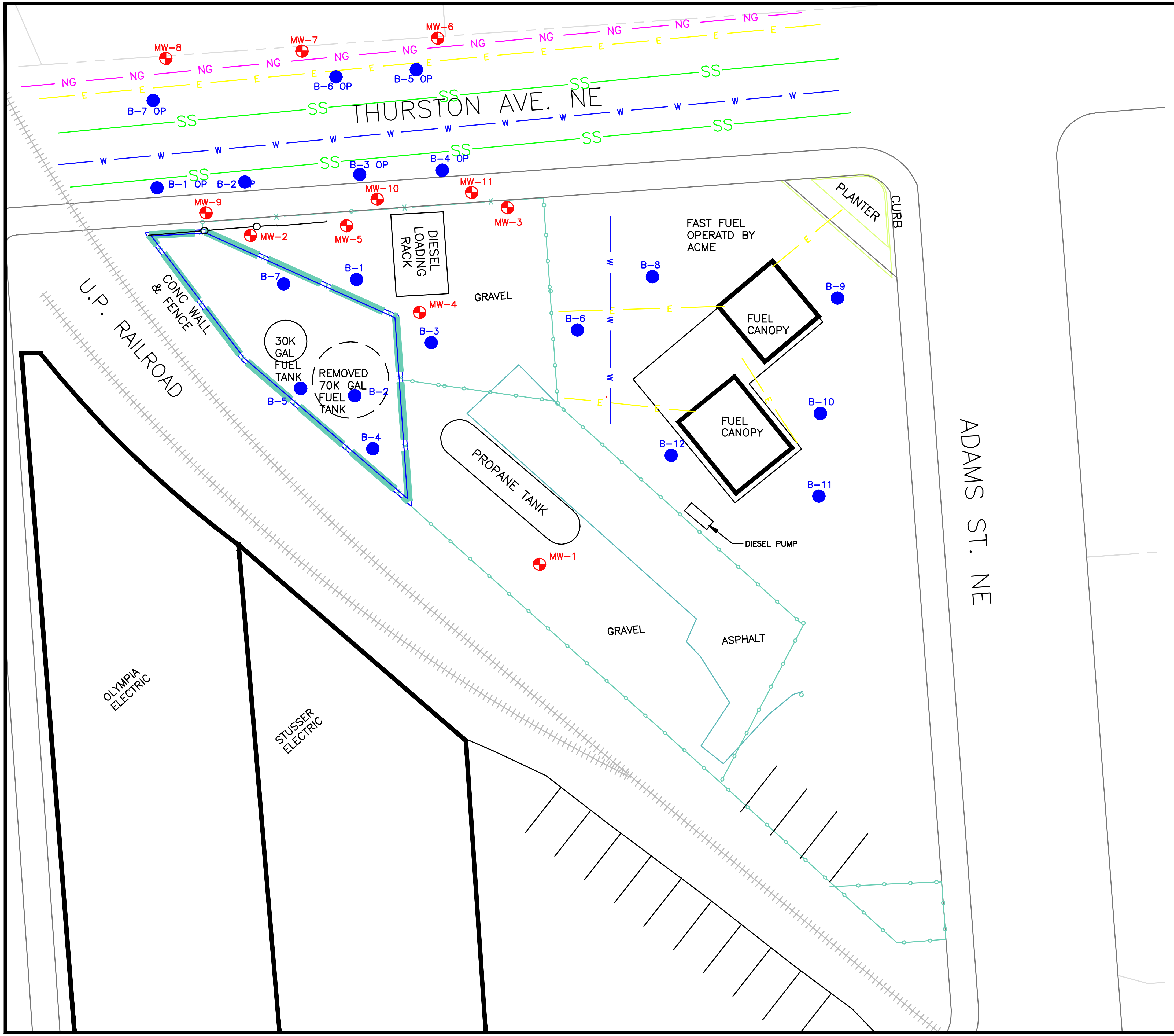
Source: Google website, 2012

ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 1 - Site & Vicinity Aerial Photo

Acme Bulk Fuel Plant & Cardlock Facilities
303 Thurston Ave. NE
Olympia, WA 98501

AEG Project No.: 12-114a



LEGEND

—SS—	SEWER LINE
—E—	ELECTRICAL LINE
—NG—	NATURAL GAS LINE
—W—	WATER LINE
▬ X ▬	4' CONCRETE WALL WITH 4' CHAIN LINK FENCE
—○—○—	SLATTED CHAIN LINK FENCE
↑	GROUNDWATER INFERRED DIRECTION
⊕ MW-1	AECOM Monitoring Wells (MW-1 - MW-5) AEG Monitoring Wells (MW-6 - MW-11)
● B-1	BORING LOCATIONS
● B-1 OP	OFF PROPERTY BORING LOCATIONS

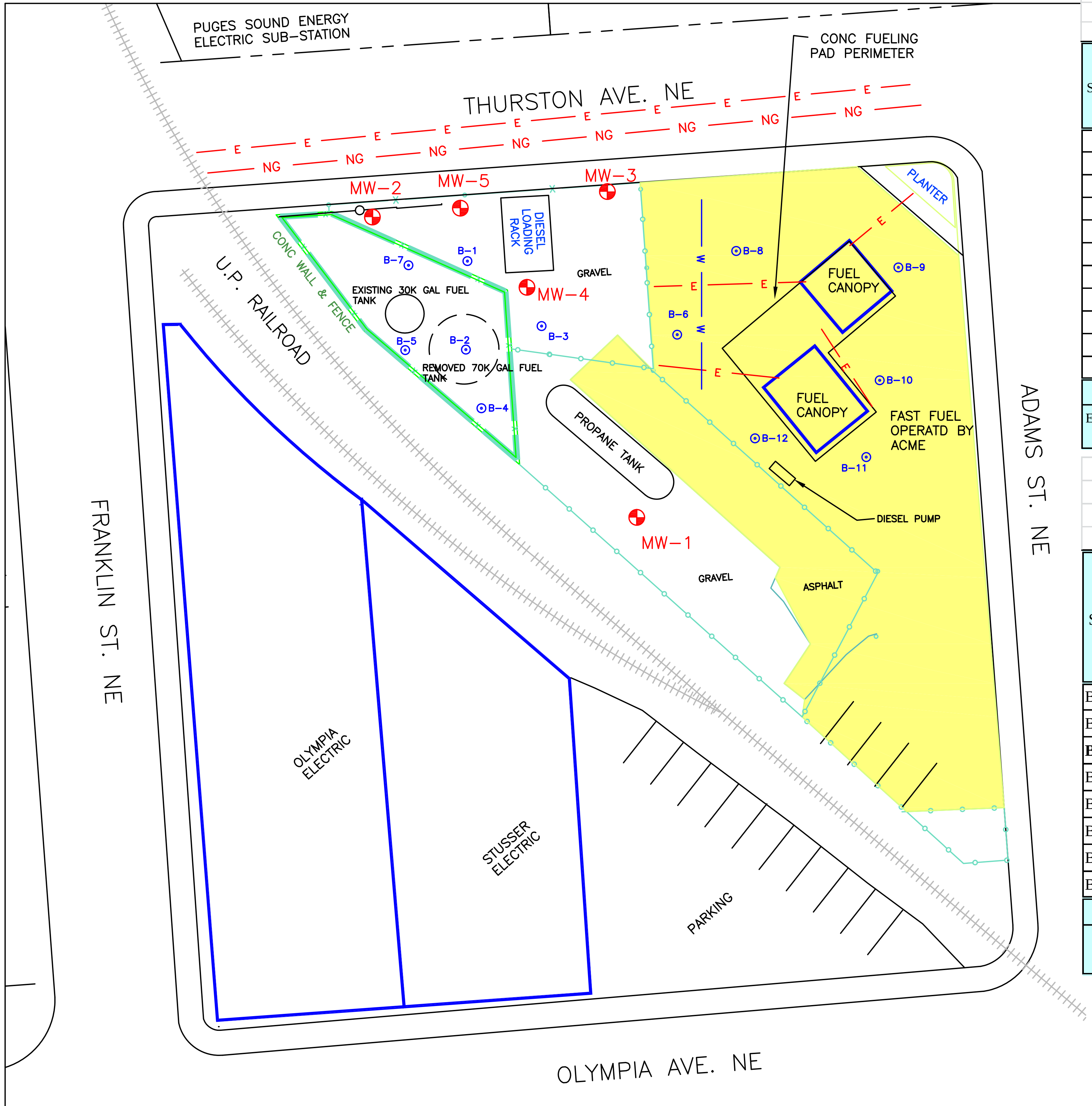
Notes:
(1) The locations of all features shown are approximate.
(2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

