

REMEDIAL INVESTIGATION AND FOCUSED FEASIBILITY STUDY

Town Center Mini-Mart

Prepared for: Farwest Petroleum Company, LLC

Project No. 080258 • April 21, 2017



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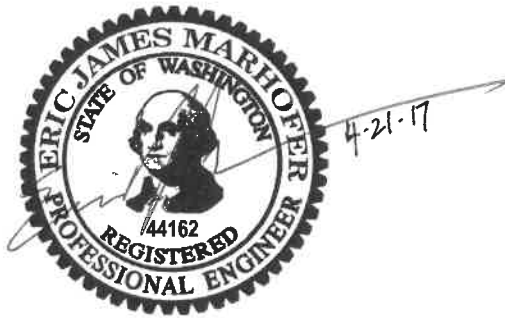
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Executive Summary

Aspect Consulting, LLC (Aspect) has prepared this combined Remedial Investigation (RI) Report and Focused Feasibility Study (FFS) for the Town Center Mini-Mart located in Duvall, Washington (the Site). The purpose of this report is to document the results of Site characterization activities to date, present a conceptual site model, evaluate remedial action alternatives, and select a preferred remedy for the Site. Once selected, the details regarding the remedy will be documented in a Cleanup Action Plan (CAP) with the objective of obtaining a No Further Action (NFA) determination for the Site through the Washington State Department of Ecology's (Ecology) Voluntary Cleanup Program (VCP).

Several soil and groundwater investigations have been performed at the Site dating back to February 2005. Initial investigations were conducted by JMK Environmental Solutions in 2005, and G-Logics, Inc. in 2008. In 2009, Aspect conducted an additional investigation to delineate the lateral extent of impacts to soil and groundwater as a result of the former leaking UST system. In late 2009, the underground storage tanks (UST) at the Site were decommissioned and replaced, followed by a soil removal action to excavate and dispose of accessible impacted soil. A biosparge system was installed at the base of the excavation. From 2010 to 2014, groundwater monitoring was conducted. Based on groundwater monitoring results, the biosparge system was operated for 1 year from 2013 to 2014 to enhance biodegradation of remaining soil and groundwater impacts.

Following the soil removal action and biosparging operation, groundwater concentrations remained elevated along the western excavation boundary. Supplemental site characterization activities were performed in December 2014 and September 2015 to investigate and delineate remaining soil, groundwater, and vapor impacts. Groundwater monitoring was conducted quarterly at existing wells during 2015 and 2016. The results of these activities delineated the vertical and lateral extents of soil and groundwater impacts remaining at the Site.

Soil and groundwater impacts are currently bounded, and the area of residual groundwater impacts is stable. The extent of groundwater impacts expands and contracts seasonally with fluctuating groundwater table, but concentrations are gradually declining.

Preliminary screening for the potential of vapor intrusion indicates that there is a low risk for vapor intrusion at this Site. There are no buildings located within the 30-foot lateral inclusion zone of soil or groundwater impacts.

The following remedial action objectives (RAOs) were developed to address the residual soil and groundwater impacts at the Site:

- Protection from direct contact with contaminated soil; and
- Protection of groundwater for drinking water use.

The cleanup standards by which achievement of these RAOs will be demonstrated include attainment of Washington State Model Toxics Control Act (MTCA) cleanup levels at their associated standard points of compliance as follows:

- For soils, attainment of Method A or Method B cleanup levels as follows:
 - Method A cleanup levels in soil throughout the Site for protection of groundwater; **or**
 - Method B cleanup levels in soil to a depth of 15 feet for protection from direct contact with an empirical demonstration that soil is protective of groundwater using groundwater monitoring.
- For groundwater, attainment of Method A cleanup levels throughout the Site for protection of drinking water.

Two remedial alternatives have been developed using a combination of applicable remedial technologies to meet these cleanup requirements for soil and groundwater:

1. Monitored Natural Attenuation with Capping and Institutional Controls; and
2. Soil Excavation with Off-Site Disposal.

Both remedial alternatives meet the requirements of MTCA. However, Alternative 2 is identified as the preferred remedial alternative for the Site because, while the overall cost of both alternatives is similar, the benefit of Alternative 2 is higher. Following concurrence from the Washington State Pollution Liability Insurance Agency (PLIA) and Ecology, the basic elements of the preferred remedy include:

- Removal of subsurface storm drain infrastructure along the western edge of the Property and provide bypass during soil excavation;
- Removal of trees, vegetation, signage, and monitoring wells in area of excavation along the storm drain alignment;
- Excavation to remove and dispose of impacted soil throughout the utility backfill material throughout the Property and off-Property, to the extent practicable;
- Soil confirmation sampling along sidewalls and bottom of excavation;
- Restoration of Site to pre-existing conditions, including storm drain infrastructure, trees, vegetation, signage, and monitoring wells in area of excavation along the storm drain alignment; and
- Up to 5 years of groundwater confirmation sampling at downgradient wells.

The estimated time to achieve cleanup levels for the Site under this alternative is up to 5 years at an estimated cost of \$440,000. Once compliance monitoring indicates that this remedial action is complete, an unrestricted NFA opinion for the Site will be sought from Ecology.

1 Introduction

Aspect Consulting, LLC (Aspect) has prepared this combined Remedial Investigation (RI) and Focused Feasibility Study (FFS) for the Town Center Mini-Mart (the Site) located in Duvall, Washington (Figure 1). This document was prepared in general accordance with the requirements of the Washington State Model Toxics Control Act (MTCA) Cleanup Regulation adopted by the Washington State Department of Ecology (Ecology) in Chapter 173-340 of the Washington Administrative Code (WAC).

1.1 Purpose and Objective

The purpose of this report is to document the results of Site characterization activities, present a conceptual site model, evaluate a limited set of remedial action alternatives, and propose a cleanup action that meets the requirements of MTCA.

Once selected, the details regarding the remedy will be documented in a Cleanup Action Plan (CAP) with the objective of obtaining a No Further Action (NFA) determination for the Site through Ecology's Voluntary Cleanup Program (VCP).

1.2 Report Organization

The remaining sections of this report have been organized as follows:

- **Section 2 – Summary of Site Conditions** provides background information including geology, hydrogeology, and a review of the investigations completed.
- **Section 3 – Conceptual Site Model** summarizes contaminants of concern (COCs), affected media, nature and extent of environmental impacts; discusses contaminant fate and transport; and presents an exposure pathway assessment for potential receptors.
- **Section 4 – Cleanup Requirements** establishes Remedial Action Objectives (RAOs), cleanup standards, and summarizes areas requiring remediation.
- **Section 5 – Focused Feasibility Study** presents a screening of potential remedial technologies, develops and evaluates remedial action alternatives, and identifies the preferred remedy based on a disproportionate cost analysis.
- **Section 6 – Proposed Cleanup Action** describes the preferred remedy to address residual soil and groundwater impacts at the Site.

2 Summary of Site Conditions

This section provides a summary of Site conditions, including Site location and description, environmental setting, geology and hydrogeology. It also documents the most recent data gaps investigation work completed by Aspect.

2.1 Site Location and Description

The Site is located at 15410 Main Street NE in Duvall, Washington (Figure 1). The surrounding land use includes both commercial and residential properties. The topography on the Town Center Mini-Mart property (the Property) is relatively flat with the surrounding area sloping towards the Snoqualmie River approximately 900 feet to the west. The Site is bounded to the west by Main Street NE, to the south by NE Ring Street, to the north by a small commercial shopping center, and to the east by a single family residential home.

The Property is currently occupied by a Texaco-branded service station and a convenience store which were constructed in 1987. The fuel distribution infrastructure includes two 12,000-gallon underground storage tanks (USTs), and a pump island with three dispensers. A layout of the Site is shown on Figure 2.

2.2 Geology

Site soil consists of a mixture of fill and native soils. Fill areas are generally sand and gravel and are present in the UST area, along utility corridors, and as base-course under the paved areas.

Native soils underlying the fill consist of very dense, sandy, gravelly silt interpreted as glacial till. The south end of the Property is primarily underlain by this dense glacial till. The north end of the Property also has areas of peaty silt and sand overlying the till that represent either recessional glacial outwash deposits or recent alluvial deposits. The heterogeneous mixture of native and fill soil affects Site groundwater flow, as discussed in the following section.

2.3 Hydrogeology

The closest bodies of surface water to the Site include the Snoqualmie River, located approximately 900 feet to the west, and Lake Rasmussen, located 2,000 feet to the east. Based on local and regional topography, soil types, and surface water occurrence, groundwater beneath the Site likely flows in a westerly direction, toward the Snoqualmie River.

The Site water table generally fluctuates between 5 and 8 feet below ground surface (bgs). Historical groundwater elevation data is summarized in Table 1, and generally indicates a westerly flow direction. Unfortunately, elevations from any single event can often be quite variable. The observed variability in groundwater elevations may be attributable to differences in the recharge/discharge behavior and/or perching behavior of groundwater in the very low-permeability native till soil, and proximal high-permeability backfill material surrounding the USTs and utilities.

2.4 Summary of Environmental Investigations and Remedial Actions

Soil and groundwater at the Site were impacted by historic gasoline fuel releases from the former UST system. Several Site investigations were performed between 2005 and 2008, leading up to a soil excavation action in 2009 that removed impacted soil within the former UST area. This section discusses these, and other investigations and remedial actions that have been performed since, to characterize and remediate residual soil and groundwater impacts at the Site.

2.4.1 Initial Site Investigations (2005-2009)

Initial investigations were conducted by JMK Environmental Solutions in 2005, and G-Logics, Inc. in 2008. In 2009, Aspect conducted an additional investigation to delineate the lateral extent of impacts to soil and groundwater as a result of the former leaking UST system. The results of these three investigations can be found in Aspect's *Soil and Groundwater Quality Investigation Results Letter* (Aspect, 2009). The investigations indicated the presence of gasoline-range total petroleum hydrocarbons (TPH) and benzene-toluene-ethylbenzene-xylenes (BTEX) compounds in soil and groundwater at concentrations exceeding MTCA Method A cleanup levels. These results were used to plan the subsequent soil excavation action.

2.4.2 Soil Removal Action (2009)

In December 2009, three gasoline USTs at the Site were decommissioned and removed along with associated piping systems. A UST site assessment was performed in accordance with *Ecology's Guidance for Site Checks and Site Assessments for Underground Storage Tanks* (Ecology, 1992). Indications of gasoline staining and odor were observed throughout the backfill in the UST nest. Impacted fill soil and native soil in the excavation floor and sidewall were excavated. The approximate extents of the excavation are shown on Figure 2. Sidewall and bottom confirmation samples were collected during excavation to document soil conditions following excavation.

The confirmation soil samples indicated there was no gasoline-range TPH remaining above MTCA Method A cleanup levels at the limits of the excavation. Benzene was detected above the MTCA Method A cleanup level in 4 of the 7 final bottom samples, and 5 of the 19 final sidewall samples. The soil removal action is documented in Aspect's *Soil Remediation and UST Decommissioning Report* (Aspect, 2010).

2.4.3 Biosparge System Operation (2013)

After completion of the soil removal action, piping for a low-volume biosparge system was installed in the bottom of the UST nest during replacement of the USTs (Aspect, 2010). The purpose of the low-volume biosparging was to increase dissolved oxygen (DO) levels in groundwater in the UST nest area, and consequently enhance the natural attenuation of dissolved hydrocarbons in groundwater downgradient of the UST nest. In January 2013, following pilot testing (Aspect, 2012), the system was started up.

Performance monitoring demonstrated that the biosparge system increased DO concentrations in groundwater within the UST nest, but DO concentrations at downgradient monitoring wells MW-1 and MW-2 remained depressed. Groundwater quality did not show a marked improvement at these wells, and biosparging was discontinued in 2014. The lack of response at wells MW-1 and MW-2 may have been due to the very low rate of groundwater movement through the dense native till, the distance between the biosparge piping and monitoring wells, the proximity of the wells to undocumented areas of residual impacted soil, or some combination of all three. Operation and performance of the biosparge system is documented in Aspect's *Biannual Progress Reports* (Aspect, 2013 and 2014).

2.4.4 Supplemental Site Characterization (2014)

In December 2014, a supplemental investigation was conducted to better define the horizontal extent of groundwater impacts on the western portion of the Property, and evaluate whether any previously-unidentified residual impacted soil remained that could be sourcing the continued groundwater impacts at monitoring wells MW-1 and MW-2. The scope of the investigation included installing four new monitoring wells (MW-5 through MW-8) along the southern and western edges of the Property, well locations are shown on Figure 2. Wells MW-5 and MW-6 were placed as close to the Property boundary as utilities and spatial constraints would allow at the time.

The supplemental investigation concluded that there were residual soil and groundwater impacts along the western edge of the Property and that further delineation was required to complete the Site characterization. Furthermore, residual soil impacts did not appear to be contiguous with the impacts previously excavated from the former UST nest, and may have resulted from preferential movement of gasoline through permeable utility backfill. Detailed results from this investigation can be found in Aspect's *Supplemental Site Characterization Report* (Aspect, 2015).

2.4.5 Data Gaps Investigation (2015)

In September 2015, an additional investigation was conducted to close remaining data gaps following the supplemental Site characterization activities in December 2014. The scope of the investigation included installing six new monitoring wells (MW-9 through MW-14) to define the extent of residual soil and groundwater impacts at the Site and evaluate whether those impacts pose a risk to potential receptors; well locations are shown on Figure 2. The wells along the east side of Highway 203 were installed within the utility corridor to investigate the potential for preferential migration of gasoline through more permeable utility backfill materials.

2.4.5.1 Soil Sampling Results

Soil encountered in each monitoring well boring was logged in accordance with the American Society for Testing and Materials (ASTM) Methods D2487 and D2488 for visual classification of soil using the unified soil classification system (USCS). Boring logs showing soil types, field screening results, and well construction details are provided in Appendix B.

All soil samples were screened for indicators of petroleum impacts using visual and olfactory methods, and by headspace screening using a photoionization detector (PID). One sample from each boring was collected using EPA Method 5035A. Samples were

submitted for laboratory analysis of gasoline-range TPH, BTEX compounds, and naphthalene by Methods NWTPH-Gx and EPA Method 8260, respectively.

Soil samples collected at MW-9 through MW-14 did not contain detectable concentrations of gasoline-range TPH, BTEX compounds, or naphthalene above MTCA Method A cleanup levels. These data bound the lateral extent of soil impacts to the west. Soil sampling results are summarized in Table 3, and laboratory analytical reports are provided in Appendix A.

2.4.5.2 Groundwater Sampling Results

Following construction, the new wells were developed to remove fine-grained material from the screen and filter pack and improve communication between the well screen and the surrounding water-bearing formation. Prior to sampling, the new monitoring wells were surveyed for top-of-casing elevations relative to the established site datum, and depth-to-groundwater measurements were collected from all Site monitoring wells. Groundwater elevation data is summarized in Table 1.

The new wells were allowed to equilibrate for one day before sampling. Groundwater samples were collected using a peristaltic pump and low-flow techniques, and submitted to the laboratory for analysis of gasoline-range TPHs, BTEX compounds, and naphthalene by Methods NWTPH-Gx and EPA Method 8260, respectively.

Groundwater samples collected from wells MW-9 through MW-12 did not contain detectable concentrations of gasoline-range TPH, BTEX compounds, or naphthalene above MTCA Method A cleanup levels. These data bound the lateral extent of groundwater impacts to the west.

Gasoline-range TPH, all BTEX compounds, and naphthalene were detected in groundwater at MW-14. Gasoline-range TPH and benzene concentrations exceeded MTCA Method A cleanup levels. Groundwater sampling results are summarized in Table 2, and laboratory analytical reports are provided in Appendix A.

2.4.6 Groundwater Monitoring (2010-2016)

Ongoing groundwater monitoring has been performed on a quarterly basis since 2010, when monitoring wells MW-1 through MW-4 were installed following the soil removal action. Groundwater monitoring results through 2014 are documented in previous reports (Aspect 2013, 2014, 2015). Groundwater elevations and analytical results collected as part of the ongoing data gaps investigation in 2015 and 2016 are summarized in Tables 1 and 2, respectively. Laboratory analytical reports are provided in Appendix A.

A review of groundwater sampling results over time suggests natural attenuation of groundwater impacts at the Site is ongoing, as evidenced by average annual reductions in gasoline-range TPH and benzene concentrations at MW-1 and MW-2 since completion of the soil removal action in 2009 (see Table 2). Since 2014, quarterly groundwater sampling results from monitoring wells MW-1, MW-2, MW-5, MW-6, and MW-14 have shown a seasonal variability, suggesting sensitivity to changes in groundwater table elevation and availability of water. For example, gasoline-range TPH and benzene concentrations at MW-14 are below MTCA Method A cleanup levels three quarters of the year and only exceed during seasonal low water level conditions in September.

3 Conceptual Site Model

This section summarizes COCs, affected media, nature and extent of environmental impacts, discusses contaminant fate and transport, and presents an exposure pathway assessment for potential receptors.

3.1 Contaminants of Concern

The COCs identified for the Site are based on the occurrence of chemicals positively identified above MTCA Method A cleanup levels in soil and groundwater due to historic release of gasoline fuel and the results of investigation activities. Based on data collected, gasoline-range TPH, BTEX, and naphthalene are the primary COCs for the Site.

3.2 Affected Media

The affected media at the Site includes soil and groundwater. The COCs identified in the previous section have been detected in both soil and groundwater at concentrations above MTCA Method A cleanup levels.

Air is not retained as a potential media of concern based on the assessment of the vapor intrusion pathway described in Section 3.5.3 below.

3.3 Nature and Extent of Contamination

Soil and groundwater at the Site were impacted by historic gasoline fuel releases from the former UST system. Dense, low-permeability native soils surrounding the UST nest limited the lateral spread of the release. Excavation of impacted soil in and around the former USTs in 2009 is believed to have removed the majority of the impacted soil at the Site. The inferred horizontal extents of remaining gasoline-range TPH and benzene impacts is shown on Figures 3 and 4.

The inferred vertical distribution of remaining soil impacts are shown in relation to subsurface geology and utilities in cross section A-A' on Figure 5. This cross section shows that residual soil impacts appear confined to a zone approximately 3-feet thick in native soil immediately below the elevation of the adjacent utility backfill material. This thin impacted zone appears to reflect a hydrocarbon "smear zone" based on its location with the vertical range of seasonal water table fluctuation.

Groundwater impacts are centered around the areas of remaining soil impacts. Permeable fill material around the utilities along the western edge of the Property appears to have provided a preferential pathway for movement of impacted groundwater. The exact pathway by which impacted groundwater may have entered the utility backfill is unclear, and was not apparent during excavation activities. The inferred horizontal extent of impacted groundwater is illustrated on Figures 6 through 9, and shows the seasonal effect of increased dissolved gasoline-range TPH and benzene concentrations in the summer at MW-14 during the low groundwater table.

3.4 Contaminant Fate and Transport

This section describes the fate and transport of COCs at the Site. The majority of source impacts were initially adsorbed into the soil matrix following the release. The vertical distribution of the release was facilitated by water table fluctuation, gravity, and capillary forces.

The primary mechanisms for transport of COCs include diffusion from soil to groundwater and advection through groundwater movement. The extent of dissolved-phase impacts is described in previous sections and appears to have been limited by the dense nature of the silty geology, a relatively flat groundwater surface gradient, and biological degradation. The dissolved-phase groundwater plume appears to be relatively stable with a gradual decline in concentrations, with seasonal expansion and contraction observed along utility corridors to the north at MW-14, and to the south at MW-1 and MW-6. The seasonal fluctuation is illustrated in Figures 6 through 9.

3.5 Potential Receptors and Exposure Assessment

The two primary exposures associated with the presence of COCs at the Site are human health and terrestrial ecological risk. The nature and extent of concentrations of COCs in the soil and groundwater determines the potential exposure scenarios for human health and terrestrial ecological effects.

Potential exposure pathways that may affect human health include soil, groundwater, and vapor intrusion. The following sections present a description of the potential exposure pathways considered in this assessment.

3.5.1 Soil Exposure Pathway

Two soil exposure pathways, direct-contact and soil leaching-to-groundwater, have been identified for the Site as follows:

- **Direct-contact pathway:** The direct-contact pathway considers both dermal contact and ingestion of soil from beneath the Site, to a maximum depth of 15 feet bgs. Residual soil impacts have been documented as shallow as 6 feet bgs at the Site. However, soil impacts for gasoline-range TPH and benzene are below MTCA Method B cleanup levels for direct contact, therefore the direct-contact pathway is currently incomplete and the potential for exposure is low.
- **Soil leaching-to-groundwater pathway:** The soil leaching-to-groundwater pathway requires consideration of the highest beneficial use of groundwater at the Site in accordance with 173-340-357(3)(d) WAC. The highest potential beneficial use of groundwater at the Site is drinking water. A review of regulatory agency databases for the Site and its vicinity by Environmental Data Resources, Inc. did not reveal water supply wells located within 0.25 miles from the Site. Several wells are located between 0.25 and 0.5 miles from the site, but do not appear to be downgradient from the Site. Furthermore, the City of Duvall provides a potable municipal water supply to properties in the vicinity of the Site. Therefore, the soil leaching-to-groundwater pathway is currently incomplete and the potential for exposure is low.

3.5.2 Groundwater Exposure Pathway

This pathway includes ingestion of groundwater at the Site. As discussed above, potable water for the Site is supplied by the City of Duvall. There are no drinking water supply wells within a 0.25-mile radius of the Site. The extent of groundwater impacts at the Site appears to be delineated and stable. Based on these data and the current Site use, the ingestion and/or dermal contact pathway for groundwater is currently incomplete and the potential for exposure is low.

3.5.3 Vapor Intrusion Pathway

The vapor intrusion pathway includes exposure to soil vapor and volatilized gases from chemicals dissolved in groundwater, separate nonaqueous phase chemicals, and chemicals sorbed to soil particles in the subsurface. Preliminary screening of the potential for vapor intrusion in accordance with Ecology's *Updated Process for Initially Assessing the Potential for Petroleum Vapor Intrusion* (Ecology, 2016) indicates that there is a low risk of vapor intrusion at this Site. There are no buildings located within the 30-foot lateral inclusion zone of soil or groundwater impacts; the nearest building is the Town Center Mini-Mart building (Figure 10). Therefore, the vapor intrusion pathway is currently incomplete and the potential for exposure is low.

Additionally, underground utility mapping was performed during the data gaps investigation in 2015 to investigate the potential for preferential pathways. The investigation included visual inspection of the locations of water, sewer, storm, and electrical utilities in relation to nearby buildings using public and private utility locates. The results of the investigation did not identify preferential vapor migration pathways. No open sanitary sewers or side sewers were identified within 30 feet horizontally from soil or groundwater impacts. There are no other utility corridors mapped within the area of impacts that provide an apparent connection to the buildings in the vicinity. Power and controls for the USTs and pump islands are located within the lateral screening distance, however they are considered shallow utilities and are direct buried in soil based on photos from the soil removal action, therefore they are not considered a risk for preferential vapor migration. Underground utility locations are shown on Figure 10.

3.6 Terrestrial Ecological Evaluation

The purpose of a TEE is intended to assess the potential risk to terrestrial plants and/or animals that live entirely or primarily on affected land. This Site qualified for a TEE exclusion under WAC 173-340-7491(1)(a) and (b) (*All contaminated soil is at least 6 feet below the surface and covered by physical barriers that prevent exposure to plants and wildlife, and institutional controls are used to manage the remaining contamination*). A copy of the TEE form documenting this exclusion is provided in Appendix C.

4 Cleanup Requirements

This section presents the objectives and standards by which evaluation of additional remedial action(s) will be measured. The areas to be addressed by additional remedial actions(s) are also recapped below.

4.1 Remedial Action Objectives

RAOs established for the Site are intended to comply with applicable environmental regulations and protect human health and the environment. The Site-specific RAOs include the following:

- Protection from direct contact with contaminated soil; and
- Protection of groundwater for drinking water use.

4.2 Cleanup Standards

Cleanup standards for the Site include establishing cleanup levels and the points of compliance at which those cleanup levels will be attained. The following presents a discussion of the preliminary cleanup levels and points of compliance for the Site.

4.2.1 Cleanup Levels

Proposed cleanup levels for potentially affected media at the Site are as follows:

- **Soil.** MTCA Method A cleanup levels for unrestricted land use, **or** Method B cleanup levels for direct contact with empirical demonstration of protection of groundwater through periodic sampling.

For reference, a Method B cleanup level of 4,335 mg/kg was calculated for gasoline-range TPH in soil at this Site using the results of an EPH/VPH analysis of the soil sample collected at MW-6 in December 2014. A summary of the calculation using *Ecology's Workbook Tool for Calculating Cleanup Levels for TPH* is provided in Appendix D.

- **Groundwater.** MTCA Method A cleanup levels for protection of drinking water as a beneficial use.

4.2.2 Points of Compliance

The standard points of compliance for affected media at the Site are as follows:

- **Soil for protection from direct contact.** Ground surface to a depth of 15 feet.
- **Soil for protection of groundwater.** Throughout the Site.
- **Groundwater for protection of drinking water.** Extending vertically from the uppermost level of the saturated zone to the lowest depth potentially affected.

When it is not practicable to achieve cleanup levels in soil at the standard points of compliance, the cleanup action may involve containment of hazardous substances. Remedies involving containment may still be determined to comply with cleanup standards, provided: 1) the selected remedy is permanent to the maximum extent

practicable; 2) the cleanup action is protective of human health and the environment; and 3) appropriate institutional controls, including compliance monitoring and periodic reviews, are implemented (173-340-740(6)(f) WAC).

4.3 Areas Requiring Remediation

The areas to be addressed by a final remedy for this Site have been delineated based on the nature and extent of contamination and cleanup standards described in the previous sections. The estimated areal extents of soil impacts are shown on Figures 3 and 4, and estimated vertical extents are shown on Figure 5. The estimated areal extents of groundwater impacts fluctuate seasonally and are shown of Figures 6 through 9.

5 Focused Feasibility Study

This FFS considers the requirements under 173-340-350 WAC, Site-specific conditions, and the criteria defined in 173-340-360 WAC for screening and evaluation of potentially feasible remedial alternatives for the Site.

5.1 Potential Remedial Technologies

Potential remedial technologies for addressing the residual soil and groundwater impacts at the Site include the following:

- **Institutional Controls (ICs).** Measures to limit or prohibit activities that may interfere with the integrity of a cleanup action or result in exposure to hazardous substances (e.g., limitations on the use of the property or resources, such as an environmental covenant or maintenance requirements for engineering controls).
- **Engineering Controls (ECs).** Containment and/or mitigation systems designed to prevent or limit the movement of, or the exposure to, hazardous substances (e.g., paving/capping, vapor barriers).
- **Monitored Natural Attenuation (MNA).** Monitoring the reduction of contaminants through natural processes over time (e.g., biodegradation).
- **Soil Vapor Extraction (SVE).** Extracting contaminants in the form of soil vapor and introducing oxygen into the unsaturated zone to enhance microbial activity.
- **Air Sparging (AS).** Injecting air into contaminated groundwater to volatilize contaminants (typically collected with an SVE system).
- **Dual-Phase Extraction (DPE).** Extracting and treating contaminated groundwater and vapor.
- **Enhanced Aerobic Biodegradation (EAB).** Introducing an oxygen source into the subsurface to stimulate microbial biodegradation of contaminants (e.g., injecting a soil amendment or bioventing).
- **In Situ Chemical Oxidation (ISCO).** Injecting or mixing an oxidant, such as potassium permanganate or sodium persulfate, into the groundwater to react with and destroy contaminants.
- **Soil Excavation:** Removal of impacted soil, followed by off-site disposal.