Figure 2
Site Map

ACME BULK FUEL SITE
303 THURSTON AVE
OLYMPIA, WASHINGTON



DRAWING SCALE: 1"= 40'

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

Reference: Drawing created from survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.

Table 2 Summary of Groundwater Analytical Results - Phase II ESA
Acme Bulk Fuel Plant & Cardlock (Fast Fuel)
Olympia, WA

Sample Number[1]	Date Sampled	Diesel Extended TPH[4] (ug/L)		Gasoline TPH[2] (ug/L)	Select Volatile Organic Compounds[3] (ug/L)					cPAH[5] (ug/L)
		Diesel	Heavy Oil		**Benzene**	Toluene	Ethylbenzene	Total Xylenes	Total Napthalenes	
B1-W	9/27/2012	<250	<500	**2,600**	**16**	1.0	72	41	--	--
B2-W	9/27/2012	**75,000**	<500	--	**35**	2.3	77	340	90	**6.5**
B3-W	9/27/2012	<250	<500	**1,700**	4.2	1.2	35	120	--	--
B4-W	9/27/2012	**28,000**	<500	--	3.3	4.9	115	390	100	**3.0**
B5-W	9/27/2012	<250	<500	--	2.3	1.5	40	110	--	--
B6-W	9/27/2012	<250	<500	<100	<1.0	<1.0	<1.0	<3.0	--	--
B7-W	9/27/2012	<250	<500	--	<1.0	<1.0	<1.0	<3.0	--	--
B8-W	9/27/2012	<250	<500	<100	<1.0	<1.0	<1.0	<3.0	--	--
B10-W	9/27/2012	<250	<500	<100	<1.0	<1.0	<1.0	<3.0	--	--
B11-W	9/27/2012	<250	<500	<100	<1.0	<1.0	<1.0	<3.0	--	--
B12-W	9/27/2012	<250	<500	<100	<1.0	<1.0	<1.0	<3.0	--	--
PQL		250	500	100	1.0	1.0	1.0	3.0	5.0	0.1
Ecology MTCA Method A Clean Up Levels		500	500	800[6]	5	1,000	700	1,000	160	0.1[7]

Table 1 Summary of Soil Analytical Results - Phase II ESA
Acme Bulk Fuel Plant & Cardlock (Fast Fuel)
Olympia, WA

Sample Number[1]	Date Sampled	Depth Sampled (feet)	Diesel Extended TPH[4] (mg/Kg)		Gasoline TPH[2] (mg/Kg)	Selected Volatile Organic Compounds[2] (mg/Kg)			
			Diesel	Heavy Oil		**Benzene**	Toluene	Ethylbenzene	Total Xylenes
B1-S1-4.5/5.0	9/27/2012	4.5-5.0	<50	<100	<10	<0.02	<0.05	<0.05	<0.15
B3-S2-6.5/7.0	9/27/2012	6.5-7.0	<50	<100	<10	<0.02	<0.05	<0.05	<0.15
B6-S1-4.5/5.0	9/27/2012	4.5-5.0	**4,600**	<100	**830**	**0.06**	0.26	<0.05	0.29
B8-S1-4.5/5.0	9/27/2012	4.5-5.0	<50	<100	<10	<0.02	<0.05	<0.05	<0.15
B9-S2-7.5/8.0	9/27/2012	7.5-8.0	<50	<100	<10	<0.02	<0.05	<0.05	<0.15
B10-S1-4.5/5.0	9/27/2012	4.5-5.0	<50	<100	<10	<0.02	<0.05	<0.05	<0.15
B11-S	9/27/2012	--	<50	<100	<10	<0.02	<0.05	<0.05	<0.15
B12-S1-4.5/5.0	9/27/2012	4.5-5.0	<50	<100	<10	<0.02	<0.05	<0.05	<0.15
PQL			50	100	10	0.02	0.05	0.05	0.15
Ecology MTCA Method A Clean Up Levels			2,000	2,000	30[5]	0.03	7	6	9