5.2 Remedial Technology Screening

Each of these remedial technologies has been applied at sites with similar conditions and chemical occurrences. Appendix E provides a detailed description and evaluation of each technology and its applicability to the Site.

Preliminary screening of these potential remedial technologies based on effectiveness, implementability, and comparative cost is shown of Table 4. Institutional and engineering controls, MNA, and soil excavation were retained for further development as remedial alternatives. The remaining technologies were not retained for the following reasons:

- SVE and AS are not considered effective technologies in low permeability soil, such as those found at the Site.
- Dual-phase extraction has significant technical challenges associated with treatment and discharge of the water this technology generates. Additionally, the low permeability soil at the Site are not expected to have a high enough groundwater yield for this technology.
- EAB and ISCO have significant technical challenges associated with distributing oxygen in the low-permeability soil via injection. In the more permeable fill material around utilities, where the residual source mass is located at this Site, injection is not considered feasible because of proximity to sensitive utilities and potential for “daylighting” or short-circuiting of air or amendments through the utilities themselves.

5.3 Development of Remedial Alternatives

Two remedial alternatives were developed for comparison with MTCA criteria for cleanup actions using the technologies retained in the initial screening:

- Alternative 1 – Monitored Natural Attenuation with Capping and Institutional Controls; and
- Alternative 2 – Soil Excavation with Off-Site Disposal.

These alternatives are described in the following sections. Feasibility-level cost estimates (+50/-30 percent) for each alternative were developed in accordance with U.S. Environmental Protection Agency (EPA) cost estimating guidance (EPA, 2000) and professional experience with similar projects. Cost estimate details and assumptions for Alternatives 1 and 2 are provided in Tables 5 and 6, respectively.

5.3.1 *Alternative 1 - Monitored Natural Attenuation with Capping and Institutional Controls*

The purpose of this alternative is to provide protection of human health and the environment until it can be demonstrated that natural attenuation has reduced COC concentrations below applicable cleanup standards to meet RAOs for the Site. This alternative involves the following elements:

- Maintaining existing pervious and impervious surfaces as an engineering control to effectively cap and prevent contact with shallow soil and groundwater impacts;
- Placing an environmental covenant on the Property to control subsurface activities (e.g., restricting groundwater use or excavation activities) and potential exposure during MNA of soil and groundwater impacts;
- Periodic performance monitoring of groundwater to assess the natural attenuation of COCs;
- Periodic protectiveness monitoring to inspect the pervious and impervious surfaces acting as the cap; and

- Confirmation monitoring of soil and groundwater following the completion of the remedial action.

For cost estimating purposes, the duration of this alternative is estimated to be 30 years after applying the rate of attenuation documented at MW-1 and MW-2 since 2010 to the starting concentration of gasoline-range TPH at MW-5 (currently the highest groundwater concentrations at the Site). The estimated cost of this alternative over this timeframe is \$400,000 (Table 5) and comes with a higher degree uncertainty.

5.3.2 Alternative 2 - Soil Excavation with Off-Site Disposal

The purpose of this alternative is to physically remove remaining impacted soil at the Site to the extent practicable, providing the most permanent remedial solution in the shortest amount of time. This alternative eliminates the need for long-term monitoring and/or institutional controls and involves the following elements:

- Removal of subsurface storm drain infrastructure along the western edge of the Property and provide bypass during soil excavation;
- Removal of trees, vegetation, signage, and monitoring wells in area of excavation along the storm drain alignment;
- Excavation to remove and dispose of impacted soil throughout the utility backfill material throughout the Property and off-Property to the extent practicable;
- Soil confirmation sampling along sidewalls and bottom of excavation;
- Restoration of Site to pre-existing conditions, including storm drain infrastructure, trees, vegetation, signage, and monitoring wells in area of excavation along the storm drain alignment; and
- Up to 5 years of groundwater confirmation sampling at downgradient wells.

Excavation will need to be completed during the dry summer months to minimize dewatering of the excavation and costs of soil disposal and stormwater management. The estimated time to achieve cleanup levels for the property under this alternative is approximately 5 years at an estimated cost of \$440,000 (Table 6).

While this alternative offers a higher degree of certainty, it should be noted that if off-Property soil impacts are not accessible (i.e. soil impacts extend farther beyond the property boundary than existing data indicates, or are embedded within sensitive utilities under the sidewalk and cannot be removed), then an environmental covenant may be required for remaining impacts in the right-of-way. If groundwater impacts persist off-Property under this scenario, then a property-specific NFA may be pursued assuming soil and groundwater on the Property meets cleanup standards.

5.4 Evaluation of Remedial Alternatives

MTCA requires that remedial alternatives for a site satisfy certain “threshold” criteria, as specified in 173-340-360(2) WAC:

- Protect human health and the environment;

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- Comply with cleanup standards;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring.

In addition to meeting the threshold criteria, cleanup action alternatives under MTCA must also satisfy these “other” requirements:

- Use of permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration timeframe; and
- Consider public concerns.

These criteria represent the minimum requirements for an acceptable cleanup action alternative under MTCA. Each remedial alternative being considered for this Site meets these criteria as summarized in Table 7.

5.5 Disproportionate Cost Analysis

In addition to meeting the minimum requirements for a cleanup action, MTCA also allows for consideration of cost in selecting among competing remedial alternatives (173-340-360(3)(e) WAC). If the cost of one alternative is disproportionately higher than another when compared to the benefits afforded by each alternative, then the lower cost alternative can be selected. The test for making this determination is stated in MTCA as follows: “Costs are disproportionate to benefits if the incremental costs of the alternative over that of a lower cost alternative exceed the incremental degree of benefits achieved by the alternative over the other lower cost alternative.” MTCA requires evaluation of the following criteria when conducting a disproportionate cost analysis (DCA):

- Protectiveness;
- Permanence;
- Effectiveness over the long term;
- Management of short-term risks;
- Technical and administrative implementability; and
- Consideration of public concerns.

For this comparison, the evaluation of each remedial alternative relative to this criteria is summarized in Table 7. In this case, Alternative 2 is identified as the preferred remedial alternative for the Site because the overall cost of both alternatives is similar, while the benefit for Alternative 2 is higher than Alternative 1. The results of the DCA are illustrated on Figure 11.

6 Proposed Cleanup Action

Based on the results of the DCA, the preferred remedial action for the Site is Alternative 2, Soil Excavation with Off-site Disposal. This remedy will be implemented independently under the joint VCP administered by the Washington State Pollution Liability Insurance Agency (PLIA) and Ecology, and is expected to satisfy the requirements of MTCA and result in an NFA opinion from Ecology.

The conceptual elements of Alternative 2 are discussed in Section 5.3.2. Specific design details, specifications, and plans will be provided in the CAP, pending PLIA's and Ecology's concurrence with the selection of this preferred remedy. The proposed cleanup action incorporates the following details:

- Decommission four monitoring wells within the proposed excavation area, including MW-1, MW-2, MW-5, and MW-6.
- Removal of the western portion of the parking area, including asphalt, a section of the concrete curb, landscaping, and business signage to facilitate excavation of impacted soil.
- Structurally support concrete utility vault located on the southwest side of the proposed excavation. Structural support would likely consist of pipe-pile or pin-pile installation.
- Temporarily plug storm sewer line that runs through the excavation area at the upstream catch basin. Bypass and direct water into the storm collector immediately south of the excavation.
- Removal of a 54-inch class II catch basin, and sections of 12-inch corrugated metal pipe (CMP) extending to the south, and 36-inch CMP extending to the north to facilitate excavation.
- Excavate approximately 477 cubic yards of soil including clean overburden and clean soils removed for a 1H:1V excavation slope along the south, north, and east sides of the excavation.
- Shoring near the sidewalk along the west side of the excavation.
- Disposal of an estimated 333 cubic yards of petroleum contaminated soil removed from the excavation.
- Confirmation soil sampling and analysis during the excavation.
- Addition of an oxygen release compound (ORC), to facilitate attenuation of residual groundwater impacts.
- Restoration of the Property, including backfilling with clean material, replacing curbs and parking areas, landscaping, signage, and replacing the stormwater infrastructure per City of Duvall requirements.

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- Up to 5 years of quarterly groundwater confirmation monitoring.

The expected duration of the construction activities is 3 weeks. It is assumed that construction would minimally interfere with business activities on the Property and the pump islands and convenience store would remain accessible during construction. Parking along the south and west perimeter of the Property would be impacted for the duration of the construction activities.

7 References

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- Washington State Department of Ecology (Ecology), 2016. Updated Process of Initially Assessing the potential for Petroleum Vapor Intrusion, Implementation Memorandum No. 14, March 31, 2016.

8 Limitations

Work for this project was performed for the Farwest Petroleum Company, LLC (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

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TABLES

Table 1 - Groundwater Elevation Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Well ID	TOC Elevation (feet)	Sample Date	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-1	96.17	7/12/2010	6.28	89.89
		10/21/2010	7.04	89.13
		2/10/2011	5.82	90.35
		5/3/2011	5.62	90.55
		8/19/2011	6.91	89.26
		12/7/2011	6.19	89.98
		3/28/2012	6.01	90.16
		8/8/2012	6.32	89.85
		11/28/2012	6.66	89.51
		3/26/2013	6.97	89.20
		6/24/2013	6.27	89.90
		9/23/2013	6.83	89.34
		12/20/2013	6.82	89.35
		3/25/2014	5.79	90.38
		6/27/2014	6.29	89.88
		9/25/2014	7.16	89.01
		12/30/2014	7.13	89.04
		3/24/2015	7.52	88.65
		6/17/2015	6.69	89.48
		9/21/2015	7.28	88.89
12/15/2015	6.17	90.00		
3/14/2016	6.05	90.12		
6/14/2016	6.76	89.41		
9/15/2016	7.06	89.11		
12/13/2016	5.77	90.40		
MW-2	96.12	7/12/2010	6.51	89.61
		10/21/2010	7.30	88.82
		2/10/2011	5.71	90.41
		5/3/2011	5.56	90.56
		8/19/2011	7.19	88.93
		12/7/2011	6.59	89.53
		3/28/2012	5.59	90.53
		8/8/2012	6.78	89.34
		11/28/2012	5.90	90.22
		3/26/2013	5.58	90.54
		6/24/2013	6.48	89.64
		9/23/2013	7.42	88.70
		12/20/2013	7.12	89.00
		3/25/2014	5.51	90.61
		6/27/2014	6.48	89.64
		9/25/2014	7.40	88.72
		12/30/2014	5.79	90.33
		3/24/2015	5.70	90.42
		6/17/2015	6.92	89.20
		9/21/2015	8.12	88.00
12/15/2015	6.08	90.04		
3/14/2016	5.52	90.60		
6/14/2016	6.74	89.38		
9/15/2016	8.07	88.05		
12/13/2016	5.83	90.29		

Table 1 - Groundwater Elevation Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Well ID	TOC Elevation (feet)	Sample Date	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-3	97.47	7/12/2010	6.94	90.53
		10/21/2010	7.70	89.77
		2/10/2011	5.86	91.61
		5/3/2011	5.75	91.72
		8/19/2011	7.61	89.86
		12/7/2011	6.73	90.74
		3/28/2012	5.70	91.77
		8/8/2012	7.13	90.34
		11/28/2012	6.10	91.37
		3/26/2013	5.75	91.72
		6/24/2013	7.00	90.47
		9/23/2013	7.94	89.53
		12/20/2013	7.56	89.91
		3/25/2014	5.62	91.85
		6/27/2014	6.86	90.61
		9/25/2014	7.84	89.63
		12/30/2014	5.86	91.61
		3/24/2015	6.06	91.41
		6/17/2015	7.57	89.90
		9/21/2015	8.54	88.93
12/15/2015	6.29	91.18		
3/14/2016	5.62	91.85		
6/14/2016	7.04	90.43		
9/15/2016	8.64	88.83		
12/13/2016	6.15	91.32		
MW-4	98.76	7/12/2010	8.13	90.63
		10/21/2010	9.18	89.58
		2/10/2011	7.62	91.14
		5/3/2011	7.38	91.38
		8/19/2011	8.49	90.27
		12/7/2011	8.53	90.23
		3/28/2012	7.09	91.67
		8/8/2012	8.26	90.50
		11/28/2012	7.96	90.80
		3/26/2013	7.38	91.38
		6/24/2013	8.06	90.70
		9/23/2013	9.21	89.55
		12/20/2013	8.99	89.77
		3/25/2014	7.66	91.10
		6/27/2014	8.02	90.74
		9/25/2014	9.26	89.50
		12/30/2014	7.85	90.91
		3/24/2015	7.61	91.15
		6/17/2015	8.45	90.31
		9/21/2015	9.66	89.10
12/15/2015	8.20	90.56		
3/14/2016	7.51	91.25		
6/14/2016	8.42	90.34		
9/15/2016	9.80	88.96		
12/13/2016	8.22	90.54		
MW-5	96.48	12/30/2014	5.44	91.04
		3/24/2015	5.54	90.94
		6/17/2015	6.91	89.57
		9/21/2015	7.47	89.01
		12/14/2015	5.37	91.11
		3/14/2016	5.57	90.91
		6/14/2016	6.49	89.99
		9/15/2016	8.30	88.18
12/13/2016	5.29	91.19		

Table 1 - Groundwater Elevation Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Well ID	TOC Elevation (feet)	Sample Date	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-6	95.58	12/30/2014	5.91	89.67
		3/24/2015	5.65	89.93
		6/17/2015	6.66	88.92
		9/21/2015	7.38	88.20
		12/15/2015	5.65	89.93
		3/14/2016	5.51	90.07
		6/14/2016	6.52	89.06
		9/15/2016	7.72	87.86
MW-7	94.89	12/30/2014	4.55	90.34
		3/24/2015	4.66	90.23
		6/17/2015	6.10	88.79
		9/21/2015	6.22	88.67
		12/15/2015	4.80	90.09
		3/14/2016	5.60	89.29
		6/14/2016	5.75	89.14
		9/15/2016	6.68	88.21
MW-8	96.16	12/30/2014	4.26	91.90
		3/24/2015	4.82	91.34
		6/17/2015	6.74	89.42
		9/21/2015	7.73	88.43
		12/15/2015	4.38	91.78
		3/14/2016	4.26	91.90
		6/14/2016	6.33	89.83
		9/15/2016	7.82	88.34
MW-9	93.20	9/21/2015	5.99	87.21
		12/15/2015	5.42	87.78
		3/14/2016	5.31	87.89
		6/14/2016	5.94	87.26
		9/15/2016	6.37	86.83
		12/13/2016	5.38	87.82
MW-10	93.28	9/21/2015	5.99	87.29
		12/14/2015	3.03	90.25
		3/14/2016	3.06	90.22
		6/14/2016	4.37	88.91
		9/15/2016	5.07	88.21
		12/13/2016	3.07	90.21

Table 1 - Groundwater Elevation Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Well ID	TOC Elevation (feet)	Sample Date	Depth to Water (feet BTOC)	Groundwater Elevation (feet)
MW-11	93.41	9/21/2015	5.22	88.19
		12/14/2015	3.44	89.97
		3/14/2016	3.40	90.01
		6/14/2016	4.21	89.20
		9/15/2016	5.29	88.12
		12/13/2016	3.30	90.11
MW-12	93.76	9/21/2015	5.04	88.72
		12/14/2015	2.91	90.85
		3/14/2016	2.75	91.01
		6/14/2016	4.57	89.19
		9/15/2016	6.05	87.71
		12/13/2016	2.81	90.95
MW-13	93.72	9/21/2015	DRY	--
		12/15/2015	5.28	88.44
		6/14/2016	DRY	--
		9/15/2016	DRY	--
MW-14	93.86	9/21/2015	6.18	87.68
		12/14/2015	2.83	91.03
		3/14/2016	2.68	91.18
		6/14/2016	4.73	89.13
		9/15/2016	6.36	87.50
		12/13/2016	2.74	91.12
Notes:				
Elevations are relative to an arbitrarily chosen site datum.				
Definitions:				
BTOC = Below top of casing				
NA = Not available				
TOC = Top of casing				

Table 2 - Groundwater Quality Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Well ID	Sample Date	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Naphthalene (µg/L)
MTCA Method A Groundwater Cleanup Level (µg/L)		800 ⁽²⁾	5	1,000	700	1000	160
MW-1	7/12/2010	12,000	60	11	380	570	110
	10/21/2010	7,300	95	8.5	78	300	160
	2/10/2011	2,900	47	4.8	64	140	26
	5/3/2011	1,300	1.9	1.3	5.8	5.9	4.7
	8/19/2011	1,000	ND	1.4	6.4	3.6	ND
	12/7/2011	4,600	360	6.3	170	260	100
	2011 ⁽¹⁾	2,500	100	3.5	62	100	33
	3/28/2012	1,000	4.4	1.1	16	17	8.9
	8/8/2012	670	5.1	ND	22	32	13
	11/28/2012	1,500	120	3.3	60	50	43
	2012 ⁽¹⁾	1,100	43	1.8	33	33	22
	3/26/2013	530	6.8	ND	12	11	NS
	6/24/2013	540	4.0	2.5	20	12	NS
	9/23/2013	160	ND	ND	4.2	ND	NS
	12/20/2013	870	13	2.1	30	17	NS
	2013 ⁽¹⁾	530	6.0	1.2	17	10	NS
	3/25/2014	560	1.4	ND	16	7	NS
	6/27/2014	160	ND	ND	2.5	ND	NS
	9/25/2014	280	8.9	8.9	10	27	NS
	12/30/2014	470	ND	ND	19	23	8.1
	2014 ⁽¹⁾	370	2.6	2.2	12	14	8
	3/24/2015	180	ND	ND	2	ND	ND
	6/17/2015	250	ND	ND	14	4.8	4.0
	9/21/2015	400	ND	ND	36	59	9
12/15/2015	2000	ND	ND	63	98	38	
2015 ⁽¹⁾	710	ND	ND	29	54	17	
3/14/2016	670	ND	ND	19	17	10	
6/14/2016	480	ND	ND	5	ND	4	
9/15/2016	330	ND	ND	5	ND	4	
12/13/2016	810	ND	ND	10	6	12	
MW-2	7/12/2010	50,000	840	200	3,000	9,300	760
	10/21/2010	30,000	350	84	2,100	5,300	640
	2/10/2011	37,000	500	150	2,400	7,100	600
	5/3/2011	48,000	690	180	3,400	11,000	920
	8/19/2011	29,000	340	79	2,100	5,500	440
	12/7/2011	25,000	230	66	1,700	4,100	430
	2011 ⁽¹⁾	35,000	440	120	2,400	6,900	598
	3/28/2012	26,000	270	110	2,000	5,400	450
	8/8/2012	21,000	170	57	1,600	3,400	300
	11/28/2012	22,000	160	57	1,700	3,600	430
	2012 ⁽¹⁾	23,000	200	75	1,800	4,100	393
	3/26/2013	32,000	200	86	2,400	5,500	NS
	6/24/2013	16,000	110	44	1,400	2,200	NS
	9/23/2013	11,000	73	23	910	980	NS
	12/20/2013	18,000	130	42	1,400	1,900	NS
	2013 ⁽¹⁾	19,000	130	49	1,500	2,600	NS
	3/25/2014	27,000	130	56	2,100	3,400	NS
	6/27/2014	15,000	87	32	1,300	1,700	NS
	9/25/2014	7,500	54	17	790	860	NS
	12/30/2014	13,000	71	30	990	1,140	290
	2014 ⁽¹⁾	16,000	90	34	1,300	1,800	290
	3/24/2015	17,000	ND	32	1,500	1,900	330
	6/17/2015	2,200	9	3.1	370	310	87
	9/21/2015	890	7	ND	110	26	19
12/15/2015	7,100	35	11	690	418	170	
2015 ⁽¹⁾	6,800	17	15	670	660	150	
3/14/2016	13,000	46	20	1200	1239	330	
6/14/2016	6,400	34	10	450	325	190	
9/15/2016	1,300	12	ND	80	17	58	
12/13/2016	5,500	37	7.9	620	2.5	ND	
2016 ⁽¹⁾	6,600	32	13	590	400	190	

Table 2 - Groundwater Quality Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Well ID	Sample Date	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Naphthalene (µg/L)
MTCA Method A Groundwater Cleanup Level (µg/L)		800 ⁽²⁾	5	1,000	700	1000	160
MW-3	7/12/2010	100	6.4	ND	ND	ND	ND
	10/21/2010	ND	ND	ND	ND	ND	ND
	2/10/2011	ND	ND	ND	ND	ND	ND
	5/3/2011	ND	ND	ND	ND	ND	ND
	8/19/2011	ND	ND	ND	ND	ND	ND
	12/7/2011	ND	ND	ND	ND	ND	ND
	3/28/2012	ND	ND	ND	ND	ND	ND
	8/8/2012	ND	1.5	ND	ND	ND	ND
	11/28/2012	ND	ND	ND	ND	ND	ND
	3/26/2013	NS	NS	NS	NS	NS	NS
	6/24/2013	NS	NS	NS	NS	NS	NS
	9/23/2013	NS	NS	NS	NS	NS	NS
	12/20/2013	NS	NS	NS	NS	NS	NS
	3/25/2014	NS	NS	NS	NS	NS	NS
	6/27/2014	NS	NS	NS	NS	NS	NS
	9/25/2014	NS	NS	NS	NS	NS	NS
	12/30/2014	ND	ND	ND	ND	ND	ND
3/24/2015	ND	ND	ND	ND	ND	3.7	
6/17/2015	ND	ND	ND	ND	ND	ND	
9/21/2015	ND	ND	ND	ND	ND	ND	
12/15/2015	ND	ND	ND	ND	ND	ND	
MW-4	7/12/2010	1,200	43	1.2	55	3.4	100
	10/21/2010	320	1.2	ND	2.8	ND	13.0
	2/10/2011	350	2.0	ND	6.8	ND	7.7
	5/3/2011	310	1.4	ND	1.6	ND	5.9
	8/19/2011	170	ND	ND	1.3	ND	NS
	12/7/2011	200	ND	ND	2.7	ND	2.7
	3/28/2012	100	ND	ND	ND	ND	ND
	8/8/2012	ND	ND	ND	ND	ND	ND
	11/28/2012	ND	ND	ND	ND	ND	ND
	3/26/2013	NS	NS	NS	NS	NS	NS
	6/24/2013	NS	NS	NS	NS	NS	NS
	9/23/2013	NS	NS	NS	NS	NS	NS
	12/20/2013	NS	NS	NS	NS	NS	NS
	3/25/2014	NS	NS	NS	NS	NS	NS
	6/27/2014	NS	NS	NS	NS	NS	NS
	9/25/2014	NS	NS	NS	NS	NS	NS
	12/30/2014	ND	ND	ND	ND	ND	ND
3/24/2015	ND	ND	ND	ND	ND	ND	
6/17/2015	ND	ND	ND	ND	ND	ND	
9/21/2015	ND	ND	ND	ND	ND	ND	
12/15/2015	ND	ND	ND	ND	ND	ND	
MW-5	12/30/2014	31,000	92	1,500	5,800	680	350
	3/24/2015	520	130	48	2,700	9,800	650
	6/17/2015	6,900	170	67	3,500	7,400	770
	9/21/2015	9,200	15	12	290	1,610	100
	12/14/2015	370	ND	ND	3	15	3
	3/14/2016	1,200	ND	ND	40	143	12
	6/14/2016	52,000	<200	31	1,100	3,930	280
	9/15/2016	79,000	<200	<200	3,200	8,700	790
12/13/2016	340	ND	ND	4.5	17	3.8	

Table 2 - Groundwater Quality Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Well ID	Sample Date	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Naphthalene (µg/L)
MTCA Method A Groundwater Cleanup Level (µg/L)		800 ⁽²⁾	5	1,000	700	1000	160
MW-6	12/30/2014	17,000	97	50	980	2,550	300
	3/24/2015	8,200	59	31	570	1,570	170
	6/17/2015	9,900	41	19	620	1,096	140
	9/21/2015	440	4	ND	32	61	11
	12/15/2015	850	ND	ND	10	16	3.4
	3/14/2016	1,400	5	ND	66	84	14
	6/14/2016	7,100	50	14	430	526	77
	9/15/2016	510	ND	ND	9	6	3.7
	12/13/2016	260	ND	ND	10	14	2.6
MW-7	12/30/2014	ND	ND	ND	ND	ND	ND
	3/24/2015	ND	ND	ND	ND	ND	ND
	6/17/2015	ND	ND	ND	ND	ND	ND
	9/21/2015	ND	ND	ND	ND	ND	ND
	12/15/2015	ND	ND	ND	ND	ND	ND
MW-8	12/30/2014	ND	ND	ND	ND	ND	ND
	3/24/2015	59	ND	ND	2.0	5.4	ND
	6/17/2015	ND	ND	ND	ND	ND	ND
	9/21/2015	ND	ND	ND	ND	ND	ND
	12/15/2015	ND	ND	ND	ND	ND	ND
MW-9	9/21/2015	ND	ND	ND	ND	ND	ND
	12/15/2015	ND	ND	ND	ND	ND	ND
MW-10	9/21/2015	ND	ND	ND	ND	ND	ND
	12/14/2015	ND	ND	ND	ND	ND	ND
	3/14/2016	ND	ND	ND	ND	ND	ND
	6/14/2016	ND	ND	ND	ND	ND	ND
	9/15/2016	ND	ND	ND	ND	ND	ND
	12/13/2016	ND	ND	ND	ND	ND	ND
MW-11	9/21/2015	ND	ND	ND	ND	ND	ND
	12/14/2015	ND	ND	ND	ND	ND	ND
	3/14/2016	ND	ND	ND	ND	ND	ND
	6/14/2016	ND	ND	ND	ND	ND	ND
	9/15/2016	ND	ND	ND	ND	ND	ND
	12/13/2016	ND	ND	ND	ND	ND	ND
MW-12	9/21/2015	340	ND	ND	ND	ND	ND
	12/14/2015	ND	ND	ND	ND	ND	ND
	3/14/2016	ND	ND	ND	ND	ND	ND
	6/14/2016	ND	ND	ND	ND	ND	ND
	9/15/2016	ND	ND	ND	ND	ND	ND
	12/13/2016	ND	ND	ND	ND	ND	ND
MW-13	9/21/2015	NS	NS	NS	NS	NS	NS
	12/15/2015 ⁽³⁾	ND	ND	ND	ND	ND	ND
MW-14	9/21/2015	10,000	52	16	670	680	110
	12/14/2015	ND	ND	ND	ND	ND	ND
	3/14/2016	ND	ND	ND	ND	ND	ND
	6/14/2016	390	ND	ND	12	4.4	11
	9/15/2016	2,700	9	ND	120	103	11
	12/13/2016	ND	ND	ND	ND	ND	ND

Notes:

Bold values exceed MTCA Method A Groundwater Cleanup Levels for Unrestricted Land Use.

(1) Average concentration for the year noted for wells with data above MTCA Method A cleanup levels.

(2) Cleanup level for gasoline with benzene present.

(3) Sample not considered representative of groundwater based on recharge observed after purging. Recharge attributed to infiltration of rain water from surface.