LEGEND

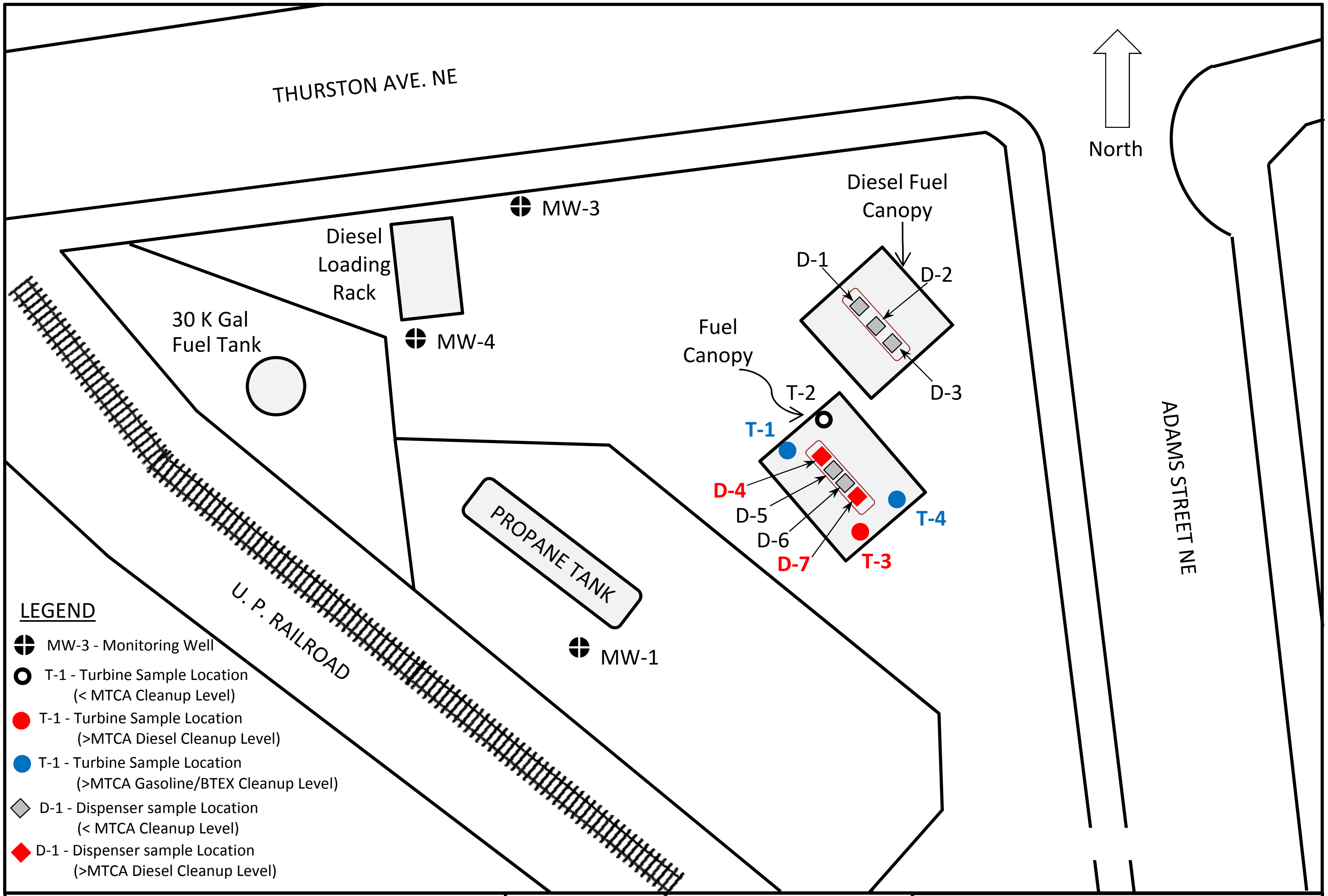
—— E ——	SLATTED CHAIN LINK FENCE
—— NG ——	NATURAL GAS LINE
—— W ——	WATER LINE
▬▬ X ▬▬	4' CONCRETE WALL WITH 4' CHAIN LINK FENCE
——○——○——	SLATTED CHAIN LINK FENCE
⊙ B-1	BORINGS TAKEN BY AEG
⊕ MW-1	AECOM MONITORING WELLS
🟨	PAVED AREA OF PROPERTY

ASSOCIATED ENVIRONMENTAL GROUP, LLC
605 11th Avenue SE, Suite 201
Olympia, WA 98501-2336
(360) 352-9835 Fax (360) 352-8164