NA = Not analyzed or not applicable

ND = Not detected above laboratory reporting limit

NS = Not sampled

TPH = Total petroleum hydrocarbons

µg/L = micrograms/Liter

Table 3 - Soil Quality Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Chemical Name	Soil Cleanup Levels, Unrestricted Land	Floor Samples						Sidewall Samples			
		BS-1 12/01/09 (11 ft.)	BS-2 12/02/09 (11 ft.)	BS-3 12/02/09 (11 ft.)	CBS-4 12/07/09 (14 ft.)	CBS-5 12/07/09 (14 ft.)	CBS-7 12/07/09 (14 ft.)	SW-1 12/01/09 (8.5 ft.)	SW-3 12/02/09 (8.5 ft.)	SW-6 12/02/09 (8.5 ft.)	SW-7 12/02/09 (8.5 ft.)
Total Petroleum Hydrocarbons											
Gasoline Range Hydrocarbons in mg/Kg	30	10 u	10 u	10 u	10 u	10 u	10 u	10 u	10 u	14	10 u
BTEX											
benzene in mg/Kg	0.03	0.2	0.21	0.02 u	0.029	0.24	0.23	0.16	0.02 u	0.14	0.14
toluene in mg/Kg	7	0.057	0.02 u	0.02 u	0.02 u	0.079	0.093	0.2	0.02 u	0.085	0.24
ethylbenzene in mg/Kg	6.0	0.27	0.27	0.05 u	0.05 u	0.13	0.13	0.27	0.09	0.36	1.02
xylenes in mg/Kg	9.0	0.14	0.18	0.05 u	0.05 u	0.37	0.4	0.48	0.08	0.68	2.5
Volatile Organic Compounds											
1,2-Dichloroethane (EDC) in mg/kg		0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u
ethylene dibromide (EDB) in mg/kg	0.005	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
methyl tert-butyl ether in mg/kg	0.1	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u
naphthalene in mg/kg	5	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u

Chemical Name	Soil Cleanup Levels, Unrestricted Land	Sidewall Samples							Product Line
		CSW-8 12/07/09 (6 ft.)	CSW-9 12/07/09 (8 ft.)	CSW-10 12/07/09 (6 ft.)	CSW-16 12/07/09 (6 ft.)	CSW-17 12/07/09 (6 ft.)	CSW-18 12/07/09 (8 ft.)	CSW-19 12/07/09 (8 ft.)	CPL-1 12/07/09 (3 ft.)
Total Petroleum Hydrocarbons									
Gasoline Range Hydrocarbons in mg/Kg	30	10 u	10 u	10 u	10 u	10 u	10 u	10 u	10 u
BTEX									
benzene in mg/Kg	0.03	0.02 u	0.02 u	0.02 u	0.32	0.02 u	0.02 u	0.22	0.02 u
toluene in mg/Kg	7	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u
ethylbenzene in mg/Kg	6	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.11	0.05 u
xylenes in mg/Kg	9	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.19	0.05 u
Volatile Organic Compounds									
1,2-Dichloroethane (EDC) in mg/kg		0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u
ethylene dibromide (EDB) in mg/kg	0.005	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
methyl tert-butyl ether in mg/kg	0.1	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u
naphthalene in mg/kg	5	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u

Notes

Bold values exceed MTCA Method A Soil Cleanup Level for Unrestricted Land Use.

U - Analyte was not detected at or above the reported result.

ft = feet

mg/kg = milligrams/kilogram

Table 3 - Soil Quality Data

Project No. 080258, Town Center Mini-Mart, Duvall, WA

Chemical Name	Soil Cleanup Levels, Unrestricted Land	MW-5 12/22/2014 (7 ft)	MW-6 12/22/2014 (7.5 ft)	MW-7 12/22/2014 (6.5 ft)	MW-8 12/22/2014 (8 ft)
Total Petroleum Hydrocarbons (TPH)					
Gasoline-Range Hydrocarbons (mg/kg)	30	86	1100	3.0 U	3.0 U
Volatile Organic Compounds (VOC)					
Benzene (mg/kg)	0.03	0.025	0.076	0.005 U	0.005 U
Ethylbenzene (mg/kg)	6	0.073 U	0.140	0.080 U	0.082 U
Toluene (mg/kg)	7	0.490	21	0.082 U	0.084 U
Xylenes (total) (mg/kg)	9	0.140	36	0.220 U	0.222 U
Napthalene (mg/kg)	5	0.079 U	5.9	0.086 U	0.089 U

Chemical Name	Soil Cleanup Levels, Unrestricted Land	MW-9 9/14/2015 (6 ft)	MW-10 9/14/2015 (5.5 ft)	MW-11 9/14/2015 (3.5 ft)	MW-12 9/14/2015 (5.5 ft)	MW-13 9/15/2015 (5 ft)	MW-14 9/15/2015 (5.5 ft)	AP-11 9/15/2015 (6.5 ft)
Total Petroleum Hydrocarbons (TPH)								
Gasoline-Range Hydrocarbons (mg/kg)	30	2 U	2 U	2 U	6.3	2 U	2 U	2 U
Volatile Organic Compounds (VOC)								
Benzene (mg/kg)	0.03	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Ethylbenzene (mg/kg)	6	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene (mg/kg)	7	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Xylenes (total) (mg/kg)	9	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U
Napthalene (mg/kg)	5	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

Notes

Bold values exceed MTCA Method A Soil Cleanup Level for Unrestricted Land Use.

U - Analyte was not detected at or above the reported result.

ft = feet

mg/kg = milligrams/kilogram

Table 4 - Preliminary Screening of Remedial Technologies

Project No. 080258, Town Center Mini-Mart, Duvall, Washington

Remedial Technology	Effectiveness	Implementability	Comparative Cost	Screening Result
Institutional Controls	medium	high	low	Retained
Engineering Controls	medium	high	low	Retained
Monitored Natural Attenuation	medium	high	low	Retained
Soil Vapor Extraction	low	medium	medium	Not Retained
Air Sparging	low	low	medium	Not Retained
Dual Phase Extraction	low	low	high	Not Retained
Enhanced Aerobic Biodegradation	medium	low	medium	Not Retained
<i>In Situ</i> Chemical Oxidation	medium	low	medium	Not Retained
Soil Excavation	high	low	high	Retained

Table 5 - Alternative 1 Cost Estimate - Monitored Natural Attenuation

Project No. 080258, Town Center Mini-Mart, Duvall, Washington

Site:	Town Center Mini Mart				
Remedial Action Description:	Monitored Natural Attenuation with Capping and Institutional Controls				
Cost Estimate Accuracy:	Feasibility Study Level (+50/-30 percent)				
Key Assumptions and Quantities:					
MONITORING COSTS					
Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Consulting Services					
monitoring plan	1	ls	\$ 15,000	\$ 15,000	develop monitoring plan, obtain Ecology approval
environmental covenant	1	ls	\$ 10,000	\$ 10,000	
<i>Subtotal</i>				\$ 25,000	
Monitoring (8 wells, quarterly to annually)					
labor (per event)	16 hr		\$ 123	\$ 1,968	
sampling equipment (per event)	1 ls		\$ 290	\$ 290	
analytical (per event)	8 ea		\$ 250	\$ 2,000	Gas, BTEX, Sulfate, Nitrate, TOC, methane, ferrous iron, manganese
<i>Sampling and analysis - each event</i>				\$ 4,258	
<i>1st year (4 events- quarterly)</i>				\$ 17,032	
<i>2nd year (2 events-semiannual)</i>				\$ 8,516	
<i>Subsequent years (1 event- annual)</i>				\$ 4,258	
					0.7% Annual discount rate(1)
Project Management and Reporting (annual average)					
project management	8 hr		\$ 173	\$ 1,384	
data management	1 ls		\$ 1,500	\$ 1,500	
data evaluation	1 ls		\$ 1,000	\$ 1,000	
annual memorandum	1 ls		\$ 5,000	\$ 5,000	
<i>Subtotal</i>				\$ 8,884	
Total 30-yr Monitoring Cost				\$ 436,292	
TOTAL ESTIMATED NPV COST⁽¹⁾				\$ 400,000	

Notes:

(1) Future costs are adjusted to present value using a discount rate of 0.7%, based on the 2017 30-year real interest rate provided in OMB Circular A-94, Appendix C.

Table 6 - Alternative 2 Cost Estimate - Excavation and Off-Site Disposal

Project No. 080258, Town Center Mini-Mart, Duvall, Washington

Site:	Town Center Mini Mart					
Remedial Action Description:	Excavation and Off-Site Disposal					
Cost Estimate Accuracy:	Feasibility Study Level (+50/-30 percent)					
Key Assumptions and Quantities:						
	1,287 ft ²		Quantities			
	10 ft		total excavation area			
	477 cy		average excavation depth			
	143 cy		PCS excavation volume			
	1,200 ft ²		overburden volume			
			asphalt area			
	1.7 ton/cy		soil density			
	10 gpm		dewatering rate			
CONSTRUCTION COSTS						
	Item	Quantity	Unit	Unit Cost	Total Cost	
Excavation						
	Mobilization/demobilization	1	LS	\$ 13,100	\$ 13,100	
	Well decommissioning	4	each	\$ 1,200	\$ 4,800	includes wells within excavation limits
	Remove and replace sign	1	LS	\$ 3,970	\$ 3,970	
	Storm drain bypass, remove and replace components	1	LS	\$ 17,239	\$ 17,239	Includes temporary management of stormwater and replacement of basins
	Asphalt demolition - remove, replace, restripe	1	LS	\$ 9,910	\$ 9,910	assumes 1200ft2 of asphalt and restripe 5 spaces
	Dewatering	1	LS	\$ 1,750	\$ 1,750	assumes able to dig in the wet
	Impacted water disposal fee	3,000	gal	\$ 0.50	\$ 1,500	
	Sidewalk and utility vault shoring	1	LS	\$ 10,000	\$ 10,000	pipe pile support for utility vault
	Excavate, direct load and dispose of PCS	567	ton	\$ 95	\$ 53,887	
	Soil handling - overburden	243	ton	\$ 18	\$ 4,376	
	Analytical sampling	25	ea	\$ 220	\$ 5,500	sample every 10' of sidewall and every 100ft2 of bottom, 24hr TAT
	Spread oxygen release compound	500	lb	\$ 7.5	\$ 3,750	
	Import, place and compact fill	567	ton	\$ 41.30	\$ 23,427	
	Landscape	1	LS	\$ 8,420	\$ 8,420	
	<i>Subtotal Excavation</i>				\$ 161,629	
Consulting Services						
	Cleanup Action Plan, specifications, and permit applications ⁽¹⁾	1	LS	\$ 30,000	\$ 30,000	
	Project management, construction oversight and monitoring	1	LS	\$ 35,000	\$ 35,000	
	Construction reporting	1	LS	\$ 25,000	\$ 25,000	
	<i>Subtotal Consulting Services</i>				\$ 90,000	
	Tax	8.7%		\$ 161,629	\$ 14,062	
	Contingency	20%		\$ 265,690	\$ 53,138	
	ESTIMATED CONSTRUCTION COST				\$ 318,828	
MONITORING COSTS						
	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Annual Monitoring (8 wells, quarterly)						
	labor	64	hr	\$ 123	\$ 7,872	
	sampling equipment	4	ls	\$ 280	\$ 1,120	
	analytical	24	ea	\$ 110	\$ 2,640	Gas, BTEX
	<i>Subtotal Annual Monitoring (8 wells, quarterly)</i>				\$ 11,632	
						0.7% Annual discount rate(2)
Annual Project Management and Reporting						
	project management	16	hr	\$ 173	\$ 2,768	
	data management	1	ls	\$ 3,000	\$ 3,000	
	data evaluation	1	ls	\$ 2,500	\$ 2,500	
	annual memorandum	1	ls	\$ 5,000	\$ 5,000	
					\$ 13,268	
	TOTAL MONITORING COSTS (5 YEARS)				\$ 124,500	
	TOTAL ESTIMATED NPV COST:				\$ 440,000	
Notes:						
⁽¹⁾ Permit fees are not included in this cost estimate.						

Notes:

(1) Permit fees are not included in this cost estimate.

(2) Future costs are adjusted to present value using a discount rate of 0.7%, based on the 2017 30-year real interest rate provided in OMB Circular A-94, Appendix C.

Table 7 - Summary of Remedial Alternative Evaluation

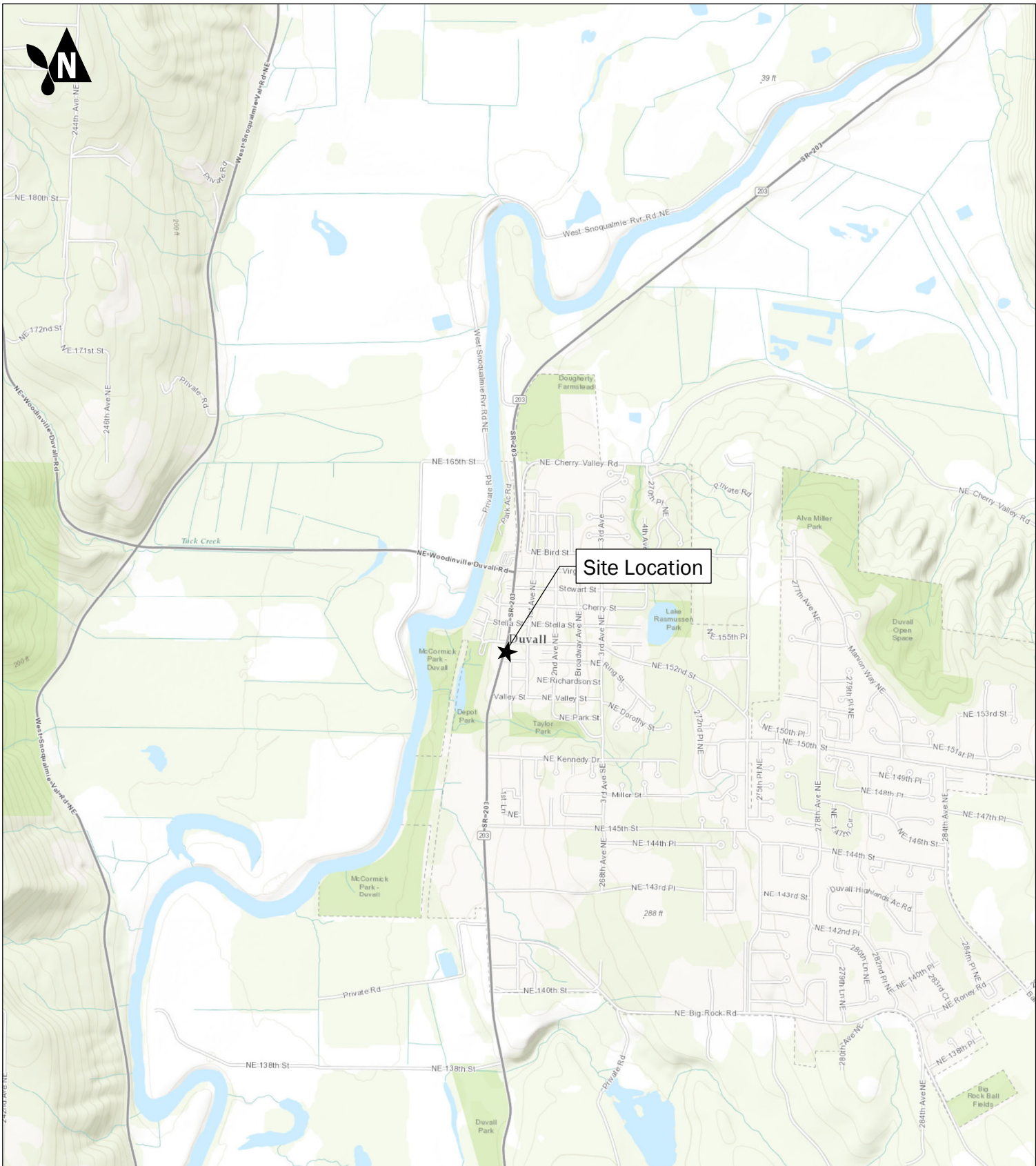
Project No. 080258, Town Center Mini-Mart, Duvall, Washington

Alternative Number	Alternative 1	Alternative 2
Description	Monitored Natural Attenuation with Capping and Institutional Controls	Excavation and Off-Site Disposal
Overall Alternative Ranking	6.8	7.7
Compliance with MTCA Threshold Criteria		
Protection of Human Health and the Environment	Yes – Alternative will protect human health and the environment.	Yes – Alternative will protect human health and the environment.
Compliance with Cleanup Standards	Yes – Relatively long restoration timeframe because no active measures are currently proposed.	Yes – Active remedial measures will remove soils not complying with cleanup standards.
Compliance with Applicable State and Federal Laws	Yes – Alternative complies with applicable laws.	Yes – Alternative complies with applicable laws.
Provision for Compliance Monitoring	Yes – Alternative includes provisions for compliance monitoring through periodic groundwater monitoring.	Yes – Alternative includes provisions for compliance monitoring through confirmation soil sampling.
Restoration Time Frame	30 years	5 years
Evaluation Criteria		
Protectiveness (30% Weighted Factor):	7 Protective of exposure pathways through the combination of engineering and institutional controls.	9 High degree of assurance for protection of identified exposure pathways.
Permanence (20% Weighted Factor):	6 Natural attenuation will reduce the volume and concentration of residual impacted soil.	8 Impacted soil is removed from the Site. Soil will likely end up in an engineered and lined landfill.
Long-Term Effectiveness (20% Weighted Factor):	6 Exposures prevented through existing soil/asphalt cap and environmental covenant.	8 Soil removal is a proven effective remedial approach at petroleum sites. Soil will be placed in an engineered and lined landfill.
Short-Term Risk Management (10% Weighted Factor):	9 Low short term risk, since alternative involves no construction.	6 This alternative poses higher short term risk from heavy construction activities, excavation work, and truck traffic.
Implementability (10% Weighted Factor):	9 High implementability. Requires recording of environmental covenant and maintaining the surface cap above the soil impacts.	7 Implementation is complicated by need subsurface utilities that must be bypassed and removed during excavation activities.
Public Concerns (10% Weighted Factor):	5 Alternative does not remove impacted soils from the Site. May not be desirable due to permanent access restrictions.	5 Concerns over disruption to facility operations, noise, and inconvenience to local residents.
Cost:	\$400,000	\$440,000

Note:

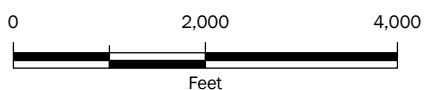
For each evaluation criterion, technologies are ranked on a scale of 1 to 10, with 1 representing the lowest protectiveness, permanence, effectiveness, risk and implementability, or greatest level of public concern.

FIGURES



Site Location Map

Remedial Investigation Report
and Focused Feasibility Study
Town Center Mini-Mart
Duvall, Washington



MAR-2017

PROJECT NO.
080258







BY:
ELG/SCC

REVISED BY:

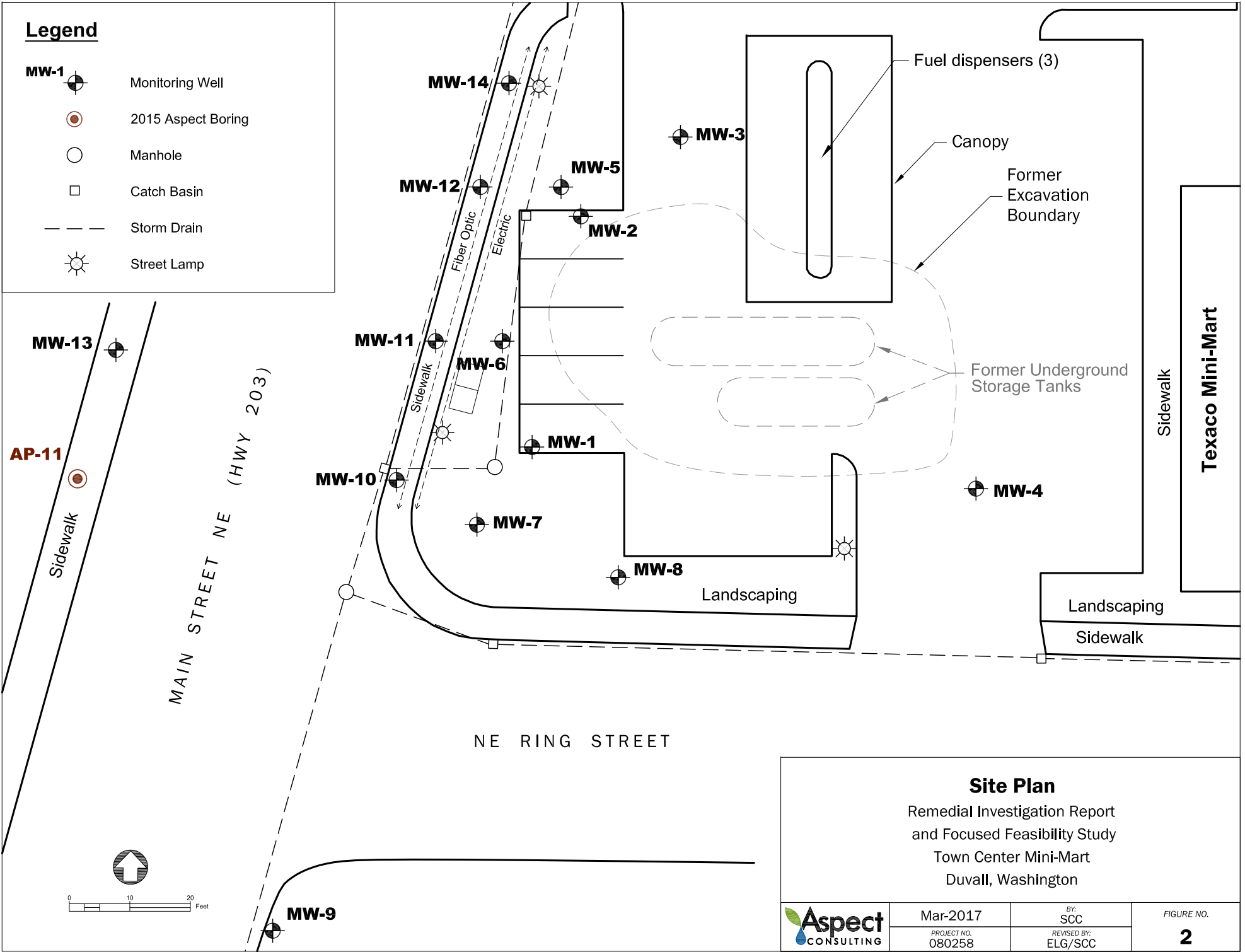
FIGURE NO.

1

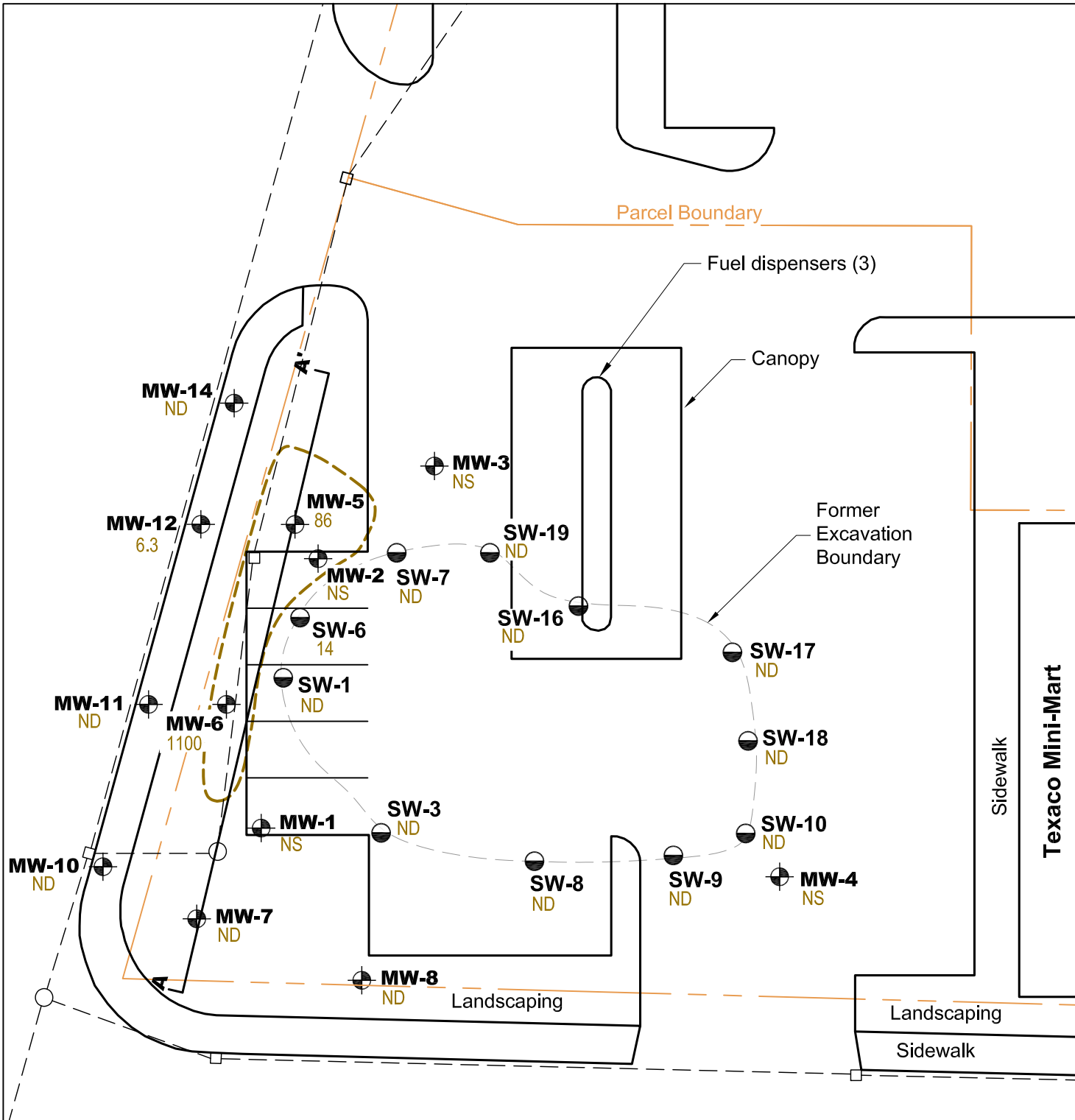
Legend

-  MW-1 Monitoring Well
-  AP-11 2015 Aspect Boring
-  Manhole
-  Catch Basin
-  Storm Drain
-  Street Lamp

CAD Path: Q:\Town Center Mini Mart\080258 Town Center Mini Mart\2017-02\080258_RIFRS_Site Plan\Figure 2 - Site Plan | Date Saved: Mar 16, 2017 3:14pm | User: scndd

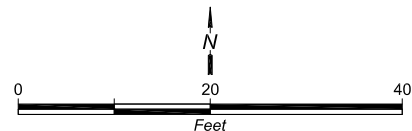


<p>Site Plan Remedial Investigation Report and Focused Feasibility Study Town Center Mini-Mart Duvall, Washington</p>		
	PROJECT NO. 080258 Mar-2017	BY: SCC REVISD BY: ELG/SCC
		FIGURE NO. 2



Legend

- MW-1 Monitoring Well
- SW-1 Sidewall Soil Sample
- Manhole
- Catch Basin
- Storm Drain
- Inferred Extent of Gasoline Range Hydrocarbons in Soil Exceeding MTCA Method A Cleanup Level (30 mg/kg)
- 1100 Concentration of Gasoline in Soil (mg/kg)
- ND Not Detected
- NS Not Sampled



Inferred Lateral Extent of Gasoline in Soil

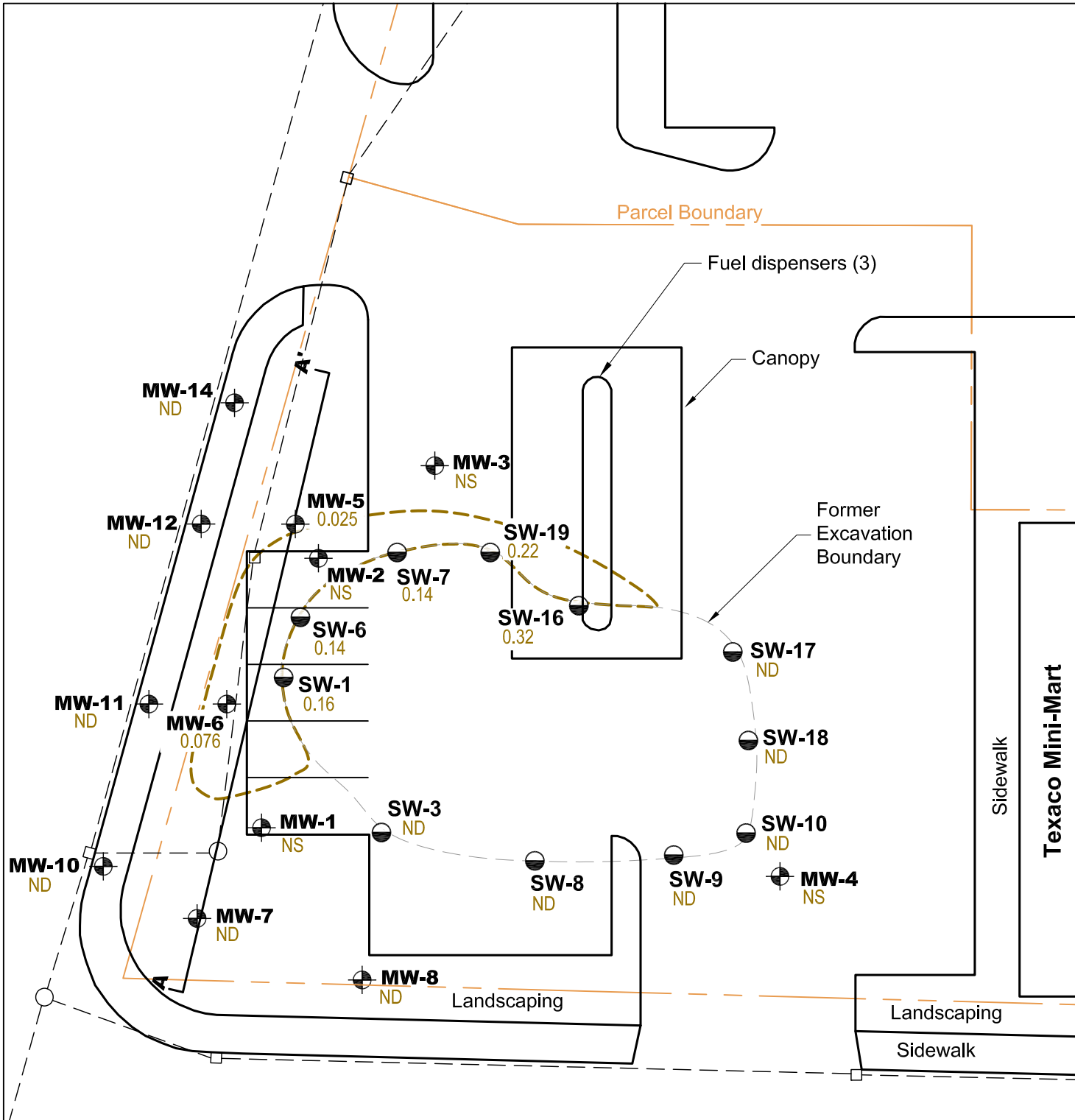
Remedial Investigation Report
and Focused Feasibility Study
Town Center Mini-Mart
Duvall, Washington



Mar-2017
PROJECT NO.
080258

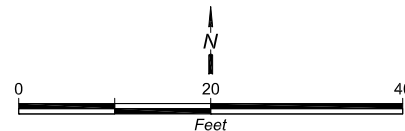
BY:
EJM
REV BY:
SCC

FIGURE NO.
3



Legend

- MW-1** Monitoring Well
- SW-1** Sidewall Soil Sample
- Manhole
- Catch Basin
- Storm Drain
- Inferred Extent of Benzene in Soil Exceeding MTCA Method A Cleanup Level (0.03 mg/kg)
- 0.32** Concentration of Benzene in Soil (mg/kg)
- ND** Not Detected
- NS** Not Sampled



Inferred Lateral Extent of Benzene in Soil

Remedial Investigation Report
and Focused Feasibility Study
Town Center Mini-Mart
Duvall, Washington



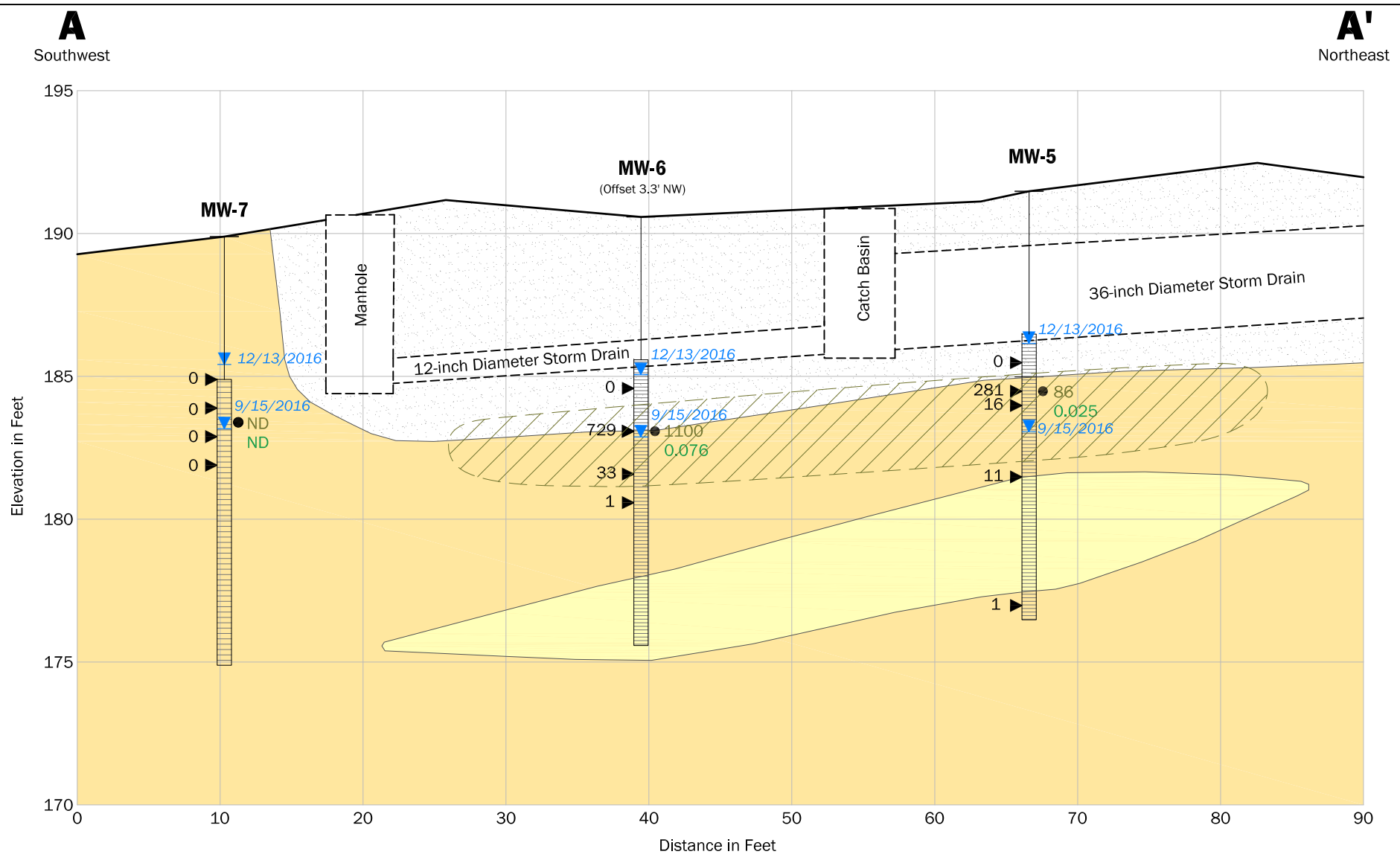
Mar-2017
PROJECT NO.
080258

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EJM
REV BY:
SCC

FIGURE NO.

4

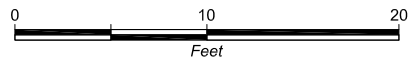
CAD Path: Q:\Town Center Mini Mart\080258 Town Center Mini Mart\2017\02\080258-AA-5-6-7.dwg Section A-A' | Date Saved: Mar 16, 2017 2:55pm | User: scoude



Legend

- Fill
- Sandy, Gravelly Silt
- Silty Sand
- Seasonal Hi/Low Water Level

- 729 ► PID Field Screening Result (ppm)
- 1100 ● Gasoline-Range TPH Concentration in Soil (mg/kg)
- 0.076 ● Benzene Concentration in Soil (mg/kg)
- ND Non-Detect
- Inferred Extent of Soil Impacts Exceeding MTCA Method A Cleanup Levels



Horizontal Scale: 1" = 10'
 Vertical Scale: 1" = 5'
 Vertical Exaggeration 2x

Cross Section A-A' Subsurface Geology and Inferred Extent of Soil Impacts

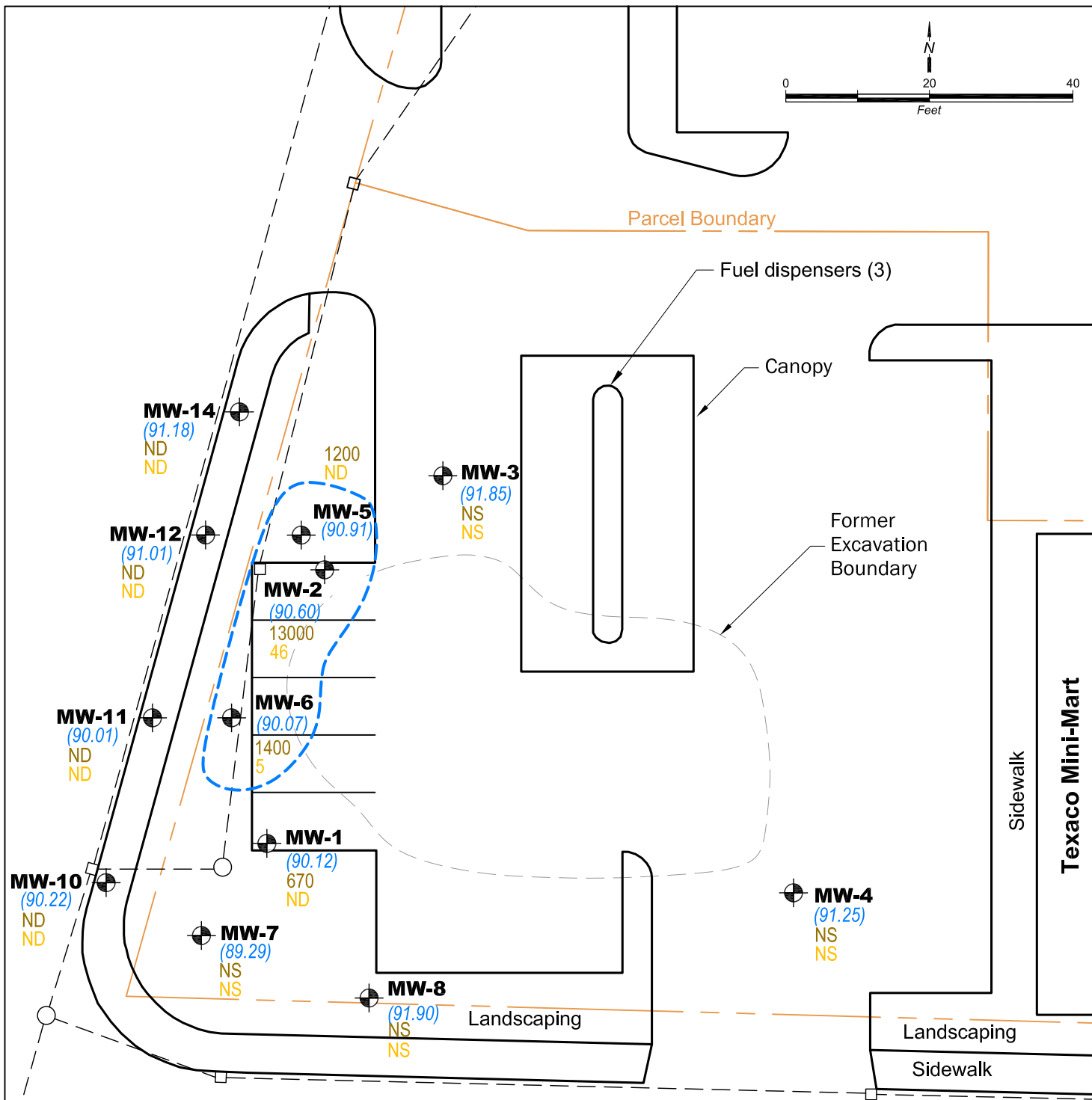
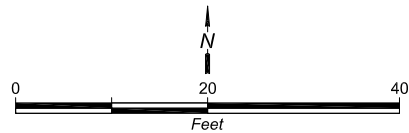
Remedial Investigation Report
 and Focused Feasibility Study
 Town Center Mini-Mart
 Duvall, Washington



Mar-2017
 PROJECT NO.
 080258

BY:
 AET/SCC
 REVISED BY:
 EJM/SCC

FIGURE NO.
5



Legend

- MW-1** Monitoring Well
- (89.29)** Groundwater Elevation
- Manhole
- Catch Basin
- Storm Drain
- Inferred Extent of Groundwater Exceeding MTCA Method A Cleanup Levels for Gasoline and Benzene (800 µg/L and 5 µg/L, respectively)
- 5500** Concentration of Gasoline in Groundwater (µg/L)
- 37** Concentration of Benzene in Groundwater (µg/L)
- ND** Not Detected
- NS** Not Sampled

**Inferred Lateral Extent of Groundwater Impacts
March 2016**

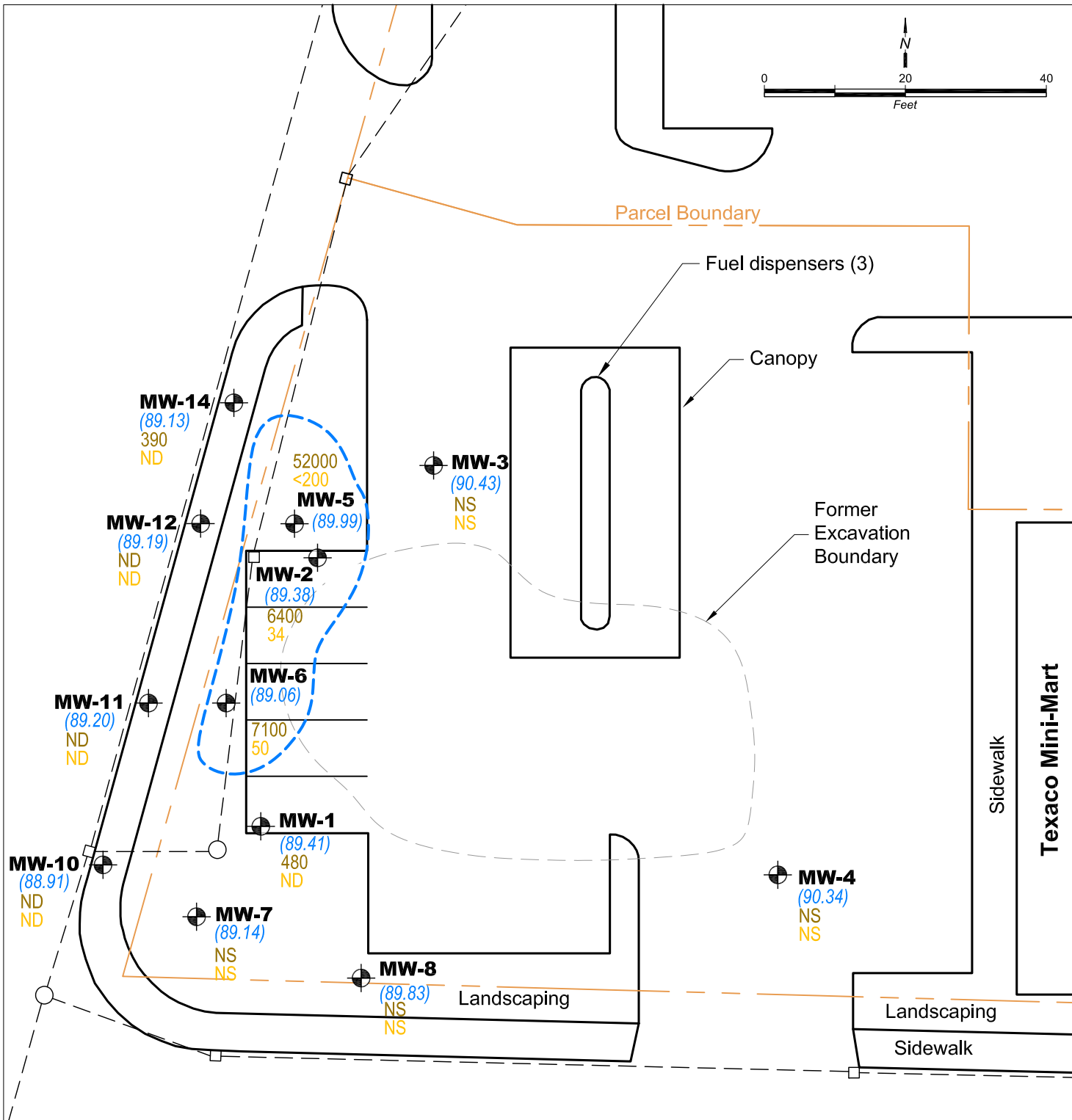
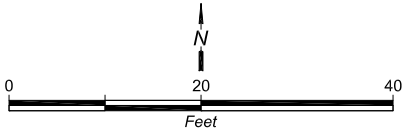
Remedial Investigation Report
and Focused Feasibility Study
Town Center Mini-Mart
Duvall, Washington



Mar-2017
PROJECT NO.
080258

BY:
EJM
REV BY:
ELG/SCC

FIGURE NO.
6

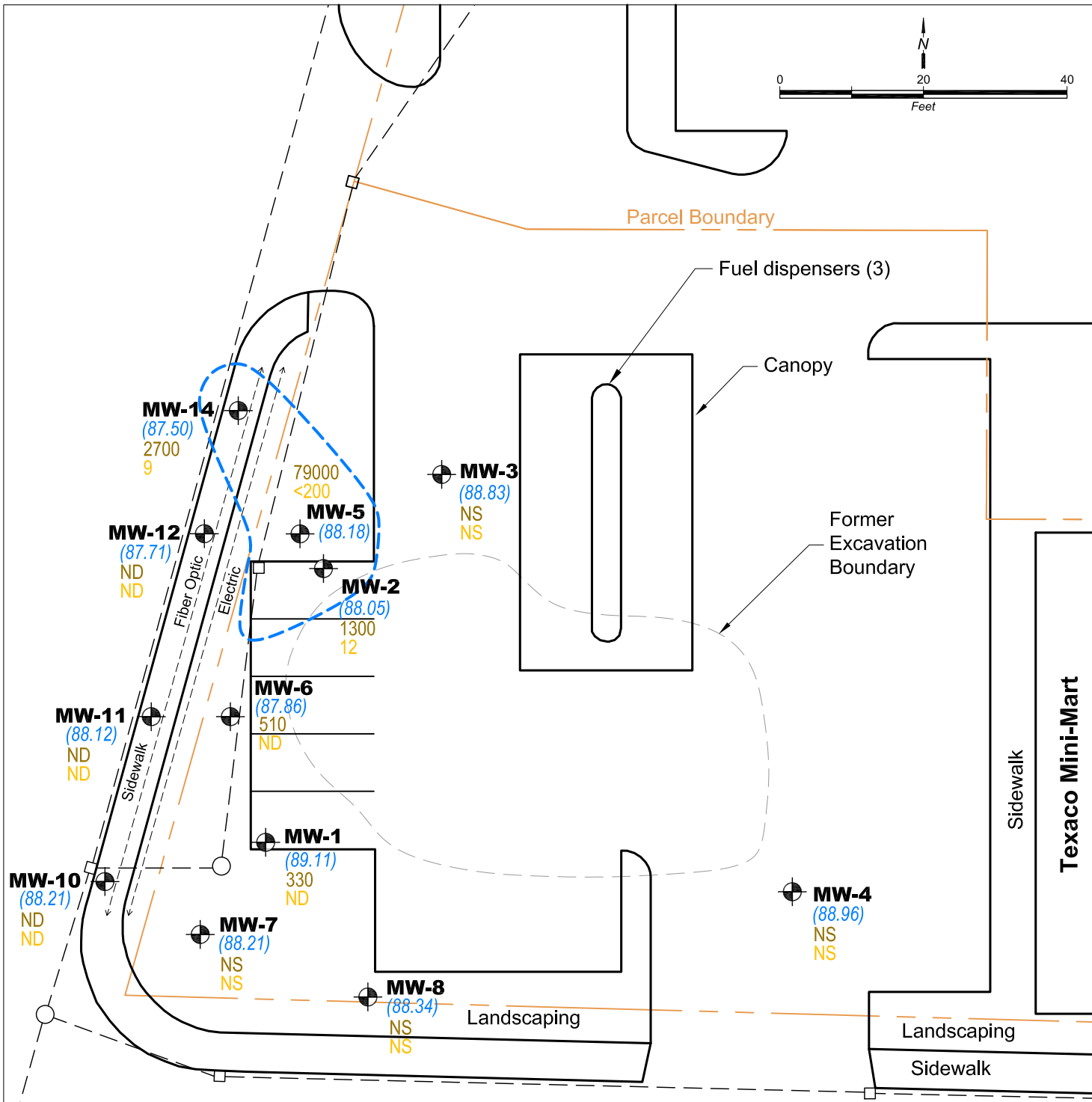
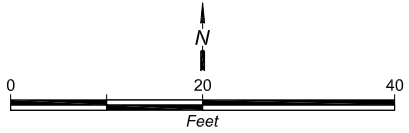


Legend

- MW-1** Monitoring Well
- (89.29)** Groundwater Elevation
- Manhole
- Catch Basin
- Storm Drain
- Inferred Extent of Groundwater Exceeding MTCA Method A Cleanup Levels for Gasoline and Benzene (800 µg/L and 5 µg/L, respectively)
- 5500** Concentration of Gasoline in Groundwater (µg/L)
- 37** Concentration of Benzene in Groundwater (µg/L)
- ND** Not Detected
- NS** Not Sampled

**Inferred Lateral Extent of Groundwater Impacts
June 2016**
Remedial Investigation Report
and Focused Feasibility Study
Town Center Mini-Mart
Duvall, Washington

	Mar-2017	BY: EJM	FIGURE NO. 7
	PROJECT NO. 080258	REV BY: EJM/SCC	

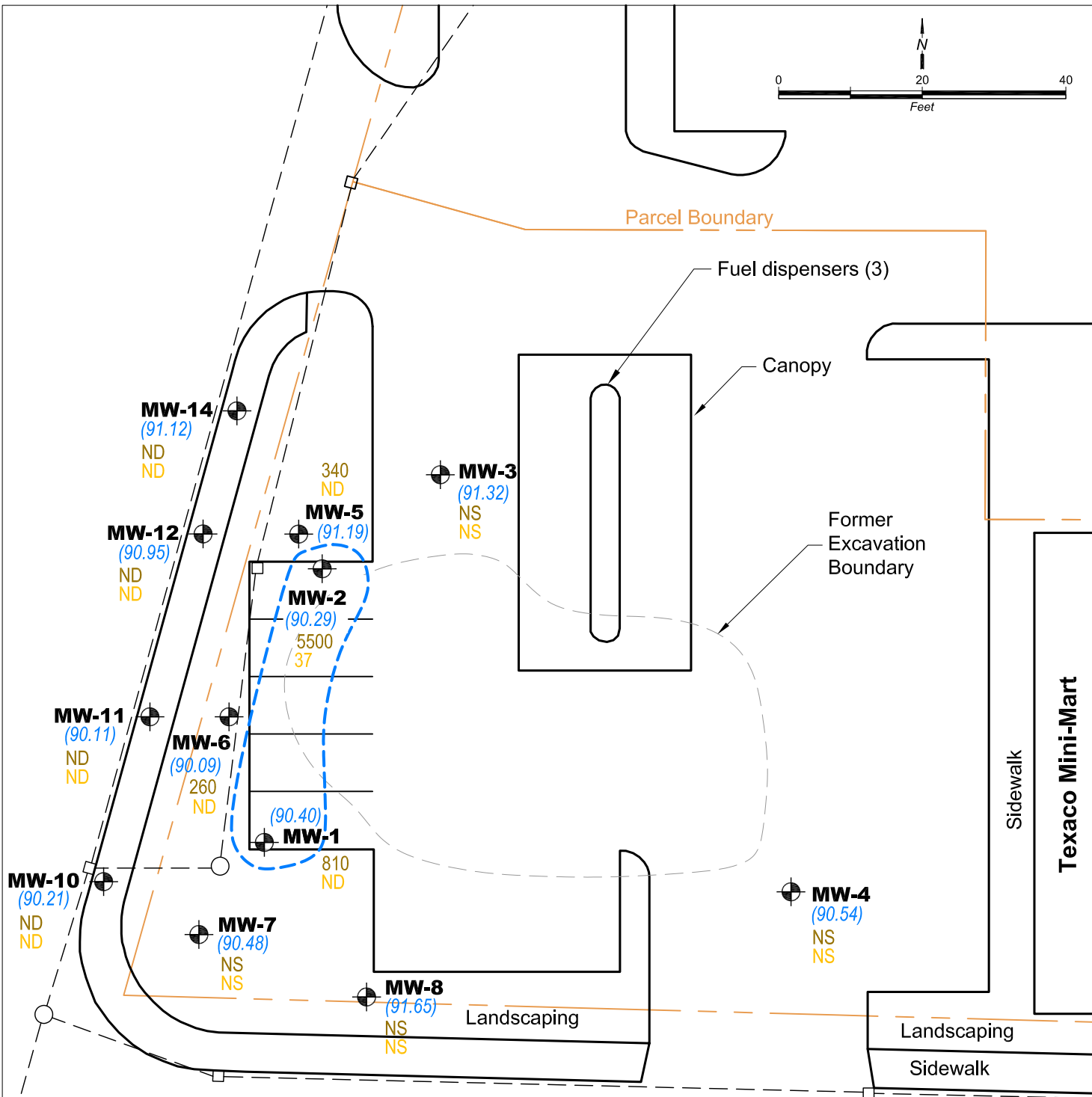
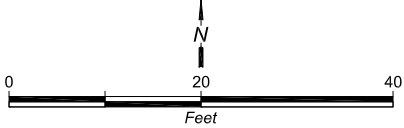