FIGURE 3
SITE PLAN &
BORINGS LOCATION MAP

ACME Bulk Fuel Plant & Cardlock
303 THURSTON AVE NE
OLYMPIA, WA

Project# 12-114a
Date: 10/30/2012
File: FILE NAME
Sheet 2 OF 3

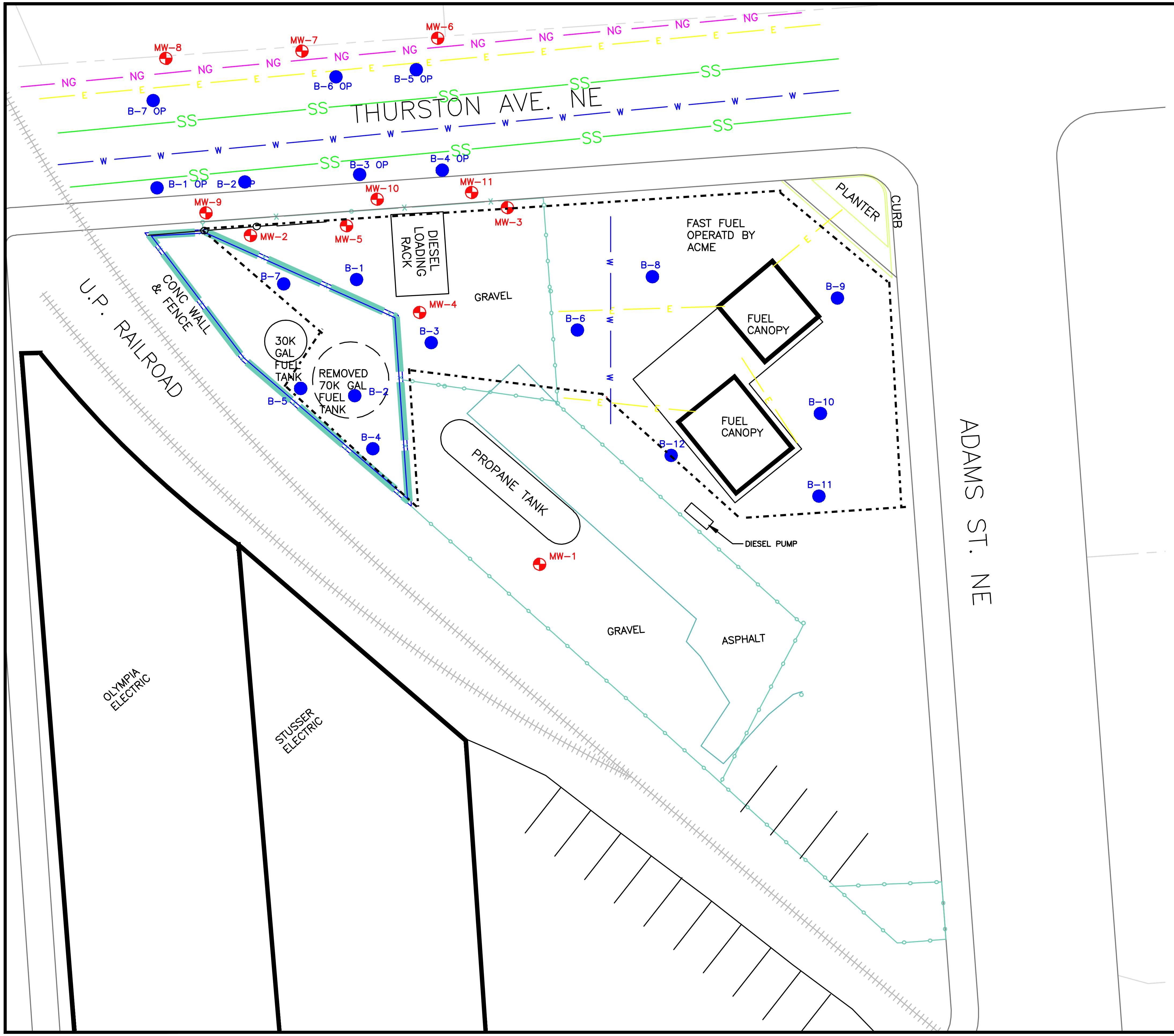


ASSOCIATED
ENVIRONMENTAL
GROUP, LLC

FIGURE 4
TURBINE BORING LOCATIONS

ACME
BULK FUEL PLANT

218 Franklin Street NE
Olympia, Washington



LEGEND

SS	SEWER LINE
E	ELECTRICAL LINE
NG	NATURAL GAS LINE
W	WATER LINE
X	4' CONCRETE WALL WITH 4' CHAIN LINK FENCE
	SLATTED CHAIN LINK FENCE
↑	GROUNDWATER INFERRED DIRECTION
MW-1	AECOM Monitoring Wells (MW-1 - MW-5) AEG Monitoring Wells (MW-6 - MW-11)
● B-1	BORING LOCATIONS
● B-1 OP	OFF PROPERTY BORING LOCATIONS
- - - -	Proposed Excavation Limits

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 survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.

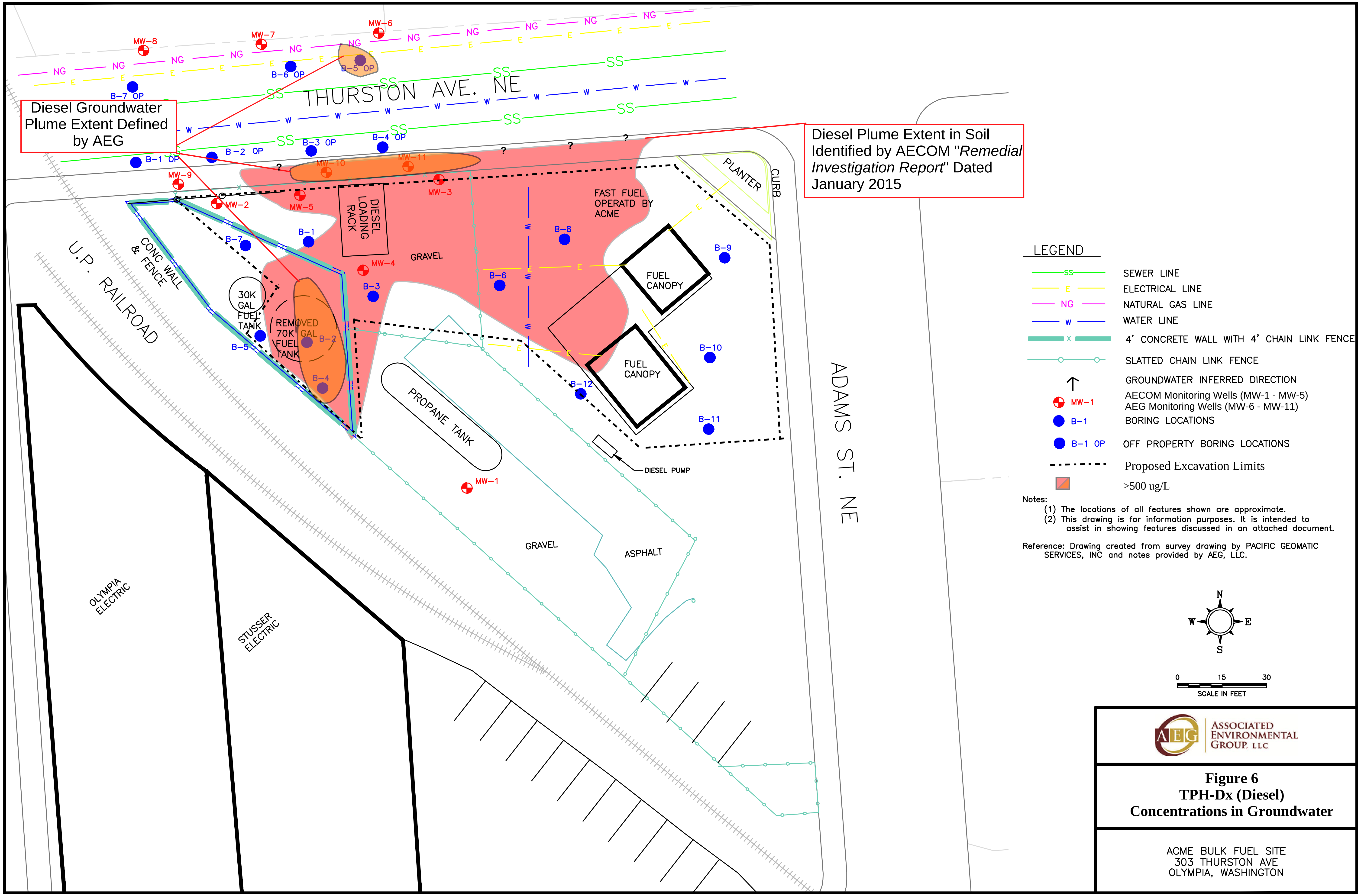
N
W E
S

0 15 30
SCALE IN FEET

ASSOCIATED ENVIRONMENTAL GROUP, LLC

Figure 5
Proposed Excavation Limits

ACME BULK FUEL SITE
303 THURSTON AVE
OLYMPIA, WASHINGTON



Diesel Groundwater Plume Extent Defined by AEG

Diesel Plume Extent in Soil Identified by AECOM "*Remedial Investigation Report*" Dated January 2015

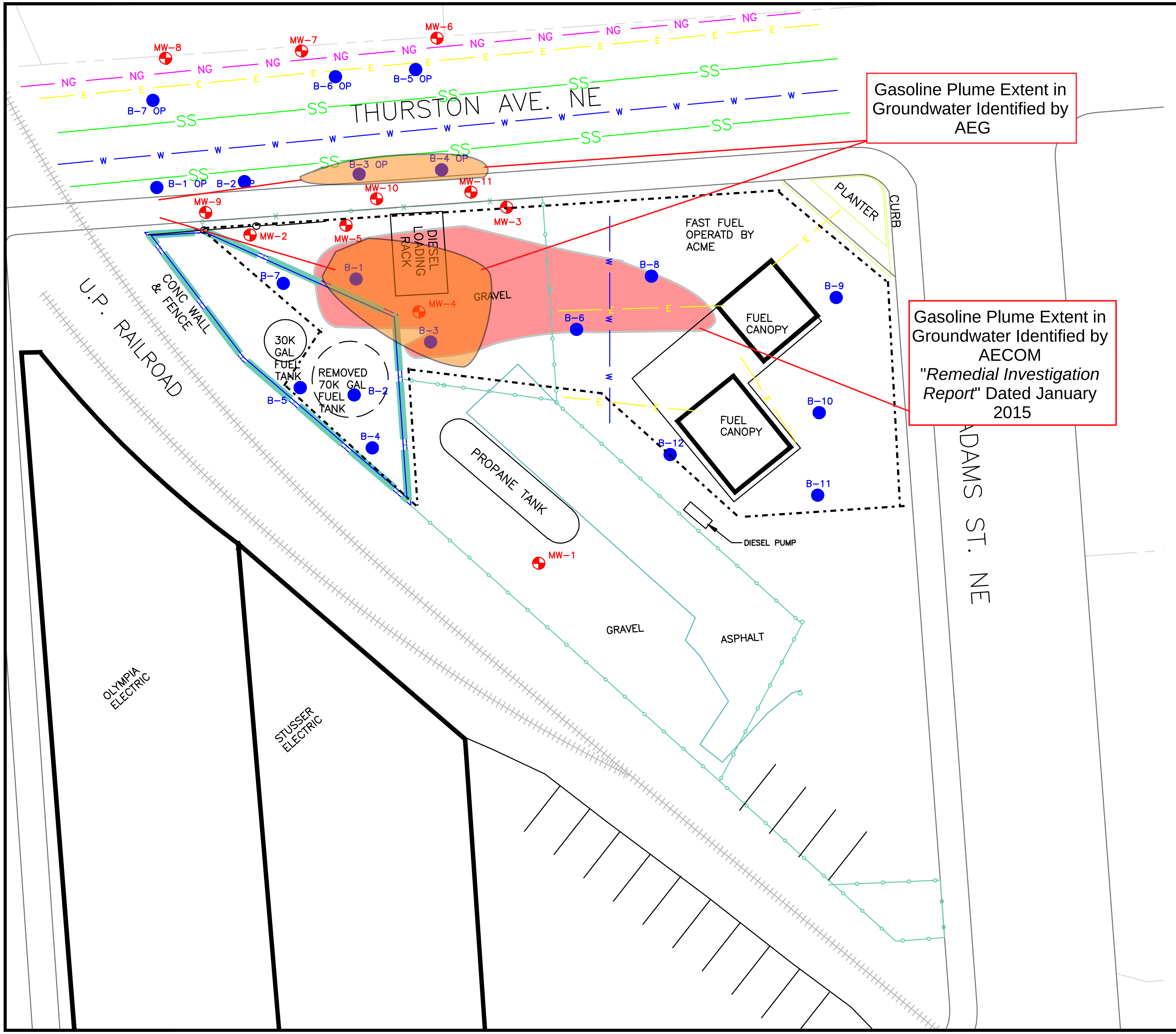
Notes:
(1) The locations of all features shown are approximate.
(2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

Figure 6
TPH-Dx (Diesel)
Concentrations in Groundwater

ACME BULK FUEL SITE
303 THURSTON AVE
OLYMPIA, WASHINGTON



Gasoline Plume Extent in Groundwater Identified by AEG

Gasoline Plume Extent in Groundwater Identified by AECOM "*Remedial Investigation Report*" Dated January 2015

LEGEND

—SS—	SEWER LINE
—E—	ELECTRICAL LINE
—NG—	NATURAL GAS LINE
—W—	WATER LINE
▬x▬	4' CONCRETE WALL WITH 4' CHAIN LINK FENCE
—○—○—	SLATTED CHAIN LINK FENCE
↑	GROUNDWATER INFERRED DIRECTION
⊕ MW-1	AECOM Monitoring Wells (MW-1 - MW-5) AEG Monitoring Wells (MW-6 - MW-11)
● B-1	BORING LOCATIONS
● B-1 OP	OFF PROPERTY BORING LOCATIONS
- - - -	Proposed Excavation Limits
🟧	> 800 ug/L

Notes:
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Reference: Drawing created from survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.