Legend

- MW-1** Monitoring Well
- (89.29)** Groundwater Elevation
- Manhole
- Catch Basin
- Storm Drain
- Inferred Extent of Groundwater Exceeding MTCA Method A Cleanup Levels for Gasoline and Benzene (800 µg/L and 5 µg/L, respectively)
- 5500** Concentration of Gasoline in Groundwater (µg/L)
- 37** Concentration of Benzene in Groundwater (µg/L)
- ND** Not Detected
- NS** Not Sampled

Inferred Lateral Extent of Groundwater Impacts
September 2016
 Remedial Investigation Report
 and Focused Feasibility Study
 Town Center Mini-Mart
 Duvall, Washington

	Mar-2017	BY: EJM	FIGURE NO. 8
	PROJECT NO. 080258	REV BY: EJM/SCC	



Legend

- MW-1** Monitoring Well
- (89.29)** Groundwater Elevation
- Manhole
- Catch Basin
- Storm Drain
- Inferred Extent of Groundwater Exceeding MTCA Method A Cleanup Levels for Gasoline and Benzene (800 µg/L and 5 µg/L, respectively)
- 5500** Concentration of Gasoline in Groundwater (µg/L)
- 37** Concentration of Benzene in Groundwater (µg/L)
- ND** Not Detected
- NS** Not Sampled

Inferred Lateral Extent of Groundwater Impacts

December 2016

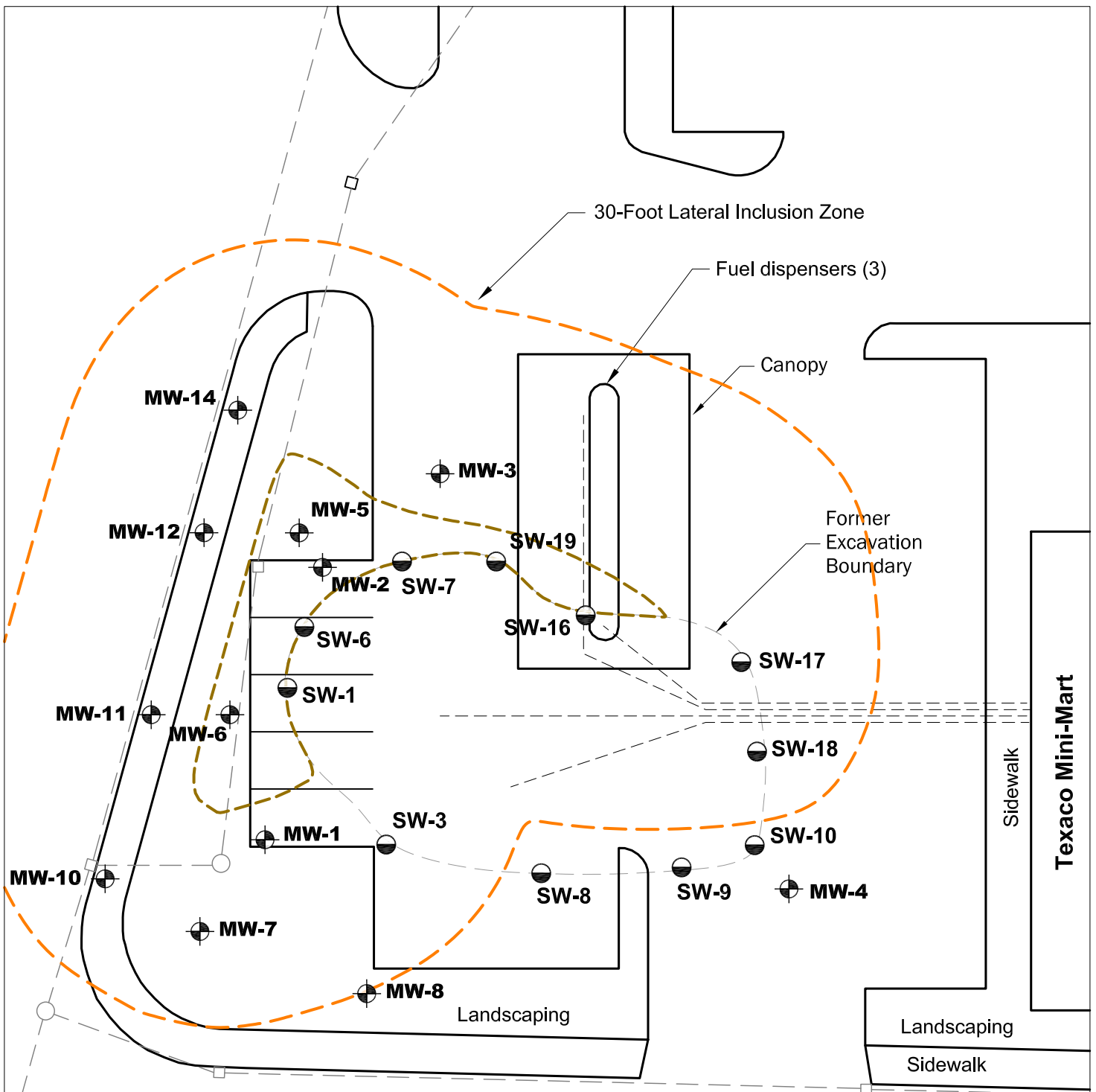
Remedial Investigation Report
and Focused Feasibility Study
Town Center Mini-Mart
Duvall, Washington



Mar-2017
PROJECT NO.
080258

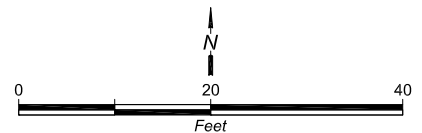
BY:
EJM
REV BY:
EJM/SCC

FIGURE NO.
9



Legend

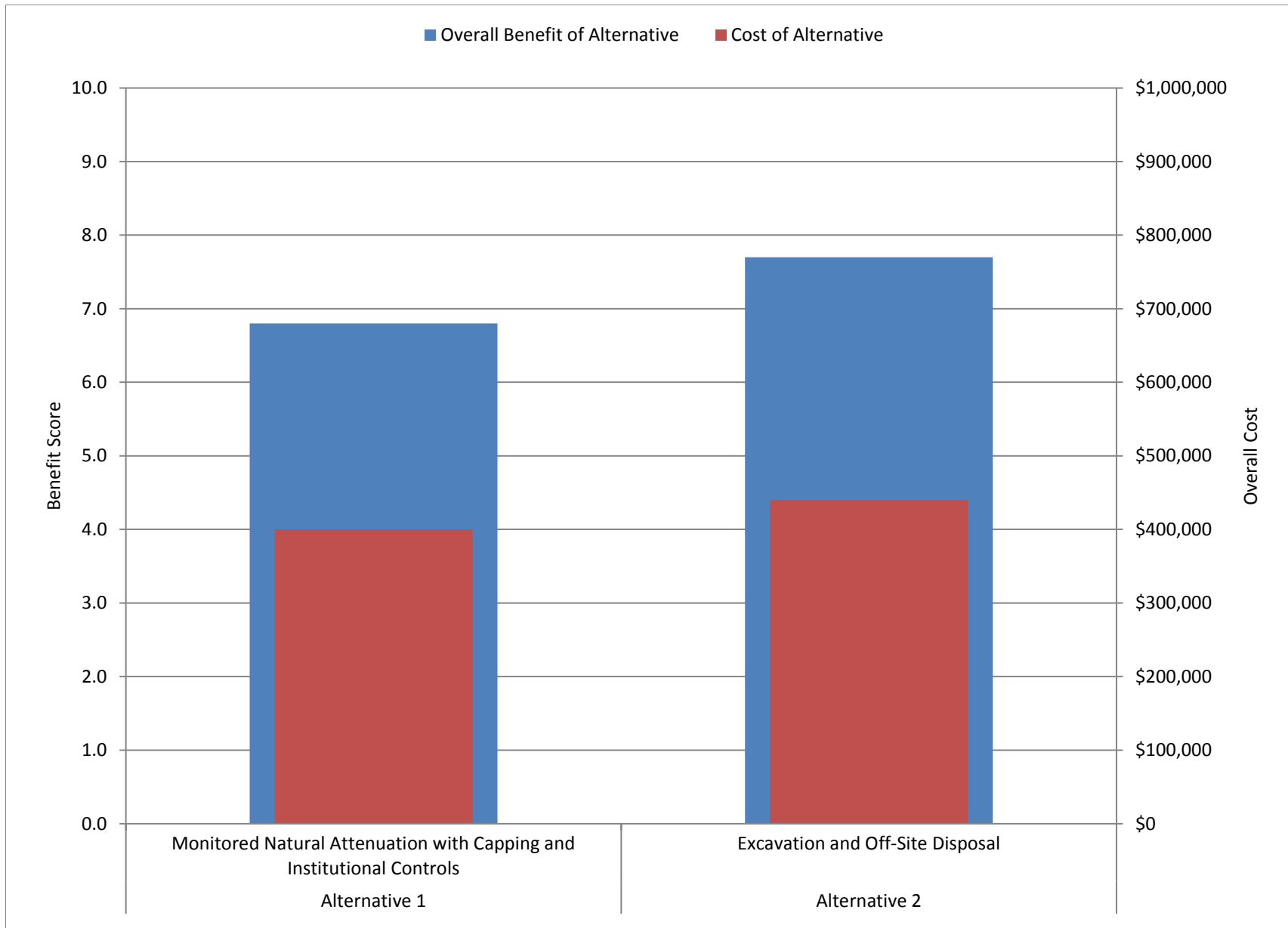
- MW-1** Monitoring Well
- SW-1** Sidewall Soil Sample
- Manhole
- Catch Basin
- 30-foot Lateral Inclusion Boundary
- Inferred Extent of Benzene or Gasoline Range Hydrocarbons in Soil Exceeding MTCA Method A Cleanup Levels
- Power and Control for Tanks and Pumps
- Storm Drain



Vapor Intrusion Lateral Inclusion Zone
 Remedial Investigation
 and Focused Feasibility Study
 Town Center Mini-Mart
 Duvall, Washington

	Mar-2017	BY: EJM	FIGURE NO. 10
	PROJECT NO. 080258	REV BY: ELG/SCC	

CAD Path: Q:\Town Center Mini Mart\080258 Town Center Mini Mart\2017-02_080258_RIFIS Inclusion Zones.dwg Fig 10 - Inclusion Zone || Date Saved: Mar 16, 2017 5:14pm || User: scudd



APPENDIX A

Laboratory Analytical Reports – 2015 and 2016



April 3, 2015

Mr. Eric Marhofer
Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

Dear Mr. Marhofer,

On March 25th, 9 samples were received by our laboratory and assigned our laboratory project number EV15030138. The project was identified as your Town Center Mini-Mart. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
 401 Second Ave. S., Suite 201
 Seattle, WA 98104

CLIENT CONTACT: Eric Marhofer
 CLIENT PROJECT: Town Center Mini-Mart
 CLIENT SAMPLE ID: MW-1-032415

DATE: 4/3/2015
 ALS JOB#: EV15030138
 ALS SAMPLE#: EV15030138-01
 DATE RECEIVED: 03/25/2015
 COLLECTION DATE: 3/24/2015 3:35:00 PM
 WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	160	50	1	ug/L	03/26/2015	PAB
Benzene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Toluene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Ethylbenzene	EPA-8260	2.2	2.0	1	ug/L	04/01/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	ug/L	04/01/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	94.0	03/26/2015	PAB
Toluene-d8	EPA-8260	99.8	04/01/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
 Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV15030138-02
CLIENT SAMPLE ID	MW-2-032415	DATE RECEIVED:	03/25/2015
		COLLECTION DATE:	3/24/2015 12:55:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	17000	1000	20	ug/L	03/25/2015	PAB
Benzene	EPA-8260	U	100	50	ug/L	04/02/2015	DLC
Toluene	EPA-8260	32	2.0	1	ug/L	04/01/2015	DLC
Ethylbenzene	EPA-8260	1500	100	50	ug/L	04/02/2015	DLC
m,p-Xylene	EPA-8260	1900	200	50	ug/L	04/02/2015	DLC
o-Xylene	EPA-8260	U	100	50	ug/L	04/02/2015	DLC
Naphthalene	EPA-8260	330	100	50	ug/L	04/02/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 20X Dilution	NWTPH-GX	117	03/25/2015	PAB
Toluene-d8	EPA-8260	101	04/01/2015	DLC
Toluene-d8 50X Dilution	EPA-8260	99.1	04/02/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV15030138-03
CLIENT SAMPLE ID	MW-3-032415	DATE RECEIVED:	03/25/2015
		COLLECTION DATE:	3/24/2015 3:15:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	ug/L	03/25/2015	PAB
Benzene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Toluene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	ug/L	04/01/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Naphthalene	EPA-8260	3.7	2.0	1	ug/L	04/01/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	108	03/25/2015	PAB
Toluene-d8	EPA-8260	99.8	04/01/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV15030138-04
CLIENT SAMPLE ID	MW-4-032415	DATE RECEIVED:	03/25/2015
		COLLECTION DATE:	3/24/2015 2:45:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	ug/L	03/25/2015	PAB
Benzene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Toluene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	ug/L	04/01/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	108	03/25/2015	PAB
Toluene-d8	EPA-8260	99.8	04/01/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV15030138-05
CLIENT SAMPLE ID	MW-5-032415	DATE RECEIVED:	03/25/2015
		COLLECTION DATE:	3/24/2015 1:45:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	520	50	1	ug/L	03/25/2015	PAB
Benzene	EPA-8260	130	40	20	ug/L	04/02/2015	DLC
Toluene	EPA-8260	48	40	20	ug/L	04/02/2015	DLC
Ethylbenzene	EPA-8260	2700	400	200	ug/L	04/02/2015	DLC
m,p-Xylene	EPA-8260	8600	800	200	ug/L	04/02/2015	DLC
o-Xylene	EPA-8260	1200	400	200	ug/L	04/02/2015	DLC
Naphthalene	EPA-8260	650	40	20	ug/L	04/02/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	113	03/25/2015	PAB
Toluene-d8	EPA-8260	101	04/01/2015	DLC
Toluene-d8 200X Dilution	EPA-8260	100	04/02/2015	DLC
Toluene-d8 20X Dilution	EPA-8260	99.6	04/02/2015	DLC

Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV15030138-06
CLIENT SAMPLE ID	MW-6-032415	DATE RECEIVED:	03/25/2015
		COLLECTION DATE:	3/24/2015 2:00:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	8200	500	10	ug/L	03/26/2015	PAB
Benzene	EPA-8260	59	40	20	ug/L	04/02/2015	DLC
Toluene	EPA-8260	31	2.0	1	ug/L	04/01/2015	DLC
Ethylbenzene	EPA-8260	570	40	20	ug/L	04/02/2015	DLC
m,p-Xylene	EPA-8260	1400	80	20	ug/L	04/02/2015	DLC
o-Xylene	EPA-8260	170	40	20	ug/L	04/02/2015	DLC
Naphthalene	EPA-8260	170	40	20	ug/L	04/02/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 10X Dilution	NWTPH-GX	107	03/26/2015	PAB
Toluene-d8	EPA-8260	101	04/01/2015	DLC
Toluene-d8 20X Dilution	EPA-8260	101	04/02/2015	DLC

Chromatogram indicates that it is likely that sample contains weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV15030138-07
CLIENT SAMPLE ID	MW-7-032415	DATE RECEIVED:	03/25/2015
		COLLECTION DATE:	3/24/2015 4:15:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	ug/L	03/25/2015	PAB
Benzene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC
Toluene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	ug/L	04/02/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	113	03/25/2015	PAB
Toluene-d8	EPA-8260	99.2	04/02/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV15030138-08
CLIENT SAMPLE ID	MW-8-032415	DATE RECEIVED:	03/25/2015
		COLLECTION DATE:	3/24/2015 2:20:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	59	50	1	ug/L	03/25/2015	PAB
Benzene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC
Toluene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC
Ethylbenzene	EPA-8260	2.0	2.0	1	ug/L	04/02/2015	DLC
m,p-Xylene	EPA-8260	5.4	4.0	1	ug/L	04/02/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	ug/L	04/02/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	111	03/25/2015	PAB
Toluene-d8	EPA-8260	100	04/02/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV15030138-09
CLIENT SAMPLE ID	Trip Blanks	DATE RECEIVED:	03/25/2015
		COLLECTION DATE:	3/24/2015
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	ug/L	03/25/2015	PAB
Benzene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Toluene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	ug/L	04/01/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	ug/L	04/01/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	105	03/25/2015	PAB
Toluene-d8	EPA-8260	99.9	04/01/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	4/3/2015
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV15030138
CLIENT PROJECT:	Town Center Mini-Mart	WDOE ACCREDITATION:	C601

LABORATORY BLANK RESULTS

MBG-032515W2 - Batch 91756 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	ug/L	03/25/2015	PAB

U - Analyte analyzed for but not detected at level above reporting limit.

MB-033115W - Batch 92033 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene	EPA-8260	U	2.0	1	ug/L	03/31/2015	DLC
Benzene	EPA-8260	U	2.0	1	ug/L	03/31/2015	DLC
Toluene	EPA-8260	U	2.0	1	ug/L	03/31/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	ug/L	03/31/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	ug/L	03/31/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	ug/L	03/31/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	ug/L	03/31/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

DATE: 4/3/2015
ALS SDG#: EV15030138
WDOE ACCREDITATION: C601

CLIENT CONTACT: Eric Marhofer
CLIENT PROJECT: Town Center Mini-Mart

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 91756 - Water by NWTPH-GX

Table with 7 columns: SPIKED COMPOUND, METHOD, %REC, RPD, QUAL, ANALYSIS DATE, ANALYSIS BY. Rows include TPH-Volatile Range - BS and TPH-Volatile Range - BSD.

ALS Test Batch ID: 92033 - Water by EPA-8260

Table with 7 columns: SPIKED COMPOUND, METHOD, %REC, RPD, QUAL, ANALYSIS DATE, ANALYSIS BY. Rows include 1,1-Dichloroethene - BS, 1,1-Dichloroethene - BSD, Benzene - BS, Benzene - BSD, Toluene - BS, and Toluene - BSD.

APPROVED BY

Handwritten signature of Paul Bagum

Laboratory Director



June 23, 2015

Mr. Eric Marhofer
Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

Dear Mr. Marhofer,

On June 18th, 8 samples were received by our laboratory and assigned our laboratory project number EV15060120. The project was identified as your Town Center Mini-Mart (TCMM). The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
 401 Second Ave. S., Suite 201
 Seattle, WA 98104

CLIENT CONTACT: Eric Marhofer
 CLIENT PROJECT: Town Center Mini-Mart (TCMM)
 CLIENT SAMPLE ID: MW-1-061715

DATE: 6/23/2015
 ALS JOB#: EV15060120
 ALS SAMPLE#: EV15060120-01
 DATE RECEIVED: 06/18/2015
 COLLECTION DATE: 6/17/2015 2:05:00 PM
 WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	250	50	1	UG/L	06/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Toluene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Ethylbenzene	EPA-8260	14	2.0	1	UG/L	06/21/2015	CCN
m,p-Xylene	EPA-8260	4.8	4.0	1	UG/L	06/21/2015	CCN
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Naphthalene	EPA-8260	4.0	2.0	1	UG/L	06/21/2015	CCN

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	140	06/18/2015	PAB
Toluene-d8	EPA-8260	106	06/21/2015	CCN

U - Analyte analyzed for but not detected at level above reporting limit.
 Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/23/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15060120
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15060120-02
CLIENT SAMPLE ID	MW-2-061715	DATE RECEIVED:	06/18/2015
		COLLECTION DATE:	6/17/2015 12:10:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	2200	500	10	UG/L	06/18/2015	PAB
Benzene	EPA-8260	9.0	2.0	1	UG/L	06/21/2015	CCN
Toluene	EPA-8260	3.1	2.0	1	UG/L	06/21/2015	CCN
Ethylbenzene	EPA-8260	370	20	10	UG/L	06/22/2015	CCN
m,p-Xylene	EPA-8260	310	40	10	UG/L	06/22/2015	CCN
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Naphthalene	EPA-8260	87	20	10	UG/L	06/22/2015	CCN

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 10X Dilution	NWTPH-GX	113	06/18/2015	PAB
Toluene-d8	EPA-8260	102	06/21/2015	CCN
Toluene-d8 10X Dilution	EPA-8260	103	06/22/2015	CCN

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/23/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15060120
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15060120-03
CLIENT SAMPLE ID	MW-3-061715	DATE RECEIVED:	06/18/2015
		COLLECTION DATE:	6/17/2015 2:20:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	06/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Toluene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/21/2015	CCN
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Naphthalene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	108	06/18/2015	PAB
Toluene-d8	EPA-8260	103	06/21/2015	CCN

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/23/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15060120
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15060120-04
CLIENT SAMPLE ID	MW-4-061715	DATE RECEIVED:	06/18/2015
		COLLECTION DATE:	6/17/2015 12:55:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	06/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Toluene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/21/2015	CCN
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN
Naphthalene	EPA-8260	U	2.0	1	UG/L	06/21/2015	CCN

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	111	06/18/2015	PAB
Toluene-d8	EPA-8260	102	06/21/2015	CCN

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/23/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15060120
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15060120-05
CLIENT SAMPLE ID	MW-5-061715	DATE RECEIVED:	06/18/2015
		COLLECTION DATE:	6/17/2015 1:10:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	69000	5000	100	UG/L	06/19/2015	PAB
Benzene	EPA-8260	170	100	100	UG/L	06/22/2015	CCN
Toluene	EPA-8260	67	8.0	4	UG/L	06/22/2015	CCN
Ethylbenzene	EPA-8260	3500	200	100	UG/L	06/22/2015	CCN
m,p-Xylene	EPA-8260	5500	1600	400	UG/L	06/23/2015	CCN
o-Xylene	EPA-8260	1900	200	100	UG/L	06/22/2015	CCN
Naphthalene	EPA-8260	770	200	100	UG/L	06/22/2015	CCN

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 100X Dilution	NWTPH-GX	123	06/19/2015	PAB
Toluene-d8 100X Dilution	EPA-8260	102	06/22/2015	CCN
Toluene-d8 4X Dilution	EPA-8260	101	06/22/2015	CCN
Toluene-d8 400X Dilution	EPA-8260	104	06/23/2015	CCN

Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/23/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15060120
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15060120-06
CLIENT SAMPLE ID	MW-6-061715	DATE RECEIVED:	06/18/2015
		COLLECTION DATE:	6/17/2015 12:25:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	9900	250	5	UG/L	06/18/2015	PAB
Benzene	EPA-8260	41	40	40	UG/L	06/22/2015	CCN
Toluene	EPA-8260	19	2.0	1	UG/L	06/21/2015	CCN
Ethylbenzene	EPA-8260	620	80	40	UG/L	06/22/2015	CCN
m,p-Xylene	EPA-8260	1000	160	40	UG/L	06/22/2015	CCN
o-Xylene	EPA-8260	96	80	40	UG/L	06/22/2015	CCN
Naphthalene	EPA-8260	140	80	40	UG/L	06/22/2015	CCN

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 5X Dilution	NWTPH-GX	166 GS3	06/18/2015	PAB
Toluene-d8	EPA-8260	105	06/21/2015	CCN
Toluene-d8 40X Dilution	EPA-8260	102	06/22/2015	CCN

GS3 - Surrogate outside of control limits due to coeluting compounds.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/23/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15060120
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15060120-07
CLIENT SAMPLE ID	MW-7-061715	DATE RECEIVED:	06/18/2015
		COLLECTION DATE:	6/17/2015 1:55:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	06/19/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN
Toluene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/22/2015	CCN
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN
Naphthalene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	103	06/19/2015	PAB
Toluene-d8	EPA-8260	103	06/22/2015	CCN

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/23/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15060120
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15060120-08
CLIENT SAMPLE ID	MW-8-061715	DATE RECEIVED:	06/18/2015
		COLLECTION DATE:	6/17/2015 3:30:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	06/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN
Toluene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/22/2015	CCN
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN
Naphthalene	EPA-8260	U	2.0	1	UG/L	06/22/2015	CCN

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	108	06/18/2015	PAB
Toluene-d8	EPA-8260	102	06/22/2015	CCN

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/23/2015
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV15060120
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	WDOE ACCREDITATION:	C601

LABORATORY BLANK RESULTS

MBG-061715W - Batch 94373 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	06/17/2015	PAB

U - Analyte analyzed for but not detected at level above reporting limit.

MB-062015W - Batch 94553 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	06/20/2015	CCN
Benzene	EPA-8260	U	1.0	1	UG/L	06/20/2015	CCN
Toluene	EPA-8260	U	2.0	1	UG/L	06/20/2015	CCN
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	06/20/2015	CCN
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/20/2015	CCN
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/20/2015	CCN
Naphthalene	EPA-8260	U	2.0	1	UG/L	06/20/2015	CCN

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104
CLIENT CONTACT: Eric Marhofer
CLIENT PROJECT: Town Center Mini-Mart (TCMM)

DATE: 6/23/2015
ALS SDG#: EV15060120
WDOE ACCREDITATION: C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 94373 - Water by NWTPH-GX

Table with 7 columns: SPIKED COMPOUND, METHOD, %REC, RPD, QUAL, ANALYSIS DATE, ANALYSIS BY. Rows include TPH-Volatile Range - BS and TPH-Volatile Range - BSD.

ALS Test Batch ID: 94553 - Water by EPA-8260

Table with 7 columns: SPIKED COMPOUND, METHOD, %REC, RPD, QUAL, ANALYSIS DATE, ANALYSIS BY. Rows include 1,1-Dichloroethene - BS, 1,1-Dichloroethene - BSD, Benzene - BS, Benzene - BSD, Toluene - BS, and Toluene - BSD.

APPROVED BY

Handwritten signature of Paul Bagum

Laboratory Director



ALS Environmental
 8620 Holly Drive, Suite 100
 Everett, WA 98208
 Phone (425) 356-2600
 Fax (425) 356-2626
 http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only)

EVI5060120

Date **6/18/15** Page **1** Of **1**

PROJECT ID: REPORT TO COMPANY:	ANALYSIS REQUESTED							OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?										
	PROJECT MANAGER:	ADDRESS:	PHONE:	P.O. #:	INVOICE TO COMPANY:	ATTENTION:	ADDRESS:													
Mini-Ment (TC MM)	Aspect	Eric Marhofer	401 2nd Ave S, suite 201	Seattle, WA 98104	(206) 838-6582	080258	Colony Insurance	Claim # 038397												
SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NMTPH-HCID	NMTPH-DX	NMTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 <input type="checkbox"/> EPA-8260 <input type="checkbox"/>	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM <input type="checkbox"/>	PCB <input type="checkbox"/> Pesticides <input type="checkbox"/> by EPA 8081/8082	Metals-MTCA-5 <input type="checkbox"/> RCRA-8 <input type="checkbox"/> Pn Pol <input type="checkbox"/> TAL <input type="checkbox"/>	Metals Other (Specify)	TCLP-Metals <input type="checkbox"/> VOA <input type="checkbox"/> Semi-Vol <input type="checkbox"/> Pest <input type="checkbox"/> Herbs <input type="checkbox"/>	
1. MW-1-061715	6/17/15	1405	Water	1		X														
2. MW-2-061715		1210		2		X														
3. MW-3-061715		1420		3		X														
4. MW-4-061715		1255		4		X														
5. MW-5-061715		1310		5		X														
6. MW-6-061715		1225		6		X														
7. MW-7-061715		1355		7		X														
8. MW-8-061715		1530		8		X														
9.																				
10.																				

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):
 1. Relinquished By: **Matthew M Seuri, Aspect, 6/18/15 0845**
 Received By: **[Signature]**
 2. Relinquished By: **[Signature]**
 Received By: _____

TURNAROUND REQUESTED in Business Days*
 OTHER: _____
 Specify: _____
 Organic, Metals & Inorganic Analysis
 10 Standard 5 3 2 1
 Fuels & Hydrocarbon Analysis
 5 Standard 3 1

*Turnaround request less than standard may incur Rush Charges

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 22, 2015

Eric Marhofer, Project Manager
Aspect Consulting, LLC
401 2nd Ave S, Suite 201
Seattle, WA 98104

Dear Mr. Marhofer:

Included are the results from the testing of material submitted on September 15, 2015 from the Town Center Mini Mart 080258, F&BI 509242 project. There are 13 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: data@aspectconsulting.com, Parker Wittman
ASP0922R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 15, 2015 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Town Center Mini Mart 080258, F&BI 509242 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Aspect Consulting, LLC</u>
509242 -01	MW-9-6
509242 -02	MW-10-5.5
509242 -03	MW-11-3.5
509242 -04	MW-12-5.5
509242 -05	MW-13-5
509242 -06	AP-11-6.5
509242 -07	MW-14-5.5

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/22/15

Date Received: 09/15/15

Project: Town Center Mini Mart 080258, F&BI 509242

Date Extracted: 09/16/15

Date Analyzed: 09/16/15

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 58-139)
MW-9-6 509242-01	<2	94
MW-10-5.5 509242-02	<2	93
MW-11-3.5 509242-03	<2	96
MW-12-5.5 509242-04	6.3	97
MW-13-5 509242-05	<2	95
AP-11-6.5 509242-06	<2	89
MW-14-5.5 509242-07	<2	94
Method Blank 05-1878 MB	<2	105

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-9-6	Client:	Aspect Consulting, LLC
Date Received:	09/15/15	Project:	Town Center Mini Mart 080258, F&BI 509242
Date Extracted:	09/16/15	Lab ID:	509242-01
Date Analyzed:	09/16/15	Data File:	091608.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-10-5.5	Client:	Aspect Consulting, LLC
Date Received:	09/15/15	Project:	Town Center Mini Mart 080258, F&BI 509242
Date Extracted:	09/16/15	Lab ID:	509242-02
Date Analyzed:	09/16/15	Data File:	091609.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-11-3.5	Client:	Aspect Consulting, LLC
Date Received:	09/15/15	Project:	Town Center Mini Mart 080258, F&BI 509242
Date Extracted:	09/16/15	Lab ID:	509242-03
Date Analyzed:	09/16/15	Data File:	091610.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-12-5.5	Client:	Aspect Consulting, LLC
Date Received:	09/15/15	Project:	Town Center Mini Mart 080258, F&BI 509242
Date Extracted:	09/16/15	Lab ID:	509242-04
Date Analyzed:	09/16/15	Data File:	091611.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-13-5	Client:	Aspect Consulting, LLC
Date Received:	09/15/15	Project:	Town Center Mini Mart 080258, F&BI 509242
Date Extracted:	09/16/15	Lab ID:	509242-05
Date Analyzed:	09/16/15	Data File:	091612.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	AP-11-6.5	Client:	Aspect Consulting, LLC
Date Received:	09/15/15	Project:	Town Center Mini Mart 080258, F&BI 509242
Date Extracted:	09/16/15	Lab ID:	509242-06
Date Analyzed:	09/16/15	Data File:	091613.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-14-5.5	Client:	Aspect Consulting, LLC
Date Received:	09/15/15	Project:	Town Center Mini Mart 080258, F&BI 509242
Date Extracted:	09/16/15	Lab ID:	509242-07
Date Analyzed:	09/16/15	Data File:	091614.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Town Center Mini Mart 080258, F&BI 509242
Date Extracted:	09/16/15	Lab ID:	05-1895 mb
Date Analyzed:	09/16/15	Data File:	091607.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/22/15

Date Received: 09/15/15

Project: Town Center Mini Mart 080258, F&BI 509242

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 509200-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/22/15

Date Received: 09/15/15

Project: Town Center Mini Mart 080258, F&BI 509242

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR VOLATILES BY EPA METHOD 8260C**

Laboratory Code: 509242-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Benzene	mg/kg (ppm)	2.5	<0.03	74	29-129
Toluene	mg/kg (ppm)	2.5	<0.05	74	35-130
Ethylbenzene	mg/kg (ppm)	2.5	<0.05	75	32-137
m,p-Xylene	mg/kg (ppm)	5	<0.1	79	34-136
o-Xylene	mg/kg (ppm)	2.5	<0.05	78	33-134
Naphthalene	mg/kg (ppm)	2.5	<0.05	68	14-157

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benzene	mg/kg (ppm)	2.5	104	102	68-114	2
Toluene	mg/kg (ppm)	2.5	100	97	66-126	3
Ethylbenzene	mg/kg (ppm)	2.5	101	98	64-123	3
m,p-Xylene	mg/kg (ppm)	5	107	103	78-122	4
o-Xylene	mg/kg (ppm)	2.5	103	101	77-124	2
Naphthalene	mg/kg (ppm)	2.5	88	86	63-140	2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The compound is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

509 242

SAMPLE CHAIN OF CUSTODY

NE 09-15-15

182

Send Report To ERIC MAUROFFER

Company ASPECT CONSULTING

Address 401 2nd Ave S. Suite 201

City, State, ZIP Seattle, WA 98104

Phone # _____ Fax # _____

SAMPLERS (signature) [Signature]

PROJECT NAME/NO. Town Center Mini Mart

PO# 080258

REMARKS

SNOW HOLD

Page # 1 of 1

TURNAROUND TIME

Standard (2 Weeks)

RUSH

Rush charges authorized by _____

SAMPLE DISPOSAL

Dispose after 30 days

Return samples

Will call with instructions

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED						Notes	
						TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS		naphthalene
MW-9-6		01/09/14/15	1015	SOIL	4	X	X	X					
MW-10-5.5	02 T		1250			X	X	X					
MW-11-3.5	03		1130			X	X	X					
MW-12-5.5	04		1355			X	X	X					
MW-13-5	05	9/15/15	0930			X	X	X					
MW-14-5.5 AP-11-6.5	06		1000			X	X	X					
MW-15-5.5	07		1140			X	X	X					
14													

per AT 9/17/15

per previous signatures

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Reinquished by:

AMYA TICO

ASPECT

9/15/15

1510

Received by:

[Signature]

ASPECT

9/15/15

1510

Reinquished by:

[Signature]

ASPECT

9/15/15

1510

Received by:

[Signature]

ASPECT

9/15/15

1510



September 30, 2015

Mr. Eric Marhofer
Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

Dear Mr. Marhofer,

On September 22nd, 14 samples were received by our laboratory and assigned our laboratory project number EV15090137. The project was identified as your Town Center Mini-Mart (TCMM). The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-01
CLIENT SAMPLE ID	MW-1-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 12:00:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	400	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
Ethylbenzene	EPA-8260	36	20	10	UG/L	09/30/2015	DLC
m,p-Xylene	EPA-8260	52	4.0	1	UG/L	09/30/2015	DLC
o-Xylene	EPA-8260	7.1	2.0	1	UG/L	09/30/2015	DLC
Naphthalene	EPA-8260	9.3	2.0	1	UG/L	09/30/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	106	09/22/2015	PAB
Toluene-d8 10X Dilution	EPA-8260	97.5	09/30/2015	DLC
Toluene-d8	EPA-8260	97.5	09/30/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-02
CLIENT SAMPLE ID	MW-2-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 11:45:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	890	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	6.5	2.0	1	UG/L	09/26/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
Ethylbenzene	EPA-8260	110	20	10	UG/L	09/29/2015	DLC
m,p-Xylene	EPA-8260	26	4.0	1	UG/L	09/26/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
Naphthalene	EPA-8260	19	2.0	1	UG/L	09/26/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	107	09/22/2015	PAB
Toluene-d8	EPA-8260	100	09/26/2015	DLC
Toluene-d8 10X Dilution	EPA-8260	97.2	09/29/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-03
CLIENT SAMPLE ID	MW-3-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 1:10:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/26/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	90.9	09/22/2015	PAB
Toluene-d8	EPA-8260	100	09/26/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-04
CLIENT SAMPLE ID	MW-4-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 12:40:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/26/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/26/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	89.6	09/22/2015	PAB
Toluene-d8	EPA-8260	99.8	09/26/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-05
CLIENT SAMPLE ID	MW-5-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 12:00:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	9200	500	10	UG/L	09/23/2015	PAB
Benzene	EPA-8260	15	2.0	1	UG/L	09/26/2015	DLC
Toluene	EPA-8260	12	2.0	1	UG/L	09/26/2015	DLC
Ethylbenzene	EPA-8260	290	20	10	UG/L	09/29/2015	DLC
m,p-Xylene	EPA-8260	1400	400	100	UG/L	09/29/2015	DLC
o-Xylene	EPA-8260	210	20	10	UG/L	09/29/2015	DLC
Naphthalene	EPA-8260	100	20	10	UG/L	09/29/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 10X Dilution	NWTPH-GX	94.4	09/23/2015	PAB
Toluene-d8	EPA-8260	98.5	09/26/2015	DLC
Toluene-d8 100X Dilution	EPA-8260	97.3	09/29/2015	DLC
Toluene-d8 10X Dilution	EPA-8260	96.8	09/29/2015	DLC

Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-06
CLIENT SAMPLE ID	MW-6-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 12:55:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	440	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	3.8	2.0	1	UG/L	09/29/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Ethylbenzene	EPA-8260	32	20	10	UG/L	09/30/2015	DLC
m,p-Xylene	EPA-8260	58	4.0	1	UG/L	09/29/2015	DLC
o-Xylene	EPA-8260	2.7	2.0	1	UG/L	09/29/2015	DLC
Naphthalene	EPA-8260	11	2.0	1	UG/L	09/29/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	126	09/22/2015	PAB
Toluene-d8	EPA-8260	99.8	09/29/2015	DLC
Toluene-d8 10X Dilution	EPA-8260	97.2	09/30/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-07
CLIENT SAMPLE ID	MW-7-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 1:35:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/29/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	89.0	09/22/2015	PAB
Toluene-d8	EPA-8260	98.7	09/29/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-08
CLIENT SAMPLE ID	MW-8-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 11:25:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/29/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	89.0	09/22/2015	PAB
Toluene-d8	EPA-8260	98.1	09/29/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-09
CLIENT SAMPLE ID	MW-9-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 11:40:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/29/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	88.2	09/22/2015	PAB
Toluene-d8	EPA-8260	98.4	09/29/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-10
CLIENT SAMPLE ID	MW-10-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 1:40:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/23/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/29/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	85.2	09/23/2015	PAB
Toluene-d8	EPA-8260	97.3	09/29/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-11
CLIENT SAMPLE ID	MW-11-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 1:15:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/23/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/30/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	87.6	09/23/2015	PAB
Toluene-d8	EPA-8260	98.6	09/30/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-12
CLIENT SAMPLE ID	MW-12-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 12:30:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	340	50	1	UG/L	09/23/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/30/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/30/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	100	09/23/2015	PAB
Toluene-d8	EPA-8260	95.8	09/30/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-13
CLIENT SAMPLE ID	MW-14-092115	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015 12:15:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	10000	500	10	UG/L	09/23/2015	PAB
Benzene	EPA-8260	52	20	10	UG/L	09/29/2015	DLC
Toluene	EPA-8260	16	2.0	1	UG/L	09/30/2015	DLC
Ethylbenzene	EPA-8260	670	200	100	UG/L	09/29/2015	DLC
m,p-Xylene	EPA-8260	660	40	10	UG/L	09/29/2015	DLC
o-Xylene	EPA-8260	20	2.0	1	UG/L	09/30/2015	DLC
Naphthalene	EPA-8260	110	20	10	UG/L	09/29/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 10X Dilution	NWTPH-GX	110	09/23/2015	PAB
Toluene-d8 100X Dilution	EPA-8260	97.3	09/29/2015	DLC
Toluene-d8 10X Dilution	EPA-8260	99.1	09/29/2015	DLC
Toluene-d8	EPA-8260	97.5	09/30/2015	DLC

Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/30/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15090137
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15090137-14
CLIENT SAMPLE ID	Trip Blanks	DATE RECEIVED:	09/22/2015
		COLLECTION DATE:	9/21/2015
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/22/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/29/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/29/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	89.6	09/22/2015	PAB
Toluene-d8	EPA-8260	97.8	09/29/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
 401 Second Ave. S., Suite 201
 Seattle, WA 98104

CLIENT CONTACT: Eric Marhofer
 CLIENT PROJECT: Town Center Mini-Mart (TCMM)

DATE: 9/30/2015
 ALS SDG#: EV15090137
 WDOE ACCREDITATION: C601

LABORATORY BLANK RESULTS

MBG-092215W - Batch 97333 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	QUAL	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U		UG/L	50	09/22/2015	PAB

U - Analyte analyzed for but not detected at level above reporting limit.

MB-092515W2 - Batch 97524 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	QUAL	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene	EPA-8260	U		UG/L	2.0	09/25/2015	DLC
Benzene	EPA-8260	U		UG/L	2.0	09/25/2015	DLC
Toluene	EPA-8260	U		UG/L	2.0	09/25/2015	DLC
Ethylbenzene	EPA-8260	U		UG/L	2.0	09/25/2015	DLC
m,p-Xylene	EPA-8260	U		UG/L	4.0	09/25/2015	DLC
o-Xylene	EPA-8260	U		UG/L	2.0	09/25/2015	DLC
Naphthalene	EPA-8260	U		UG/L	2.0	09/25/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104
CLIENT CONTACT: Eric Marhofer
CLIENT PROJECT: Town Center Mini-Mart (TCMM)

DATE: 9/30/2015
ALS SDG#: EV15090137
WDOE ACCREDITATION: C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 97333 - Water by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range - BS	NWTPH-GX	91.2			09/22/2015	PAB
TPH-Volatile Range - BSD	NWTPH-GX	92.2	1		09/22/2015	PAB

ALS Test Batch ID: 97524 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	EPA-8260	110			09/25/2015	DLC
1,1-Dichloroethene - BSD	EPA-8260	108	2		09/25/2015	DLC
Benzene - BS	EPA-8260	110			09/25/2015	DLC
Benzene - BSD	EPA-8260	108	3		09/25/2015	DLC
Toluene - BS	EPA-8260	95.6			09/25/2015	DLC
Toluene - BSD	EPA-8260	95.4	0		09/25/2015	DLC

APPROVED BY

Laboratory Director



ALS Environmental
 8620 Holly Drive, Suite 100
 Everett, WA 98208
 Phone (425) 356-2600
 Fax (425) 356-2626
 http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only)

EV15090137

Date **9/21/15** Page **2** of **2**

PROJECT INFORMATION				ANALYSIS REQUESTED												OTHER (Specify)							
PROJECT ID:	REPORT TO COMPANY:	PROJECT MANAGER:	ADDRESS:	MTBE by EPA-8021	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semi-volatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM	PCB Pesticides by EPA 8081/8082	Metals-MTCA-5 RCPA-8 Pri Pol TAL	Metals Other (Specify)	TCLP-Metals VOA Semi-Vol Pest Herbs	RECEIVED IN GOOD CONDITION?								
SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NMTPH-HCID	NMTPH-DX	NMTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semi-volatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM	PCB Pesticides by EPA 8081/8082	Metals-MTCA-5 RCPA-8 Pri Pol TAL	Metals Other (Specify)	TCLP-Metals VOA Semi-Vol Pest Herbs	OTHER (Specify)	NUMBER OF CONTAINERS		
1. MW-11-092115	9/21/15	1315	Water	11	X																X	5	
2. MW-12-092115		1230		12	X																X	5	
3. MW-14-092115		1215		13	X																X	5	
4. Trip Blanks		-		14	X																X	2	
5.																							
6.																							
7.																							
8.																							
9.																							
10.																							

PROJECT ID: **Town Center Mini-Mart (TCMM)**
 REPORT TO COMPANY: **Aspect Consulting**
 PROJECT MANAGER: **Eric Marhofer**
 ADDRESS: **401 2nd Ave S, Ste 201
 Seattle, WA 98104**
 PHONE: **(206) 838-6582** FAX:
 P.O. #: **080258** E-MAIL:
 INVOICE TO COMPANY: **Colony Insurance**
 ATTENTION:
 ADDRESS: **claim #038397**

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):
 1. Relinquished By: **Matt M Semi, Aspect, 9/22/15, 0900**
 Received By: **Paul Zog, ALS, 9.27.15, 1750**

TURNAROUND REQUESTED in Business Days*
 OTHER:
 Specify: _____

Organic, Metals & Inorganic Analysis
 10 Standard 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis
 5 Standard 5 3 1 SAME DAY

2. Relinquished By: _____
 Received By: _____

*Turnaround request less than standard may incur Rush Charges



December 21, 2015

Mr. Eric Marhofer
Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

Dear Mr. Marhofer,

On December 17th, 15 samples were received by our laboratory and assigned our laboratory project number EV15120150. The project was identified as your Town Center Mini-Mart (TCMM). The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-01
CLIENT SAMPLE ID	MW-1-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 1:50:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	2000	250	5	UG/L	12/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
Ethylbenzene	EPA-8260	63	20	10	UG/L	12/21/2015	DLC
m,p-Xylene	EPA-8260	89	40	10	UG/L	12/21/2015	DLC
o-Xylene	EPA-8260	9.4	2.0	1	UG/L	12/18/2015	DLC
Naphthalene	EPA-8260	38	2.0	1	UG/L	12/18/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 5X Dilution	NWTPH-GX	105	12/18/2015	PAB
Toluene-d8	EPA-8260	99.1	12/18/2015	DLC
Toluene-d8 10X Dilution	EPA-8260	98.1	12/21/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-02
CLIENT SAMPLE ID	MW-2-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 1:35:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	7100	500	10	UG/L	12/18/2015	PAB
Benzene	EPA-8260	35	2.0	1	UG/L	12/18/2015	DLC
Toluene	EPA-8260	11	2.0	1	UG/L	12/18/2015	DLC
Ethylbenzene	EPA-8260	690	100	50	UG/L	12/21/2015	DLC
m,p-Xylene	EPA-8260	410	200	50	UG/L	12/21/2015	DLC
o-Xylene	EPA-8260	7.7	2.0	1	UG/L	12/18/2015	DLC
Naphthalene	EPA-8260	170	100	50	UG/L	12/21/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 10X Dilution	NWTPH-GX	101	12/18/2015	PAB
Toluene-d8	EPA-8260	97.5	12/18/2015	DLC
Toluene-d8 50X Dilution	EPA-8260	98.9	12/21/2015	DLC

Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-03
CLIENT SAMPLE ID	MW-3-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 2:50:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/18/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	87.8	12/18/2015	PAB
Toluene-d8	EPA-8260	96.8	12/18/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-04
CLIENT SAMPLE ID	MW-4-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 2:35:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/17/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	95.2	12/17/2015	PAB
Toluene-d8	EPA-8260	97.4	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-05
CLIENT SAMPLE ID	MW-5-121415	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/14/2015 12:30:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	370	50	1	UG/L	12/17/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	3.4	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	15	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	3.2	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	97.0	12/17/2015	PAB
Toluene-d8	EPA-8260	97.4	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-06
CLIENT SAMPLE ID	MW-6-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 2:20:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	850	50	1	UG/L	12/17/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	10	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	16	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	3.4	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	111	12/17/2015	PAB
Toluene-d8	EPA-8260	97.6	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-07
CLIENT SAMPLE ID	MW-7-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 3:35:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/17/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	96.6	12/17/2015	PAB
Toluene-d8	EPA-8260	98.3	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-08
CLIENT SAMPLE ID	MW-8-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 2:05:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/17/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	85.2	12/17/2015	PAB
Toluene-d8	EPA-8260	96.9	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-09
CLIENT SAMPLE ID	MW-9-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 1:10:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/17/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	86.6	12/17/2015	PAB
Toluene-d8	EPA-8260	97.3	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-10
CLIENT SAMPLE ID	MW-10-121415	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/14/2015 3:20:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	86.2	12/18/2015	PAB
Toluene-d8	EPA-8260	97.4	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-11
CLIENT SAMPLE ID	MW-11-121415	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/14/2015 2:45:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	83.8	12/18/2015	PAB
Toluene-d8	EPA-8260	97.5	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-12
CLIENT SAMPLE ID	MW-12-121415	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/14/2015 1:45:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	84.2	12/18/2015	PAB
Toluene-d8	EPA-8260	97.8	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-13
CLIENT SAMPLE ID	MW-13-121515	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/15/2015 9:45:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	89.4	12/18/2015	PAB
Toluene-d8	EPA-8260	98.2	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-14
CLIENT SAMPLE ID	MW-14-121415	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/14/2015 1:10:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/18/2015	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/19/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/19/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	86.7	12/18/2015	PAB
Toluene-d8	EPA-8260	97.2	12/19/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV15120150-15
CLIENT SAMPLE ID	Trip Blanks	DATE RECEIVED:	12/17/2015
		COLLECTION DATE:	12/14/2015
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Benzene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/18/2015	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/18/2015	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8	EPA-8260	96.9	12/18/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
 401 Second Ave. S., Suite 201
 Seattle, WA 98104

CLIENT CONTACT: Eric Marhofer
 CLIENT PROJECT: Town Center Mini-Mart (TCMM)

DATE: 12/21/2015
 ALS SDG#: EV15120150
 WDOE ACCREDITATION: C601

LABORATORY BLANK RESULTS

MB-121715W2 - Batch 99939 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	UG/L	50	12/17/2015	PAB

U - Analyte analyzed for but not detected at level above reporting limit.

MB-121815W2 - Batch 99996 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene	EPA-8260	U	UG/L	2.0	12/18/2015	DLC
Benzene	EPA-8260	U	UG/L	2.0	12/18/2015	DLC
Toluene	EPA-8260	U	UG/L	2.0	12/18/2015	DLC
Ethylbenzene	EPA-8260	U	UG/L	2.0	12/18/2015	DLC
m,p-Xylene	EPA-8260	U	UG/L	4.0	12/18/2015	DLC
o-Xylene	EPA-8260	U	UG/L	2.0	12/18/2015	DLC
Naphthalene	EPA-8260	U	UG/L	2.0	12/18/2015	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/21/2015
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV15120150
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	WDOE ACCREDITATION:	C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 99939 - Water by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range - BS	NWTPH-GX	87.6			12/17/2015	PAB
TPH-Volatile Range - BSD	NWTPH-GX	89.4	2		12/17/2015	PAB

ALS Test Batch ID: 99996 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	EPA-8260	122			12/18/2015	DLC
1,1-Dichloroethene - BSD	EPA-8260	104	15		12/18/2015	DLC
Benzene - BS	EPA-8260	123			12/18/2015	DLC
Benzene - BSD	EPA-8260	106	14		12/18/2015	DLC
Toluene - BS	EPA-8260	111			12/18/2015	DLC
Toluene - BSD	EPA-8260	96.9	14		12/18/2015	DLC

APPROVED BY

Laboratory Director



March 21, 2016

Mr. Eric Marhofer
Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

Dear Mr. Marhofer,

On March 15th, 9 samples were received by our laboratory and assigned our laboratory project number EV16030113. The project was identified as your Town Center Mini-Mart. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
		ALS JOB#:	EV16030113
CLIENT CONTACT:	Eric Marhofer	ALS SAMPLE#:	EV16030113-01
CLIENT PROJECT:	Town Center Mini-Mart	DATE RECEIVED:	03/15/2016
CLIENT SAMPLE ID	MW-1-031416	COLLECTION DATE:	3/14/2016 1:30:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	670	50	1	UG/L	03/16/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	19	2.0	1	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	17	4.0	1	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	10	2.0	1	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	154 GS3	03/16/2016	PAB
Toluene-d8	EPA-8260	93.5	03/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
 GS3 - Surrogate outside of control limits due to coeluting compounds.
 Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16030113
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV16030113-02
CLIENT SAMPLE ID	MW-2-031416	DATE RECEIVED:	03/15/2016
		COLLECTION DATE:	3/14/2016 3:20:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	13000	1000	20	UG/L	03/16/2016	PAB
Benzene	EPA-8260	46	20	10	UG/L	03/17/2016	DLC
Toluene	EPA-8260	20	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	1200	200	100	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	1200	400	100	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	39	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	330	20	10	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 20X Dilution	NWTPH-GX	111	03/16/2016	PAB
Toluene-d8 100X Dilution	EPA-8260	96.0	03/17/2016	DLC
Toluene-d8	EPA-8260	98.2	03/17/2016	DLC
Toluene-d8 10X Dilution	EPA-8260	95.6	03/17/2016	DLC

Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16030113
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV16030113-03
CLIENT SAMPLE ID	MW-5-031416	DATE RECEIVED:	03/15/2016
		COLLECTION DATE:	3/14/2016 2:40:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	1200	50	1	UG/L	03/16/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	40	2.0	1	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	130	40	10	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	13	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	12	2.0	1	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	107	03/16/2016	PAB
Toluene-d8 10X Dilution	EPA-8260	96.8	03/17/2016	DLC
Toluene-d8	EPA-8260	97.9	03/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16030113
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV16030113-04
CLIENT SAMPLE ID	MW-6-031416	DATE RECEIVED:	03/15/2016
		COLLECTION DATE:	3/14/2016 2:05:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	1400	50	1	UG/L	03/16/2016	PAB
Benzene	EPA-8260	4.9	2.0	1	UG/L	03/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	66	20	10	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	75	4.0	1	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	8.7	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	14	2.0	1	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	115	03/16/2016	PAB
Toluene-d8 10X Dilution	EPA-8260	97.5	03/17/2016	DLC
Toluene-d8	EPA-8260	95.1	03/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16030113
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV16030113-05
CLIENT SAMPLE ID	MW-10-031416	DATE RECEIVED:	03/15/2016
		COLLECTION DATE:	3/14/2016 10:15:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	03/16/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	101	03/16/2016	PAB
Toluene-d8	EPA-8260	96.7	03/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16030113
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV16030113-06
CLIENT SAMPLE ID	MW-11-031416	DATE RECEIVED:	03/15/2016
		COLLECTION DATE:	3/14/2016 11:05:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	03/16/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	97.3	03/16/2016	PAB
Toluene-d8	EPA-8260	96.9	03/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16030113
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV16030113-07
CLIENT SAMPLE ID	MW-12-031416	DATE RECEIVED:	03/15/2016
		COLLECTION DATE:	3/14/2016 11:40:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	03/16/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	102	03/16/2016	PAB
Toluene-d8	EPA-8260	97.1	03/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16030113
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV16030113-08
CLIENT SAMPLE ID	MW-14-031416	DATE RECEIVED:	03/15/2016
		COLLECTION DATE:	3/14/2016 12:05:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	03/16/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	97.1	03/16/2016	PAB
Toluene-d8	EPA-8260	96.6	03/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	3/21/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16030113
CLIENT PROJECT:	Town Center Mini-Mart	ALS SAMPLE#:	EV16030113-09
CLIENT SAMPLE ID	Trip Blanks	DATE RECEIVED:	03/15/2016
		COLLECTION DATE:	3/14/2016
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	03/16/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	92.4	03/16/2016	PAB
Toluene-d8	EPA-8260	96.6	03/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
 401 Second Ave. S., Suite 201
 Seattle, WA 98104

DATE: 3/21/2016
 ALS SDG#: EV16030113
 WDOE ACCREDITATION: C601

CLIENT CONTACT: Eric Marhofer
 CLIENT PROJECT: Town Center Mini-Mart

LABORATORY BLANK RESULTS

MBG-031516W - Batch 102309 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	UG/L	50	03/15/2016	PAB

U - Analyte analyzed for but not detected at level above reporting limit.