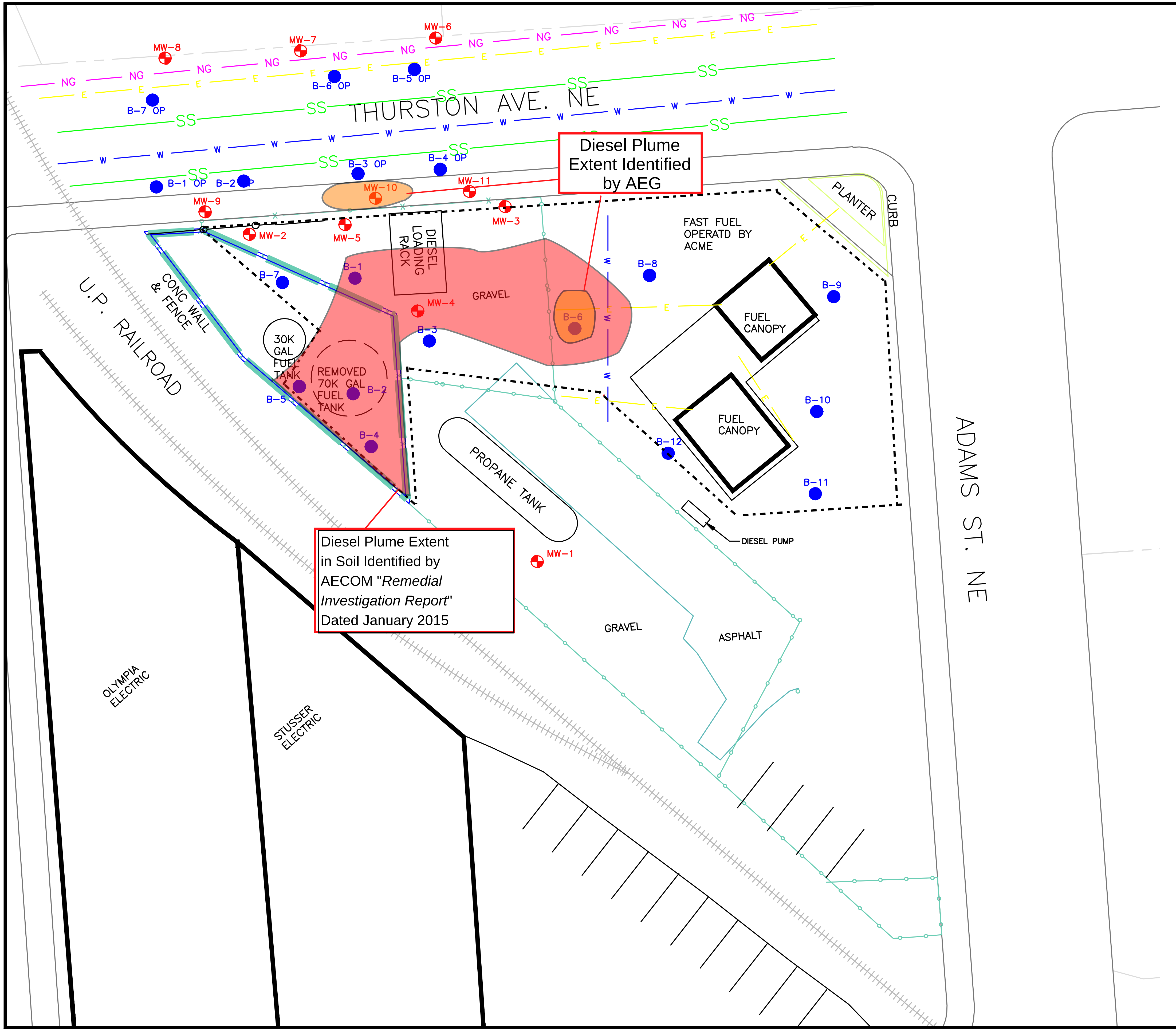
N
W E
S

0 15 30
SCALE IN FEET

ASSOCIATED ENVIRONMENTAL GROUP, LLC

Figure 7
TPH-Gx (Gasoline)
Concentrations in Groundwater

ACME BULK FUEL SITE
303 THURSTON AVE
OLYMPIA, WASHINGTON



LEGEND

SS	SEWER LINE
E	ELECTRICAL LINE
NG	NATURAL GAS LINE
W	WATER LINE
▬ X ▬	4' CONCRETE WALL WITH 4' CHAIN LINK FENCE
—○—○—	SLATTED CHAIN LINK FENCE
↑	GROUNDWATER INFERRED DIRECTION
MW-1	AECOM Monitoring Wells (MW-1 - MW-5) AEG Monitoring Wells (MW-6 - MW-11)
● B-1	BORING LOCATIONS
● B-1 OP	OFF PROPERTY BORING LOCATIONS
- - - - -	Proposed Excavation Limits
🟥	> 2,000 MG/KG

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 survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.

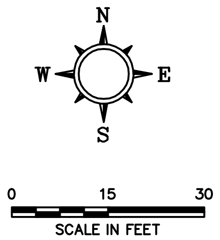


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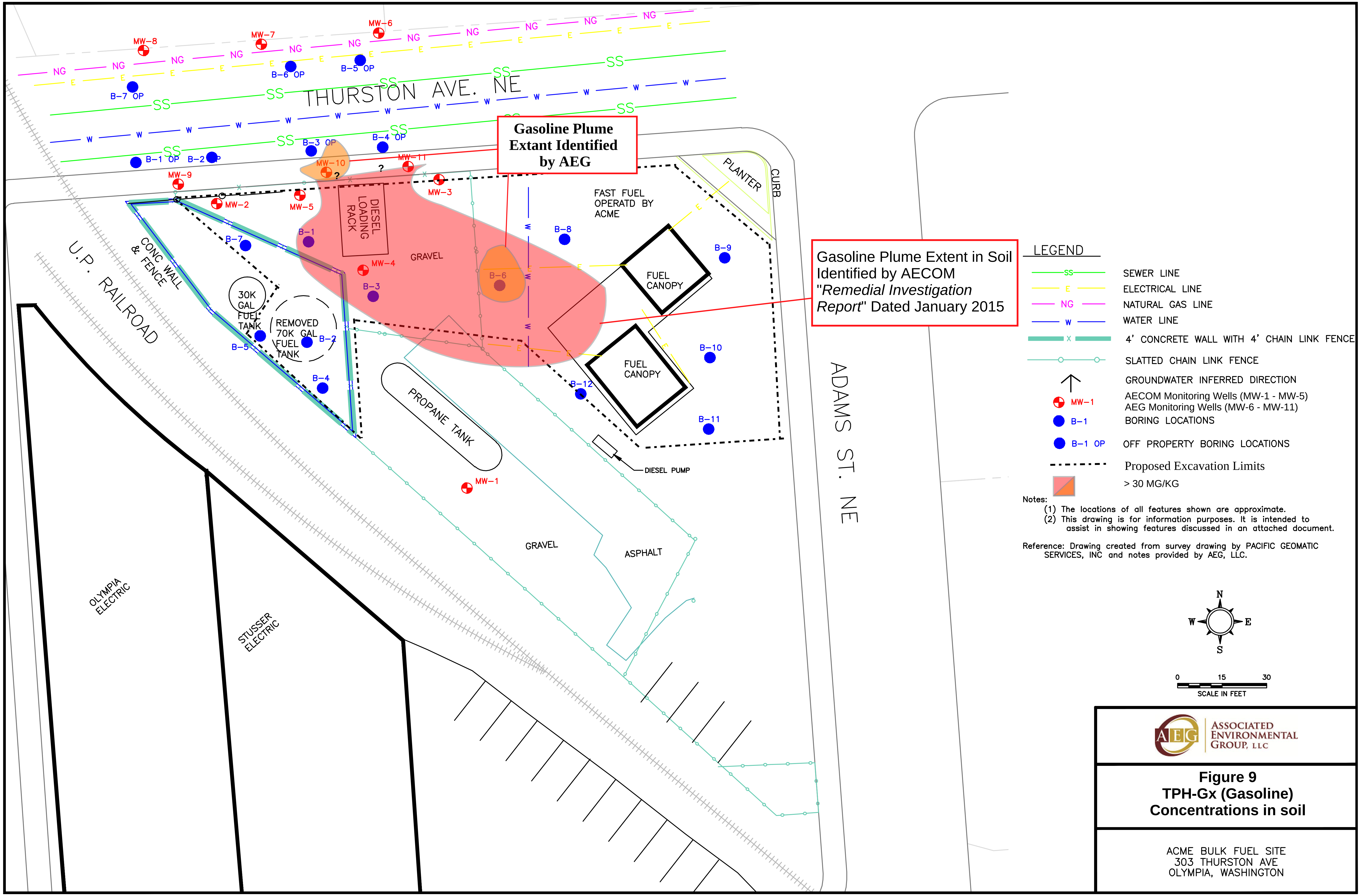
Figure 8
TPH-Dx (Diesel)
Concentrations in Soil

ACME BULK FUEL SITE
303 THURSTON AVE
OLYMPIA, WASHINGTON



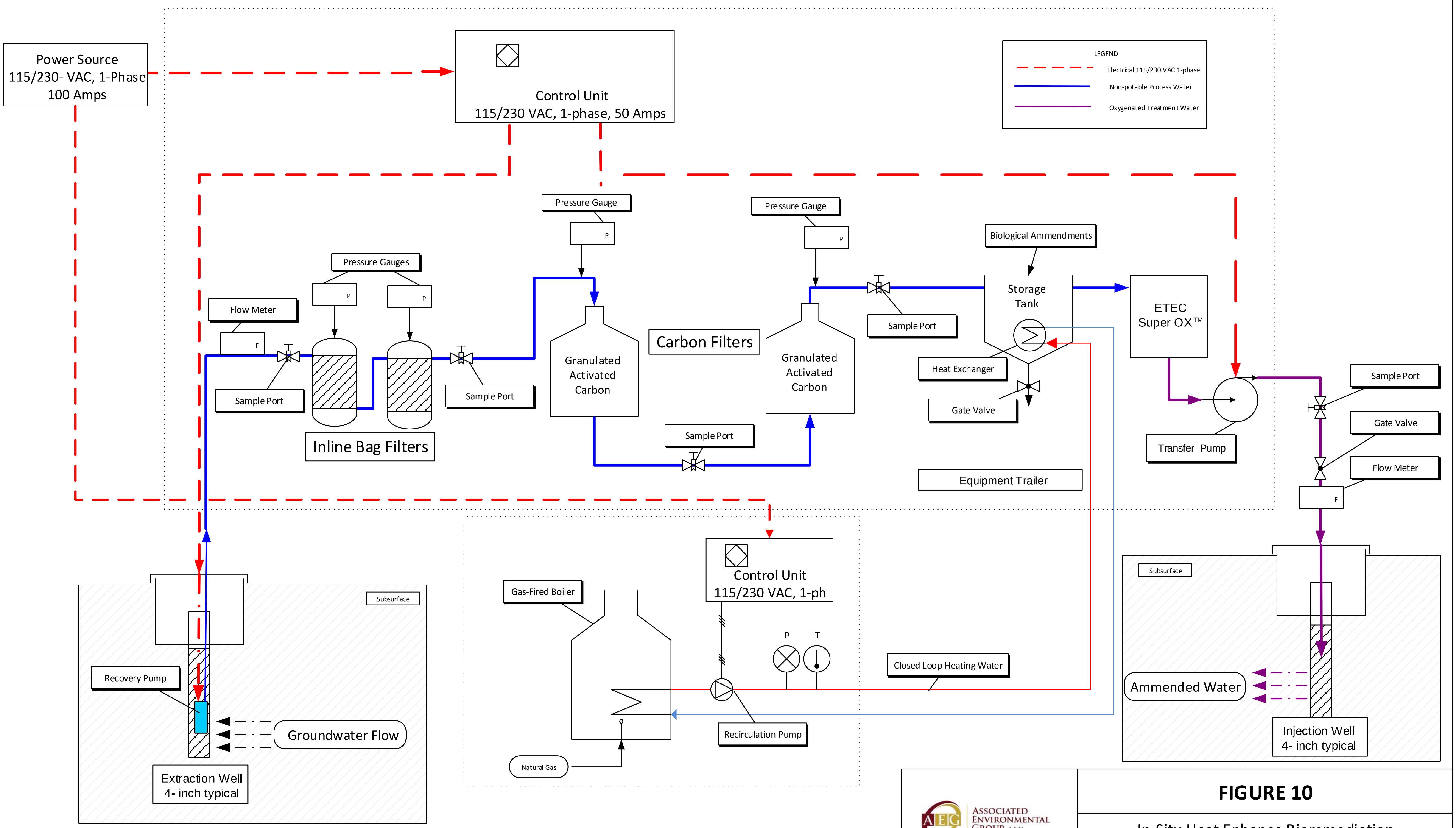
Notes:
(1) The locations of all features shown are approximate.
(2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

Figure 9
TPH-Gx (Gasoline)
Concentrations in soil

ACME BULK FUEL SITE
303 THURSTON AVE
OLYMPIA, WASHINGTON



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303 Thurston Avenue NE, Olympia, WA

FIGURE 10

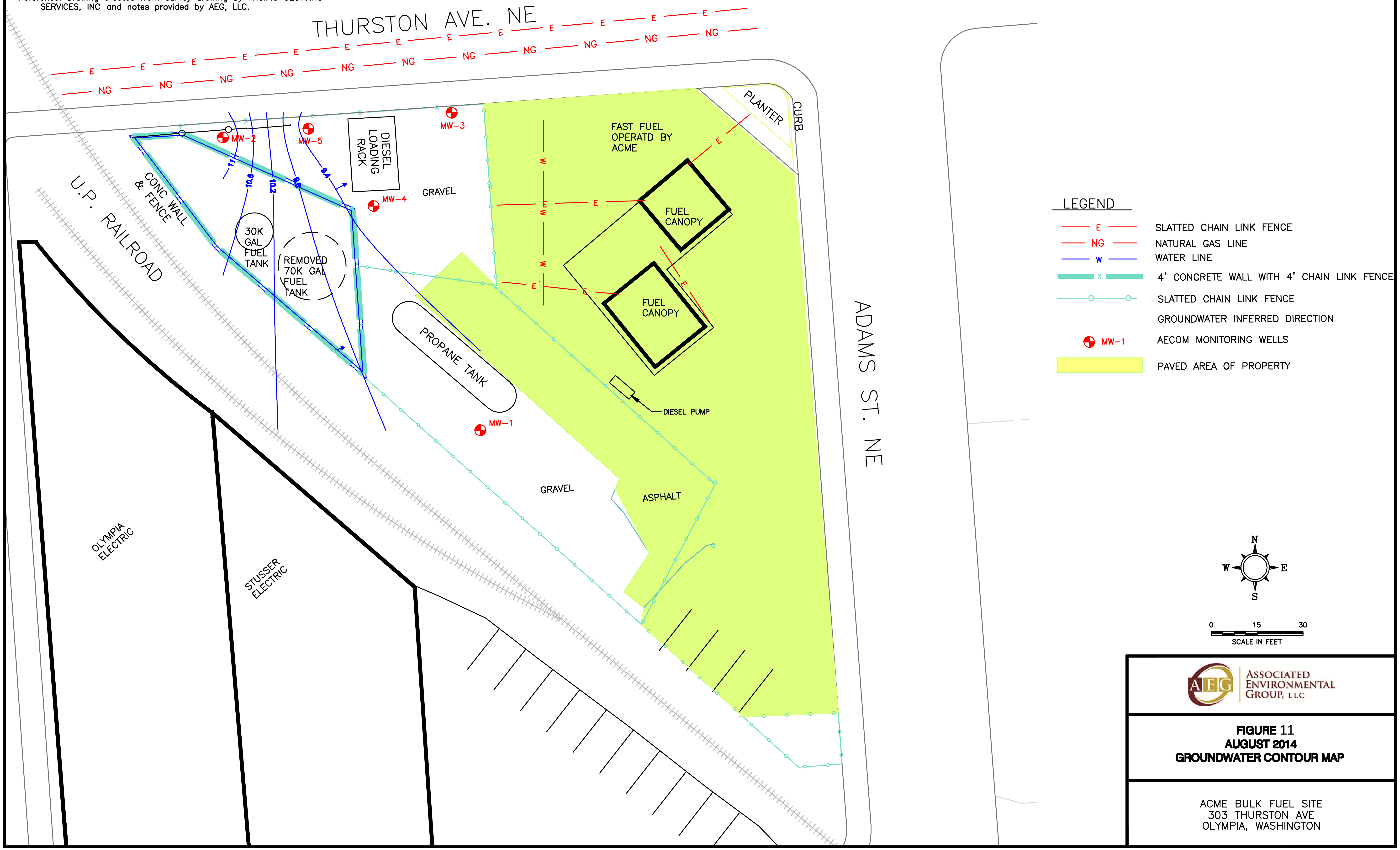
In-Situ Heat Enhance Bioremediation
Process Flow Schematic