MB-031616W2 - Batch 102451 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene	EPA-8260	U	UG/L	2.0	03/16/2016	DLC
Benzene	EPA-8260	U	UG/L	2.0	03/16/2016	DLC
Toluene	EPA-8260	U	UG/L	2.0	03/16/2016	DLC
Ethylbenzene	EPA-8260	U	UG/L	2.0	03/16/2016	DLC
m,p-Xylene	EPA-8260	U	UG/L	4.0	03/16/2016	DLC
o-Xylene	EPA-8260	U	UG/L	2.0	03/16/2016	DLC
Naphthalene	EPA-8260	U	UG/L	2.0	03/16/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Aspect Consulting, LLC
 401 Second Ave. S., Suite 201
 Seattle, WA 98104

DATE: 3/21/2016
 ALS SDG#: EV16030113
 WDOE ACCREDITATION: C601

CLIENT CONTACT: Eric Marhofer
 CLIENT PROJECT: Town Center Mini-Mart

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 102309 - Water by NWTPH-GX

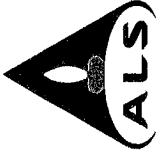
SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	83.5			66.5	122.7	03/15/2016	PAB
TPH-Volatile Range - BSD	NWTPH-GX	88.9	6		66.5	122.7	03/15/2016	PAB

ALS Test Batch ID: 102451 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
1,1-Dichloroethene - BS	EPA-8260	117			72.5	136	03/16/2016	DLC
1,1-Dichloroethene - BSD	EPA-8260	115	2		72.5	136	03/16/2016	DLC
Benzene - BS	EPA-8260	108			74.7	143	03/16/2016	DLC
Benzene - BSD	EPA-8260	103	4		74.7	143	03/16/2016	DLC
Toluene - BS	EPA-8260	109			71.7	139	03/16/2016	DLC
Toluene - BSD	EPA-8260	105	4		71.7	139	03/16/2016	DLC

APPROVED BY

Laboratory Director



ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job#

EV16030113

Date 3/15/16 Page 1 Of 1

PROJECT ID: REPORT TO COMPANY: PROJECT MANAGER: ADDRESS: PHONE: P.O. #: INVOICE TO COMPANY: ATTENTION: ADDRESS:	ANALYSIS REQUESTED				OTHER (Specify)																	
	NMTPH-HCID	NMTPH-DX	NMTPH-GX	BTX by EPA-8021	MTBE by EPA-8021	EPA-8260	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM	PCB Pesticides by EPA 8081/8082	Metals-MTCA-5	RCRA-8	Pt Pol	TAL	Metals Other (Specify)	TCLP-Metals	VOA	Semi-Vol	Pest
PROJECT ID: REPORT TO COMPANY: PROJECT MANAGER: ADDRESS: PHONE: P.O. #: INVOICE TO COMPANY: ATTENTION: ADDRESS:	LAB#	TYPE	TIME	DATE	RECEIVED IN GOOD CONDITION?																	
Town Center Minis-Mart Aspect Eric Marchofer 401 2nd Ave S, 201 Seattle, WA 98104 (206) 838-6582 080258 Colony Insurance Claim #038397	1. MW-1-031416	Water	1330	3/14	X																	
	2. MW-2-031416		1520		X																	
	3. MW-5-031416		1440		X																	
	4. MW-6-031416		1405		X																	
	5. MW-10-031416		1015		X																	
	6. MW-11-031416		1105		X																	
	7. MW-12-031416		1140		X																	
	8. MW-14-031416		1205		X																	
	9. Trip Blanks				X																	
	10.																					

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Matt M. Sene, Aspect, 3/15/16, 0915
 Received By: [Signature]
 2. Relinquished By: [Signature] ALS 3-15-16 2:25

TURNAROUND REQUESTED in Business Days*
 Organic, Metals & Inorganic Analysis
 1 SAME DAY
 2
 3
 5

Specify:

Fuels & Hydrocarbon Analysis
 1 SAME DAY
 3
 5

*Turnaround request less than standard may incur Rush Charges



June 22, 2016

Mr. Eric Marhofer
Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

Dear Mr. Marhofer,

On June 15th, 8 samples were received by our laboratory and assigned our laboratory project number EV16060100. The project was identified as your TCMM. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16060100
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16060100-01
CLIENT SAMPLE ID	MW-10-061416	DATE RECEIVED:	06/15/2016
		COLLECTION DATE:	6/14/2016 9:35:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	06/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	89.1	06/15/2016	PAB
Toluene-d8	EPA-8260	96.0	06/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16060100
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16060100-02
CLIENT SAMPLE ID	MW-11-061416	DATE RECEIVED:	06/15/2016
		COLLECTION DATE:	6/14/2016 10:15:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	06/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	88.8	06/15/2016	PAB
Toluene-d8	EPA-8260	100	06/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16060100
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16060100-03
CLIENT SAMPLE ID	MW-12-061416	DATE RECEIVED:	06/15/2016
		COLLECTION DATE:	6/14/2016 10:55:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	06/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	90.0	06/15/2016	PAB
Toluene-d8	EPA-8260	97.7	06/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16060100
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16060100-04
CLIENT SAMPLE ID	MW-14-061416	DATE RECEIVED:	06/15/2016
		COLLECTION DATE:	6/14/2016 11:50:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	390	50	1	UG/L	06/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Ethylbenzene	EPA-8260	12	2.0	1	UG/L	06/17/2016	DLC
m,p-Xylene	EPA-8260	4.4	4.0	1	UG/L	06/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Naphthalene	EPA-8260	11	2.0	1	UG/L	06/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	123	06/15/2016	PAB
Toluene-d8	EPA-8260	99.2	06/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16060100
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16060100-05
CLIENT SAMPLE ID	MW-1-061416	DATE RECEIVED:	06/15/2016
		COLLECTION DATE:	6/14/2016 1:55:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	480	50	1	UG/L	06/16/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Ethylbenzene	EPA-8260	4.7	2.0	1	UG/L	06/17/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	06/17/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	06/17/2016	DLC
Naphthalene	EPA-8260	4.3	2.0	1	UG/L	06/17/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	147 GS3	06/16/2016	PAB
Toluene-d8	EPA-8260	95.4	06/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
 GS3 - Surrogate outside of control limits due to coeluting compounds.
 Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16060100
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16060100-06
CLIENT SAMPLE ID	MW-6-061416	DATE RECEIVED:	06/15/2016
		COLLECTION DATE:	6/14/2016 2:45:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	7100	250	5	UG/L	06/16/2016	PAB
Benzene	EPA-8260	50	20	10	UG/L	06/20/2016	DLC
Toluene	EPA-8260	14	2.0	1	UG/L	06/17/2016	DLC
Ethylbenzene	EPA-8260	430	200	100	UG/L	06/21/2016	DLC
m,p-Xylene	EPA-8260	470	40	10	UG/L	06/20/2016	DLC
o-Xylene	EPA-8260	56	20	10	UG/L	06/20/2016	DLC
Naphthalene	EPA-8260	77	20	10	UG/L	06/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 5X Dilution	NWTPH-GX	159 GS3	06/16/2016	PAB
Toluene-d8	EPA-8260	111	06/17/2016	DLC
Toluene-d8 10X Dilution	EPA-8260	94.7	06/20/2016	DLC
Toluene-d8 100X Dilution	EPA-8260	95.5	06/21/2016	DLC

GS3 - Surrogate outside of control limits due to coeluting compounds.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16060100
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16060100-07
CLIENT SAMPLE ID	MW-5-061416	DATE RECEIVED:	06/15/2016
		COLLECTION DATE:	6/14/2016 3:35:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	52000	5000	100	UG/L	06/16/2016	PAB
Benzene	EPA-8260	U	200	100	UG/L	06/20/2016	DLC
Toluene	EPA-8260	31	2.0	1	UG/L	06/17/2016	DLC
Ethylbenzene	EPA-8260	1100	200	100	UG/L	06/20/2016	DLC
m,p-Xylene	EPA-8260	3600	400	100	UG/L	06/20/2016	DLC
o-Xylene	EPA-8260	330	200	100	UG/L	06/20/2016	DLC
Naphthalene	EPA-8260	280	200	100	UG/L	06/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 100X Dilution	NWTPH-GX	97.8	06/16/2016	PAB
Toluene-d8	EPA-8260	120	06/17/2016	DLC
Toluene-d8 100X Dilution	EPA-8260	93.6	06/20/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16060100
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16060100-08
CLIENT SAMPLE ID	MW-2-061416	DATE RECEIVED:	06/15/2016
		COLLECTION DATE:	6/14/2016 4:20:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	6400	500	10	UG/L	06/15/2016	PAB
Benzene	EPA-8260	34	2.0	1	UG/L	06/17/2016	DLC
Toluene	EPA-8260	10	2.0	1	UG/L	06/17/2016	DLC
Ethylbenzene	EPA-8260	450	200	100	UG/L	06/21/2016	DLC
m,p-Xylene	EPA-8260	320	40	10	UG/L	06/20/2016	DLC
o-Xylene	EPA-8260	5.3	2.0	1	UG/L	06/17/2016	DLC
Naphthalene	EPA-8260	190	20	10	UG/L	06/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 10X Dilution	NWTPH-GX	108	06/15/2016	PAB
Toluene-d8	EPA-8260	112	06/17/2016	DLC
Toluene-d8 10X Dilution	EPA-8260	98.2	06/20/2016	DLC
Toluene-d8 100X Dilution	EPA-8260	95.6	06/21/2016	DLC

Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV16060100
CLIENT PROJECT:	TCMM	WDOE ACCREDITATION:	C601

LABORATORY BLANK RESULTS

MBG-061516W - Batch 105414 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	UG/L	50	06/15/2016	PAB

U - Analyte analyzed for but not detected at level above reporting limit.

MB-061716W - Batch 105511 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene	EPA-8260	U	UG/L	2.0	06/17/2016	DLC
Benzene	EPA-8260	U	UG/L	2.0	06/17/2016	DLC
Toluene	EPA-8260	U	UG/L	2.0	06/17/2016	DLC
Ethylbenzene	EPA-8260	U	UG/L	2.0	06/17/2016	DLC
m,p-Xylene	EPA-8260	U	UG/L	4.0	06/17/2016	DLC
o-Xylene	EPA-8260	U	UG/L	2.0	06/17/2016	DLC
Naphthalene	EPA-8260	U	UG/L	2.0	06/17/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	6/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV16060100
CLIENT PROJECT:	TCMM	WDOE ACCREDITATION:	C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 105414 - Water by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	90.3			66.5	122.7	06/15/2016	PAB
TPH-Volatile Range - BSD	NWTPH-GX	90.0	0		66.5	122.7	06/15/2016	PAB

ALS Test Batch ID: 105511 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
1,1-Dichloroethene - BS	EPA-8260	96.8			72.5	136	06/17/2016	DLC
1,1-Dichloroethene - BSD	EPA-8260	109	12		72.5	136	06/17/2016	DLC
Benzene - BS	EPA-8260	94.0			74.7	143	06/17/2016	DLC
Benzene - BSD	EPA-8260	98.6	5		74.7	143	06/17/2016	DLC
Toluene - BS	EPA-8260	89.5			71.7	139	06/17/2016	DLC
Toluene - BSD	EPA-8260	92.5	3		71.7	139	06/17/2016	DLC

APPROVED BY

Laboratory Director



September 22, 2016

Mr. Eric Marhofer
Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

Dear Mr. Marhofer,

On September 16th, 9 samples were received by our laboratory and assigned our laboratory project number EV16090107. The project was identified as your TCMM. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-01
CLIENT SAMPLE ID	MW-10-091516	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016 10:15:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/19/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/20/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	92.2	09/19/2016	PAB
Toluene-d8	EPA-8260	96.2	09/20/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-02
CLIENT SAMPLE ID	MW-11-091516	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016 10:55:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/19/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/20/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	101	09/19/2016	PAB
Toluene-d8	EPA-8260	96.5	09/20/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-03
CLIENT SAMPLE ID	MW-12-091516	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016 11:40:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	69	50	1	UG/L	09/19/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/20/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	105	09/19/2016	PAB
Toluene-d8	EPA-8260	94.4	09/20/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-04
CLIENT SAMPLE ID	MW-14-091516	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016 12:30:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	2700	250	5	UG/L	09/20/2016	PAB
Benzene	EPA-8260	9.4	2.0	1	UG/L	09/20/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Ethylbenzene	EPA-8260	120	20	10	UG/L	09/21/2016	DLC
m,p-Xylene	EPA-8260	87	40	10	UG/L	09/21/2016	DLC
o-Xylene	EPA-8260	16	2.0	1	UG/L	09/20/2016	DLC
Naphthalene	EPA-8260	11	2.0	1	UG/L	09/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 5X Dilution	NWTPH-GX	105	09/20/2016	PAB
Toluene-d8	EPA-8260	98.9	09/20/2016	DLC
Toluene-d8 10X Dilution	EPA-8260	98.6	09/21/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-05
CLIENT SAMPLE ID	MW-1-091516	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016 1:05:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	330	50	1	UG/L	09/20/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Ethylbenzene	EPA-8260	5.0	2.0	1	UG/L	09/20/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/20/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Naphthalene	EPA-8260	3.6	2.0	1	UG/L	09/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	101	09/20/2016	PAB
Toluene-d8	EPA-8260	94.4	09/20/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-06
CLIENT SAMPLE ID	MW-6-091516	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016 1:55:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	510	50	1	UG/L	09/19/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Ethylbenzene	EPA-8260	9.0	2.0	1	UG/L	09/20/2016	DLC
m,p-Xylene	EPA-8260	6.1	4.0	1	UG/L	09/20/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/20/2016	DLC
Naphthalene	EPA-8260	3.7	2.0	1	UG/L	09/20/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	126	09/19/2016	PAB
Toluene-d8	EPA-8260	108	09/20/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-07
CLIENT SAMPLE ID	MW-5-091516	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016 2:35:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	79000	5000	100	UG/L	09/20/2016	PAB
Benzene	EPA-8260	U	200	100	UG/L	09/21/2016	DLC
Toluene	EPA-8260	U	200	100	UG/L	09/21/2016	DLC
Ethylbenzene	EPA-8260	3200	200	100	UG/L	09/21/2016	DLC
m,p-Xylene	EPA-8260	7500	4000	1000	UG/L	09/21/2016	DLC
o-Xylene	EPA-8260	1200	200	100	UG/L	09/21/2016	DLC
Naphthalene	EPA-8260	790	200	100	UG/L	09/21/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 100X Dilution	NWTPH-GX	102	09/20/2016	PAB
Toluene-d8	EPA-8260	138 GS1	09/20/2016	DLC
Toluene-d8 1000X Dilution	EPA-8260	95.4	09/21/2016	DLC
Toluene-d8 100X Dilution	EPA-8260	96.1	09/21/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
 GS1 - Surrogate outside of control limits due to matrix effect.
 Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-08
CLIENT SAMPLE ID	MW-2-091516	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016 3:20:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	1300	50	1	UG/L	09/19/2016	PAB
Benzene	EPA-8260	12	2.0	1	UG/L	09/22/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/22/2016	DLC
Ethylbenzene	EPA-8260	80	20	10	UG/L	09/21/2016	DLC
m,p-Xylene	EPA-8260	17	4.0	1	UG/L	09/22/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/22/2016	DLC
Naphthalene	EPA-8260	58	20	10	UG/L	09/21/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	126	09/19/2016	PAB
Toluene-d8 10X Dilution	EPA-8260	97.0	09/21/2016	DLC
Toluene-d8	EPA-8260	93.3	09/22/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16090107
CLIENT PROJECT:	TCMM	ALS SAMPLE#:	EV16090107-09
CLIENT SAMPLE ID	Trip Blanks	DATE RECEIVED:	09/16/2016
		COLLECTION DATE:	9/15/2016
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	09/19/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	09/21/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	09/21/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	09/21/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	09/21/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	09/21/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	09/21/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	91.3	09/19/2016	PAB
Toluene-d8	EPA-8260	97.9	09/21/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV16090107
CLIENT PROJECT:	TCMM	WDOE ACCREDITATION:	C601

LABORATORY BLANK RESULTS

MBG-091916W - Batch 108167 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	UG/L	50	09/19/2016	PAB

U - Analyte analyzed for but not detected at level above reporting limit.

MB-092016W - Batch 108199 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene	EPA-8260	U	UG/L	2.0	09/20/2016	DLC
Benzene	EPA-8260	U	UG/L	2.0	09/20/2016	DLC
Toluene	EPA-8260	U	UG/L	2.0	09/20/2016	DLC
Ethylbenzene	EPA-8260	U	UG/L	2.0	09/20/2016	DLC
m,p-Xylene	EPA-8260	U	UG/L	4.0	09/20/2016	DLC
o-Xylene	EPA-8260	U	UG/L	2.0	09/20/2016	DLC
Naphthalene	EPA-8260	U	UG/L	2.0	09/20/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	9/22/2016
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV16090107
CLIENT PROJECT:	TCMM	WDOE ACCREDITATION:	C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 108167 - Water by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	96.5			66.5	122.7	09/19/2016	PAB
TPH-Volatile Range - BSD	NWTPH-GX	98.4	2		66.5	122.7	09/19/2016	PAB

ALS Test Batch ID: 108199 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
1,1-Dichloroethene - BS	EPA-8260	95.9			72.5	136	09/20/2016	DLC
1,1-Dichloroethene - BSD	EPA-8260	95.0	1		72.5	136	09/20/2016	DLC
Benzene - BS	EPA-8260	95.1			74.7	143	09/20/2016	DLC
Benzene - BSD	EPA-8260	108	12		74.7	143	09/20/2016	DLC
Toluene - BS	EPA-8260	96.7			71.7	139	09/20/2016	DLC
Toluene - BSD	EPA-8260	108	11		71.7	139	09/20/2016	DLC

APPROVED BY

Laboratory Director



December 19, 2016

Mr. Eric Marhofer
Aspect Consulting, LLC
401 Second Ave. S., Suite 201
Seattle, WA 98104

Dear Mr. Marhofer,

On December 14th, 9 samples were received by our laboratory and assigned our laboratory project number EV16120076. The project was identified as your Town Center Mini-Mart (TCMM). The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-01
CLIENT SAMPLE ID	MW-10-121316	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016 10:20:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/14/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/15/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	88.6	12/14/2016	PAB
Toluene-d8	EPA-8260	104	12/15/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-02
CLIENT SAMPLE ID	MW-11-121316	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016 10:45:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/15/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	89.7	12/15/2016	PAB
Toluene-d8	EPA-8260	106	12/15/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-03
CLIENT SAMPLE ID	MW-12-121316	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016 11:20:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/15/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	88.1	12/15/2016	PAB
Toluene-d8	EPA-8260	102	12/15/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-04
CLIENT SAMPLE ID	MW-14-121316	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016 11:45:00 AM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/15/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	86.9	12/15/2016	PAB
Toluene-d8	EPA-8260	104	12/15/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-05
CLIENT SAMPLE ID	MW-1-121316	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016 1:20:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	810	50	1	UG/L	12/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	10	2.0	1	UG/L	12/15/2016	DLC
m,p-Xylene	EPA-8260	6.1	4.0	1	UG/L	12/15/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	12	2.0	1	UG/L	12/15/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	120	12/15/2016	PAB
Toluene-d8	EPA-8260	103	12/15/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-06
CLIENT SAMPLE ID	MW-6-121316	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016 2:15:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	260	50	1	UG/L	12/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	10	2.0	1	UG/L	12/15/2016	DLC
m,p-Xylene	EPA-8260	14	4.0	1	UG/L	12/15/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	2.6	2.0	1	UG/L	12/15/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	108	12/15/2016	PAB
Toluene-d8	EPA-8260	103	12/15/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-07
CLIENT SAMPLE ID	MW-5-121316	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016 2:45:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	340	50	1	UG/L	12/15/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	4.5	2.0	1	UG/L	12/15/2016	DLC
m,p-Xylene	EPA-8260	17	4.0	1	UG/L	12/15/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	3.8	2.0	1	UG/L	12/15/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	95.9	12/15/2016	PAB
Toluene-d8	EPA-8260	100	12/15/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-08
CLIENT SAMPLE ID	MW-2-121316	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016 3:35:00 PM
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	5500	500	10	UG/L	12/15/2016	PAB
Benzene	EPA-8260	37	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	7.9	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	620	200	100	UG/L	12/16/2016	DLC
m,p-Xylene	EPA-8260	U	400	100	UG/L	12/16/2016	DLC
o-Xylene	EPA-8260	2.5	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	U	200	100	UG/L	12/16/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 10X Dilution	NWTPH-GX	102	12/15/2016	PAB
Toluene-d8	EPA-8260	93.4	12/15/2016	DLC
Toluene-d8 100X Dilution	EPA-8260	99.9	12/16/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS JOB#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	ALS SAMPLE#:	EV16120076-09
CLIENT SAMPLE ID	Trip Blanks	DATE RECEIVED:	12/14/2016
		COLLECTION DATE:	12/13/2016
		WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	12/14/2016	PAB
Benzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	12/15/2016	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC
Naphthalene	EPA-8260	U	2.0	1	UG/L	12/15/2016	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	85.9	12/14/2016	PAB
Toluene-d8	EPA-8260	103	12/15/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	WDOE ACCREDITATION:	C601

LABORATORY BLANK RESULTS

MBG-121316W - Batch 110801 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	UG/L	50	12/13/2016	PAB

U - Analyte analyzed for but not detected at level above reporting limit.

MB-121316W - Batch 110740 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene	EPA-8260	U	UG/L	2.0	12/13/2016	DLC
Benzene	EPA-8260	U	UG/L	2.0	12/13/2016	DLC
Toluene	EPA-8260	U	UG/L	2.0	12/13/2016	DLC
Ethylbenzene	EPA-8260	U	UG/L	2.0	12/13/2016	DLC
m,p-Xylene	EPA-8260	U	UG/L	4.0	12/13/2016	DLC
o-Xylene	EPA-8260	U	UG/L	2.0	12/13/2016	DLC
Naphthalene	EPA-8260	U	UG/L	2.0	12/13/2016	DLC

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	Aspect Consulting, LLC 401 Second Ave. S., Suite 201 Seattle, WA 98104	DATE:	12/19/2016
CLIENT CONTACT:	Eric Marhofer	ALS SDG#:	EV16120076
CLIENT PROJECT:	Town Center Mini-Mart (TCMM)	WDOE ACCREDITATION:	C601

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 110801 - Water by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	84.7			66.5	122.7	12/14/2016	PAB
TPH-Volatile Range - BSD	NWTPH-GX	91.2	7		66.5	122.7	12/13/2016	PAB

ALS Test Batch ID: 110740 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
1,1-Dichloroethene - BS	EPA-8260	97.8			72.5	136	12/13/2016	DLC
1,1-Dichloroethene - BSD	EPA-8260	96.7	1		72.5	136	12/13/2016	DLC
Benzene - BS	EPA-8260	98.7			74.7	143	12/13/2016	DLC
Benzene - BSD	EPA-8260	96.5	2		74.7	143	12/13/2016	DLC
Toluene - BS	EPA-8260	96.9			71.7	139	12/13/2016	DLC
Toluene - BSD	EPA-8260	93.6	4		71.7	139	12/13/2016	DLC

APPROVED BY

Laboratory Director

APPENDIX B

Boring Logs

Coarse-Grained Soils - More than 50% (1) Retained on No. 200 Sieve		Sands - 50% (1) or More of Coarse Fraction Passes No. 4 Sieve		Silt and Clays Liquid Limit Less than 50		Silt and Clays Liquid Limit 50 or More		Highly Organic Soils	
Gravels - More than 50% (1) of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines (5)	≥15% Fines (5)	Gravels - More than 50% (1) of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines (5)	≥15% Fines (5)	Silt and Clays Liquid Limit Less than 50	Silt and Clays Liquid Limit 50 or More	Highly Organic Soils	USCS Symbol
Well-graded gravel and gravel with sand, little to no fines	GW		Well-graded sand and sand with gravel, little to no fines	SW		Silt, sandy silt, gravelly silt, silt with sand or gravel	ML	Peat, muck and other highly organic soils	PT
Poorly-graded gravel and gravel with sand, little to no fines	GP		Poorly-graded sand and sand with gravel, little to no fines	SP		Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay	CL		
Silty gravel and silty gravel with sand	GM		Silty sand and silty sand with gravel	SM		Organic clay or silt of low plasticity	OL		
Clayey gravel and clayey gravel with sand	GC		Clayey sand and clayey sand with gravel	SC		Elastic silt, clayey silt, silt with micaceous or diatomaceous fine sand or silt	MH		
						Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel	CH		
						Organic clay or silt of medium to high plasticity	OH		

Terms Describing Relative Density and Consistency

Coarse-Grained Soils	Density	SPT ⁽²⁾ blows/foot
	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
Very Dense	>50	
Fine-Grained Soils	Consistency	SPT ⁽²⁾ blows/foot
	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
Hard	>30	

Test Symbols

FC = Fines Content
G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Consolidation
DD = Dry Density
K = Permeability
Str = Shear Strength
Env = Environmental
PiD = Photoionization Detector

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

Estimated Percentage

Percentage by Weight	Modifier
<5	Trace
5 to 15	Slightly (sandy, silty, clayey, gravelly)
15 to 30	Sandy, silty, clayey, gravelly
30 to 49	Very (sandy, silty, clayey, gravelly)

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch
Slightly Moist - Perceptible moisture
Moist - Damp but no visible water
Very Moist - Water visible but not free draining
Wet - Visible free water, usually from below water table

Symbols

(1) Percentage by dry weight
(2) (SPT) Standard Penetration Test (ASTM D-1586)
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
(4) Depth of groundwater ∇ ATD = At time of drilling
 ∇ Static water level (date)

(5) Combined USCS symbols used for fines between 5% and 15% as estimated in General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
BGS = below ground surface

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

	Exploration Log Key	DATE:	PROJECT NO.
		DESIGNED BY:	
		DRAWN BY:	FIGURE NO.
		REVISED BY:	B-1