SIZE	FSCM NO	DWG NO	REV
		ACME Bulk Plant Figure 10	1

SCALE NONE CSS SHEET 1 OF 1

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 survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.



AEG ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 11
AUGUST 2014
GROUNDWATER CONTOUR MAP

ACME BULK FUEL SITE
303 THURSTON AVE
OLYMPIA, WASHINGTON

Notes:
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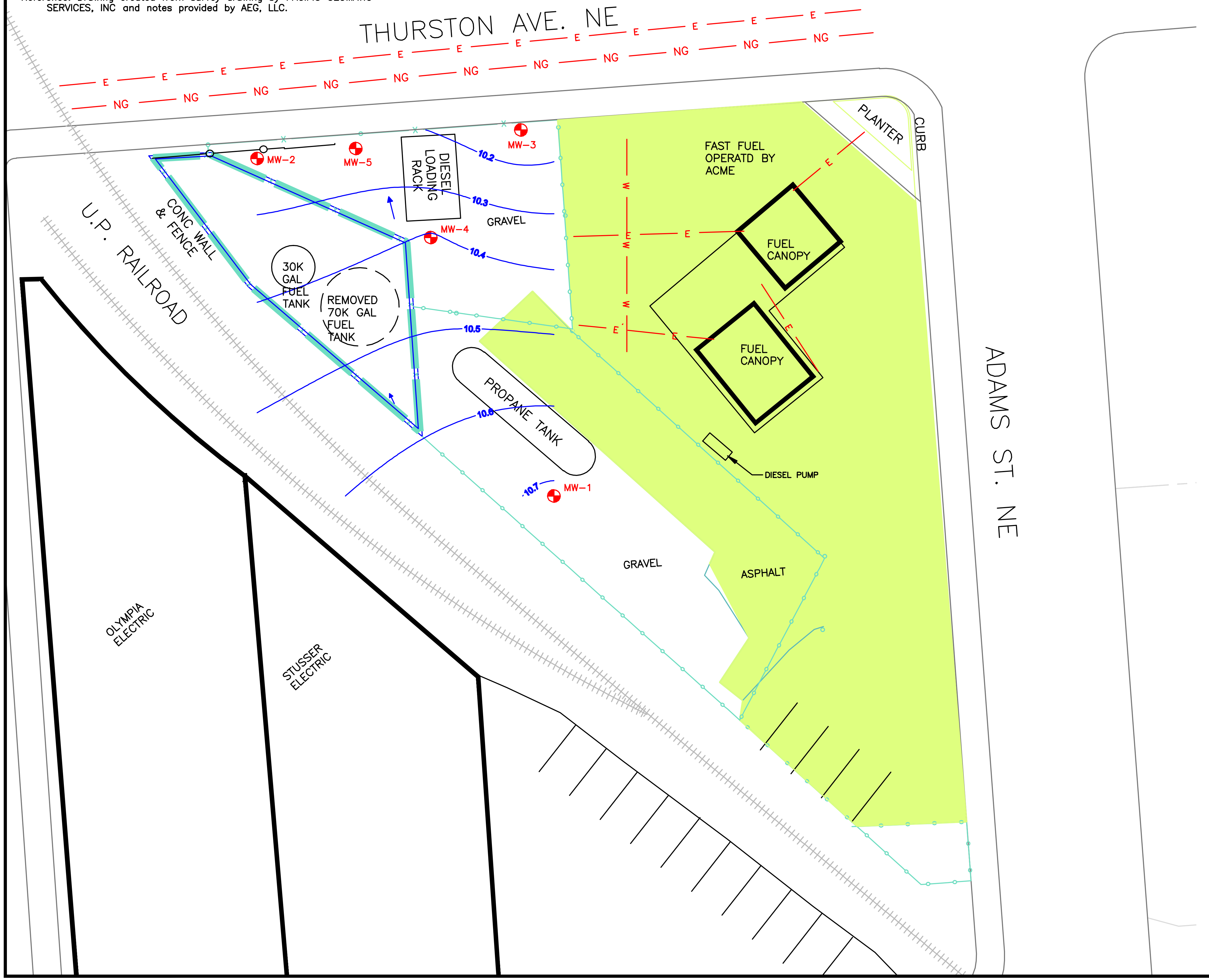
Reference: Drawing created from survey drawing by PACIFIC GEOMATIC SERVICES, INC and notes provided by AEG, LLC.



LEGEND

—— E ——	SLATTED CHAIN LINK FENCE
—— NG ——	NATURAL GAS LINE
—— W ——	WATER LINE
▬▬ x ▬▬	4' CONCRETE WALL WITH 4' CHAIN LINK FENCE
—○——○—	SLATTED CHAIN LINK FENCE
↑	GROUNDWATER INFERRED DIRECTION
● MW-1	AECOM MONITORING WELLS
🟨	PAVED AREA OF PROPERTY

N
W E
S

0 15 30
SCALE IN FEET

ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 12
FEBRUARY 2015
GROUNDWATER CONTOUR MAP

ACME BULK FUEL SITE
303 THURSTON AVE
OLYMPIA, WASHINGTON