Monitoring Well Construction Log

Project Number
080258

Well Number
MW-1

Sheet
1 of 1

Project Name: Town Center Mini Mart

Ground Surface Elev. _____

Location: Duvall, WA

Top of Casing Elev. _____

96.17

Driller/Method: Pacific Northwest Probe & Drilling / Push-Probe

Depth to Water (ft BGS) _____

8.8

Sampling Method: Continuous Core

Start/Finish Date _____

6/21/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	Flushmount 5" monument in concrete	S1		0.6		Asphalt		1
2				0.7		Slightly moist, brown, slightly silty, very sandy GRAVEL (GM)		2
3	3/4" ID Schedule 40 PVC riser	S2		0.6		Slightly moist, brown, slightly silty SAND (SP); fine sand		3
4				0.8		Moist, light gray SILT (ML); wood and organics		4
5	Hydrated bentonite chips	S3		0.7				5
6				1.8				6
7				1.3				7
8				4.5				8
9	▼ 6/21/2010 10-20 sand			8.6			Moist, dark brown, peaty ORGANIC SILT (OL)	9
10	▽ 6/21/2010			6.4				10
11				4.7			Wet, brown, slightly gravelly, very silty SAND to very sandy SILT (SM-ML)	11
12	3/4" ID Schedule 40 PVC prepacked screen, 0.010" slot			2.2				12
13				8.7			Slightly moist, brown, silty, very gravelly SAND (SM); till-like	13
14				1.2				14
15	Threaded PVC endcap			1.1			Bottom of boring at 15'	15

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: JTL

Approved by: WVG

Figure No. B- 2

MONITORING WELL - TOWN CENTER MINI MART_DUVALL.GPJ March 18, 2015



Monitoring Well Construction Log

Project Number
080258

Well Number
MW-2

Sheet
1 of 1

Project Name: Town Center Mini Mart

Ground Surface Elev. _____

Location: Duvall, WA

Top of Casing Elev. _____

96.12

Driller/Method: Pacific Northwest Probe & Drilling / Push-Probe

Depth to Water (ft BGS) _____

Sampling Method: Continuous Core

Start/Finish Date _____

6/16/2010 - 6/21/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	Flushmount 5" monument in concrete			0.8		Asphalt	Slightly moist, brown, slightly silty, very sandy GRAVEL (GM)	1
2		S1		0.9			Slightly moist, brown, slightly silty SAND (SM); trace fine gravel Moist, light brown SILT (ML); trace wood and organics	2
3	Hydrated bentonite chips							3
4				0.8			Gray and iron oxide mottling	4
5	3/4" ID Schedule 40 PVC riser			1.1			Very moist, brown, peaty SILT (OL); abundant wood and organics	5
6				0.7				6
7		S2		1.2				7
8	▽ 6/21/2010			2.4			Wet, light brown to light gray, slightly gravelly, very silty SAND (SM)	8
9				132			Slight hydrocarbon-like odor	9
10	10-20 sand			6.6			Becomes light brown and gravelly	10
11	3/4" diam Sch 40 PVC prepacked screen, 0.020" slot			1.2				11
12		S3		16			Wet, light gray, silty SAND (SM); sand is fine	12
13				3.4				13
14	Threaded PVC endcap			1.2			Wet, light brown, slightly sandy, slightly gravelly SILT (ML)	14
15							Bottom of boring at 14.5	15

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- ▽ Static Water Level
- ▽ Water Level (ATD)

Logged by: **JTL**

Approved by: **WVG**

Figure No. **B- 3**

MONITORING WELL TOWN CENTER MINI MART_DUVALL.GPJ March 18, 2015



Monitoring Well Construction Log

Project Number
080258

Well Number
MW-3

Sheet
1 of 1

Project Name: Town Center Mini Mart

Ground Surface Elev. _____

Location: Duvall, WA

Top of Casing Elev. _____

97.47

Driller/Method: Pacific Northwest Probe & Drilling / Push-Probe

Depth to Water (ft BGS) _____

6.02

Sampling Method: Continuous Core

Start/Finish Date _____

6/16/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	Flushmount 5" monument in concrete			2		Asphalt	Moist, brown, slightly silty, very sandy GRAVEL (GM)	1
2							Moist, brown, silty SAND (SM)	
3	Hydrated bentonite chips	S1		2.8			Moist, light brown, slightly sandy SILT (ML)	2
4							Trace organics	
5	3/4" ID Schedule 40 PVC riser						Moist, dark brown, slightly sandy, peaty SILT (OL)	5
6	▼ 6/21/2010			3.4				6
7								7
8	▽ 6/16/2010	S2					Wet, gray, slightly gravelly, silty SAND (SM); sand is fine, slight gasoline-like odor	8
9	10-20 sand			4				9
10	3/4" diam Sch 40 PVC prepacked screen, 0.020" slot			1.2			Moist, brown, slightly gravelly, sandy SILT (ML)	10
11		S3		1.2				11
12	Threaded PVC endcap			1.6				12
13							Refusal at 12.5' at very hard, till-like material.	13
14								14
15								15

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: JTL

Approved by: WVG

Figure No. B- 4

MONITORING WELL TOWN CENTER MINI MART_DUVALL.GPJ March 18, 2015



Monitoring Well Construction Log

Project Number
080258

Well Number
MW-4

Sheet
1 of 1

Project Name: Town Center Mini Mart

Ground Surface Elev. _____

Location: Duvall, WA

Top of Casing Elev. _____

98.76

Driller/Method: Pacific Northwest Probe & Drilling / Push-Probe

Depth to Water (ft BGS) _____

Sampling Method: Continuous Core

Start/Finish Date _____

6/21/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	Flushmount 5" monument in concrete					Asphalt		1
1						Dry, brown, silty, very sandy GRAVEL (GM)		1
2				0.2				2
2	Hydrated bentonite chips	S1				Slightly moist, brown to light brown SILT (ML); trace sand, trace gravel, trace organics		2
3				0.2				3
4				0.4		Gravel		4
5	3/4" ID Schedule 40 PVC riser			0.2				5
5						Moist, brown, gravelly, very silty SAND (SM)		5
6				0.4				6
7	10-20 sand	S2		0.6				7
8				0.8				8
9	3/4" diam Sch 40 PVC prepacked screen, 0.020" slot			0.8				9
9						Very moist, brown, gravelly, sandy SILT (SM-ML)		9
10				0.8				10
11	▽ 6/21/2010	S3		0.2				11
11						Wet, brown, silty, very gravelly SAND (SM); fine gravel, fine to coarse sand		11
12				0.3				12
12	Threaded PVC endcap			0.2				12
12						Moist, gray, silty, very sandy GRAVEL (GM); fine sand, coarse gravel		12
13						Refusal at 12.5', bottom of boring at 12.5'		13
14								14
15								15

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- ▽ Static Water Level
- ▽ Water Level (ATD)

Logged by: JTL

Approved by: WVG

Figure No. B- 5

MONITORING WELL TOWN CENTER MINI MART_DUVALL.GPJ March 18, 2015



Monitoring Well Construction Log

Project Number
080258

Well Number
MW-5

Sheet
1 of 1

Project Name: Town Center Mini Mart

Ground Surface Elev. _____

Location: Duvall, WA

Top of Casing Elev. _____

96.48

Driller/Method: Cascade Drilling / Push-Probe

Depth to Water (ft BGS) _____

6.5 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

12/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	Flushmount 8" monument in concrete						Moist, brown, slightly silty SAND (SP-SM); fine to medium sand, no odor	1
2	Hydrated bentonite chips	VAC		0.0				2
3	3/4" ID Schedule 40 PVC riser							3
4	#20/40 Colorado silica							4
5				0.0			Very moist, brown SAND (SP); medium sand, trace coarse sand	5
6				0.0				6
7	12/22/2014 3/4" ID Schedule 40 PVC prepacked screen, 0.010" slot	S1	Soil: MW-5-7	1.0 281			Wet, gray brown, gravelly, sandy SILT (ML); fine sand, gasoline odor	7
8				16.1				8
9								9
10				11.1			Wet, blue gray, very silty SAND (SM); trace gravel, very faint odor to 14'	10
11				4.4				11
12		S2		5.7				12
13				5.9				13
14				7.1				14
14				2.7			Wet, blue gray, sandy SILT (ML); trace gravel	14
15	Threaded PVC endcap			1.2			Bottom of boring at 15' BGS	15

Sampler Type:

- No Recovery
- Bulk sample
- Continuous Core

PID - Photoionization Detector

- Static Water Level
- Water Level (ATD)

Logged by: AET/RRH

Approved by: WVG

Figure No. B- 6

MONITORING WELL TOWN CENTER MINI MART_DUVALL_GPJ March 18, 2015



Monitoring Well Construction Log

Project Number
080258

Well Number
MW-6

Sheet
1 of 1

Project Name: Town Center Mini Mart

Ground Surface Elev. _____

Location: Duvall, WA

Top of Casing Elev. _____

95.58

Driller/Method: Cascade Drilling / Push-Probe

Depth to Water (ft BGS) _____

7.5 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

12/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	Flushmount 8" monument in concrete						Moist, brown, sandy SILT (ML); numerous roots and organics	1
2	Hydrated bentonite chips	VAC		0.0				2
3	3/4" ID Schedule 40 PVC riser							3
4	#20/40 Colorado silica							4
5				0.3			Becomes dark brown scattered organics	5
6	3/4" ID Schedule 40 PVC prepacked screen, 0.010" slot			0.8				6
7	▽ 12/22/2014	S1	Soil: MW-6-7.5	57.5			Wet, blue gray, very sandy SILT (ML) to very silty SAND (SM); gasoline odor	7
8				729			Moist, blue gray, sandy SILT (ML); trace gravel, fine sand, orange brown mottling (weathered till)	8
9				120				9
10				8.3				10
11				33.3				11
12				2.9				12
13		S2		1.2			Grades to wet, gray, silty SAND (SM); fine sand, orange brown mottling	13
14				1.4				14
15	Threaded PVC endcap			0.8				15
				0.0			Bottom of boring at 15' BGS	

Sampler Type:

- No Recovery
- Bulk sample
- Continuous Core

PID - Photoionization Detector

- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/RRH

Approved by: WVG

Figure No. B- 7

MONITORING WELL TOWN CENTER MINI MART_DUVALL.GPJ March 18, 2015



Monitoring Well Construction Log

Project Number
080258

Well Number
MW-7

Sheet
1 of 1

Project Name: Town Center Mini Mart

Ground Surface Elev. _____

Location: Duvall, WA

Top of Casing Elev. _____

94.89

Driller/Method: Cascade Drilling / Push-Probe

Depth to Water (ft BGS) _____

6.5 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

12/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	Flushmount 8" monument in concrete						Moist, brown, gravelly SILT (ML); with cobbles	1
2		VAC		0.0				2
3	Hydrated bentonite chips							3
4	3/4" ID Schedule 40 PVC riser							4
5	#20/40 Colorado silica			0.0				5
6				0.0				6
7	12/22/2014		Soil: MW-7-6.5	0.0			Becomes wet and gray at 6.5' bgs	7
8	3/4" ID Schedule 40 PVC prepacked screen, 0.010" slot	S1		0.0				8
9							Becomes moist at 8.5' bgs	9
10								10
11								11
12		S2						12
13							wet 13' to 14' bgs	13
14							Becomes moist at 14' bgs	14
15	Threaded PVC endcap						Bottom of boring at 15' BGS	15

Sampler Type:

- No Recovery
- Bulk sample
- Continuous Core

PID - Photoionization Detector

- Static Water Level
- Water Level (ATD)

Logged by: AET/RRH

Approved by: WVG

Figure No. B- 8

MONITORING WELL TOWN CENTER MINI MART_DUVALL.GPJ March 18, 2015



Monitoring Well Construction Log

Project Number
080258

Well Number
MW-8

Sheet
1 of 1

Project Name: Town Center Mini Mart

Ground Surface Elev. _____

Location: Duvall, WA

Top of Casing Elev. _____

96.16

Driller/Method: Cascade Drilling / Push-Probe

Depth to Water (ft BGS) _____

8 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

12/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	Flushmount 8" monument in concrete						Moist, brown, sandy SILT (ML); fine sand, numerous roots, no odors	1
2	Hydrated bentonite chips	VAC		0.0				2
3	3/4" ID Schedule 40 PVC riser							3
4	#20/40 Colorado silica							4
5				0.0			Becomes gravelly at 5' bgs	5
6				0.0			2" bed of coarse sand at 6' bgs	6
7	3/4" ID Schedule 40 PVC prepacked screen, 0.010" slot	S1		0.0			Becomes wet and dark gray	7
8	▽ 12/22/2014		Soil: MW-8-8	0.0			No gravel below 8.5' bgs	8
9				0.0			Numerous organics at 9' bgs	9
10								10
11				0.0				11
12				0.0			Becomes moist at 12' bgs	12
13		S2		0.0				13
14				0.0				14
15	Threaded PVC endcap			0.0			Bottom of boring at 15' BGS	15

Sampler Type:

- No Recovery
- Bulk sample
- Continuous Core

PID - Photoionization Detector

- ▽ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/RRH

Approved by: WVG

Figure No. B- 9

MONITORING WELL TOWN CENTER MINI MART_DUVALL_GPJ March 18, 2015



Town Center Mini Mart - 080258

Project Address & Site Specific Location
15410 Main Street NE, Duvall, WA 98019, SE Corner of Ring St. and Main St.

Monitoring Well Log

Coordinates

NA

Exploration Number

MW-9

Ecology Well Tag No.
BJE 540

Contractor

Holt/APS

Equipment

Vacuum excavator

Sampling Method

Grab

Ground Surface (GS) Elev.

NA

Operator

Josh

Exploration Method(s)

Air knife

Work Start/Completion Dates

9/14/2015

Top of Casing Elev.

NA

Depth to Water (Below GS)

6.33' (Static)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
0						Concrete sidewalk		0
1						Moist, brown SAND (SP); fine to medium sand, no odor		1
2								2
3			S1		PID= 0.0		at 2.5' - approximate 4" diameter plastic pipe/hose running parallel to road at west edge of vacuum hole	3
4								4
5								5
6		9/15/2015	S2	MW-9-6 NWTPH-Gx, BTEXN	PID= 0.0	Moist, gray brown, slightly gravelly silty SAND (SM); diamict fabric with cobbles up to 5" diameter at 5.5' - Driller noted significant density increase		6
7								7
8							Bottom of exploration at 8 ft. bgs.	8
9								9

Legend

Grab Sample

Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: AET
Approved by:

Exploration Log MW-9

Sheet 1 of 1

ASPECT STANDARD EXPLORATION LOG TEMPLATE, P:\GINT\PROJECTS\TOWN CENTER MINI MART_DUVALL_080258.GPJ, March 8, 2017



Town Center Mini Mart - 080258

Monitoring Well Log

Project Address & Site Specific Location
15410 Main Street NE, Duvall, WA 98019, NE Corner of Ring St. and Main St.

Coordinates

NA

Exploration Number

MW-10

Ecology Well Tag No.
BJE 541

Contractor

Holt/APS

Equipment

Vacuum excavator

Sampling Method

Grab

Ground Surface (GS) Elev.

NA

Operator

Josh

Exploration Method(s)

Air knife

Work Start/Completion Dates

9/14/2015

Top of Casing Elev.

NA

Depth to Water (Below GS)

5.03' (Static)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
		9/15/2015		MW-10-5.5 NWTPH-Gx, BTEXN	PID= 0.0	SILT (ML)	Concrete sidewalk	
1								1
2							At 1.5' - approximate 12" diameter boulder broken with jack hammer	2
3								3
4								4
5			SI				Very moist to wet, gray brown and blue mottled, slightly gravelly, sandy SILT (ML)	5
6								6
7								7
8							Bottom of exploration at 8 ft. bgs.	8
9								9

Legend

Grab Sample

Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: AET
Approved by:

Exploration Log
MW-10

Sheet 1 of 1



Town Center Mini Mart - 080258

Monitoring Well Log

Project Address & Site Specific Location
15410 Main Street NE, Duvall, WA 98019, W of MW-6

Coordinates

Exploration Number

NA

MW-11

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev.

Ecology Well Tag No.
BJE 542

Holt/APS

Vacuum excavator

Grab

NA

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev.

Depth to Water (Below GS)

Josh

Air knife

9/14/2015

NA

5.36' (Static)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
						Concrete sidewalk		
1						Moist, brown SAND (SP); medium sand, no odor, mild blue mottling, Fill		1
2								2
3			S1	MW-11-3.5 NWTPH-Gx, BTEXN	PID= 0.0			3
4								4
5		▼ 9/15/2015						5
6			S2		PID= 0.0			6
7								7
8					Downhole PID = 2.1 ppm			8
9							Bottom of exploration at 8 ft. bgs.	9

Legend

Grab Sample

Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: AET
Approved by:

Exploration Log
MW-11

Sheet 1 of 1



Town Center Mini Mart - 080258

Monitoring Well Log

Project Address & Site Specific Location
15410 Main Street NE, Duvall, WA 98019, W of MW-5 in sidewalk

Coordinates

Exploration Number

NA

MW-12

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev.

Ecology Well Tag No.
BJE 543

Holt/APS

Vacuum excavator

Grab

NA

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev.

Depth to Water (Below GS)

Josh

Air knife

9/14/2015

NA

5.73' (Static)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
						Concrete sidewalk		
1						Moist, brown SAND (SP); medium sand, trace gravel, no odor, Fill		1
2								2
3			S1		PID= 0.0			3
4								4
5			S2	MW-12-5.5 NWTPH-Gx, BTEXN	PID= 1.2		Very moist to wet, dark gray SILT (ML); trace organics, petroleum odor, downhole PID = 59 ppm	5
6		▼ 9/15/2015						6
7			S3		PID= 0.2		at 7' - becomes slightly gravelly and sandy with a very slight petroleum odor	7
8							Bottom of exploration at 8 ft. bgs.	8
9								9

ASPECT STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECT\SITDOWN CENTER MINI MART_DUVALL_080258.GPJ March 8, 2017

Legend

- No Soil Sample Recovery
- Grab Sample

Water Level

▼ Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: AET
Approved by:

Exploration Log
MW-12

Sheet 1 of 1



Town Center Mini Mart - 080258

Monitoring Well Log

Project Address & Site Specific Location
15410 Main Street NE, Duvall, WA 98019, Across Main St. from MW-11

Coordinates

Exploration Number

NA

MW-13

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev.

Ecology Well Tag No.
BKY 266

Holt/APS

Direct push rig

Percussion hammer

NA

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev.

Depth to Water (Below GS)

Josh

Direct push

9/15/2015

NA

7.07' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
1						Concrete sidewalk		1
2					PID= 0.0	No recovery/Vacuumed to 2 feet		2
3					PID= 0.0	Moist, green gray, gravelly sandy SILT (ML); fine to medium sand, coarse gravel, no odor, till		3
4			S1		PID= 0.0			4
5				MW-13-5 NWTPH-Gx, BTEXN	PID= 0.0	at 5' - becomes very moist		5
6			S2		PID= 0.0	at 6' - becomes dark gray brown and slightly gravelly with trace organics		6
7		9/15/2015			PID= 0.0			7
8						Bottom of exploration at 8 ft. bgs.		8
9								9

Legend

- No Soil Sample Recovery
- Continuous core 1.85" ID

Water Level

Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: AET
Approved by:

Exploration Log MW-13

Sheet 1 of 1

ASPECT STANDARD EXPLORATION LOG TEMPLATE, P:\GINT\PROJECTS\TOWN CENTER MINI MART_DUVALL_080258.GPJ, March 8, 2017



Town Center Mini Mart - 080258

Monitoring Well Log

Project Address & Site Specific Location

Coordinates

Exploration Number

15410 Main Street NE, Duvall, WA 98019, N of MW-12

NA

MW-14

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev.

Ecology Well Tag No.
BJE 544

Holt/APS

Vacuum excavator

Grab

NA

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev.

Depth to Water (Below GS)

Josh

Air knife

9/15/2015

NA

6.46' (Static)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
0						Concrete sidewalk		0
1						Moist, brown SAND (SP); medium sand, no odor; fill		1
2					PID= 0.0			2
3			S1					3
4								4
5								5
6			S2	MW-14-5.5 NWTPH-Gx, BTEXN	PID= 0.3 PID= 0.0	Wet, blue brown gray mottled, slightly gravelly, sandy SILT (ML); fine to medium sand		6
7		▼ 9/15/2015						7
8						Bottom of exploration at 8 ft. bgs.		8
9								9

Legend

▣ Grab Sample

▼ Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: AET
Approved by:

**Exploration Log
MW-14**

Sheet 1 of 1

ASPECT STANDARD EXPLORATION LOG TEMPLATE, P:\GINT\PROJECT\SITDOWN CENTER MINI MART_DUVALL_080258.GPJ March 8, 2017



Town Center Mini Mart - 080258

Environmental Exploration Log

Project Address & Site Specific Location
15410 Main Street NE, Duvall, WA 98019, Across Main St. from MW-10

Coordinates

Exploration Number

NA

AP-11

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev.

Holt/APS

Direct push rig

Percussion hammer

NA

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev.

Depth to Water (Below GS)

Josh

Direct push

9/15/2015

NA

6.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
						Concrete sidewalk		
1						No recovery Vacuumed to 2 feet		1
2			S1		PID= 0.0		Moist, brown gray, gravelly, sandy SILT (ML); fine to medium sand, coarse gravel, no odors; driller notes very dense	2
3					PID= 0.0			3
4								4
5			S2		PID= 0.0			5
6				AP-11-6.5 NWTPH-Gx, BTEXN	PID= 0.0			6
7		▽ 9/15/2015			PID= 0.0		at 6.5' - becomes very moist to wet with blue mottling; trace sand	7
8					PID= 0.0		Bottom of exploration at 8 ft. bgs.	8
9							Note: No well installed - 3" diameter rods required for setting well met refusal at 4' depth.	9

Legend

- ☐ No Soil Sample Recovery
- ▣ Continuous core 1.85" ID

Water Level

▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: AET
Approved by:

Exploration Log
AP-11

Sheet 1 of 1

APPENDIX C

Terrestrial Ecological Evaluation



Voluntary Cleanup Program

Washington State Department of Ecology Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to www.ecy.wa.gov/programs/tcp/policies/terrestrial/TEEHome.htm.

Step 1: IDENTIFY HAZARDOUS WASTE SITE

Please identify below the hazardous waste site for which you are documenting an evaluation.

Facility/Site Name: Town Center Mini-Mart

Facility/Site Address: 15410 Main Street NE, Duvall, WA

Facility/Site No:

VCP Project No.: Not Yet Assigned

Step 2: IDENTIFY EVALUATOR

Please identify below the person who conducted the evaluation and their contact information.

Name: Amy Tice

Title: Project Geologist

Organization: Aspect Consulting, LLC

Mailing address: 401 2nd Avenue South, Suite 201

City: Seattle

State: WA

Zip code: 98104

Phone: 206-838-6585

Fax: 206-838-5853

E-mail: atices@aspectconsulting.com

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

- Yes *If you answered "YES," then answer **Question 2**.*
- No or Unknown *If you answered "NO" or "UNKNOWN," then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? Check all that apply. Then skip to **Step 4** of this form.

Point of Compliance: WAC 173-340-7491(1)(a)

- All soil contamination is, or will be,* at least 15 feet below the surface.
- All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

- All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

- There is less than 0.25 acres of contiguous# undeveloped± land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.
- For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous# undeveloped± land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

- Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

± "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

"Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

- Yes *If you answered "YES," then answer **Question 2** below.*
- No or Unknown *If you answered "NO" or "UNKNOWN," then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

- Yes *If you answered "YES," then answer **Question 3** below.*
- No *If you answered "NO," then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

- Yes *If you answered "YES," then answer **Question 4** below.*
- No *If you answered "NO," then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

- Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*
- Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? Check all that apply. Then skip to **Step 4** of this form.

Exposure Analysis: WAC 173-340-7492(2)(a)

- Area of soil contamination at the Site is not more than 350 square feet.
- Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

- No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

- No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. See WAC 173-340-7493(1)(c).

1. Was there a problem? See WAC 173-340-7493(2).

- Yes *If you answered "YES," then answer **Question 2** below.*
- No *If you answered "NO," then identify the reason here and then skip to **Question 5** below:*
- No issues were identified during the problem formulation step.
 - While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? See WAC 173-340-7493(3).

- Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*
- Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use?

Check all that apply. See WAC 173-340-7493(3).

- Literature surveys.
- Soil bioassays.
- Wildlife exposure model.
- Biomarkers.
- Site-specific field studies.
- Weight of evidence.
- Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

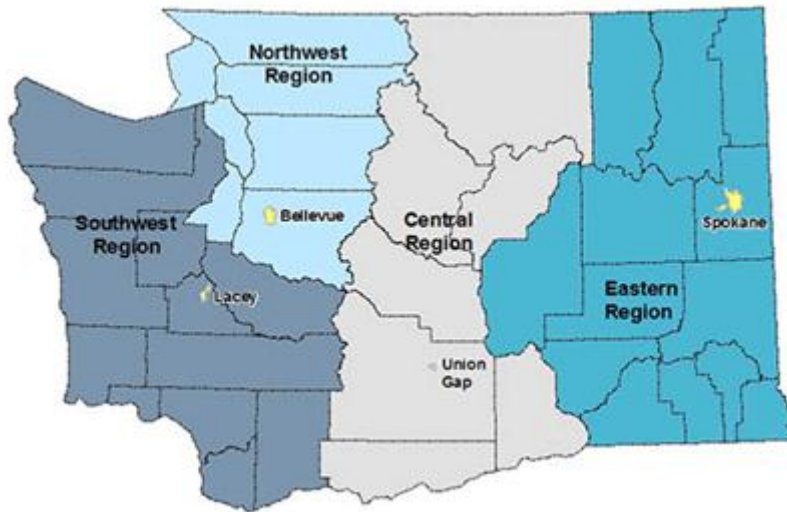
- Confirmed there was no problem.
- Confirmed there was a problem and established site-specific cleanup levels.

5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

- Yes If so, please identify the Ecology staff who approved those steps:
- No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



Northwest Region: Attn: VCP Coordinator 3190 160 th Ave. SE Bellevue, WA 98008-5452	Central Region: Attn: VCP Coordinator 1250 West Alder St. Union Gap, WA 98903-0009
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	Eastern Region: Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

If you need this publication in an alternate format, please call the Toxics Cleanup Program at 360-407-7170. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

APPENDIX D

MTCA Method B Cleanup Level Calculation for TPH

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 05/27/15

Site Name: Town Center Mini-Mart

Sample Name: MW-6-7.5

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
<u>Petroleum EC Fraction</u>		
AL_EC >5-6	62	4.91%
AL_EC >6-8	430	34.08%
AL_EC >8-10	130	10.30%
AL_EC >10-12	12.5	0.99%
AL_EC >12-16	15	1.19%
AL_EC >16-21	2.5	0.20%
AL_EC >21-34	2.5	0.20%
AR_EC >8-10	260	20.61%
AR_EC >10-12	220	17.44%
AR_EC >12-16	26	2.06%
AR_EC >16-21	2.5	0.20%
AR_EC >21-34	2.5	0.20%
Benzene	0.076	0.01%
Toluene	0.14	0.01%
Ethylbenzene	21	1.66%
Total Xylenes	36	2.85%
Naphthalene	5.9	0.47%
1-Methyl Naphthalene	0	0.00%
2-Methyl Naphthalene	0	0.00%
n-Hexane	33	2.62%
MTBE	0	0.00%
Ethylene Dibromide (EDB)	0	0.00%
1,2 Dichloroethane (EDC)	0	0.00%
Benzo(a)anthracene	0	0.00%
Benzo(b)fluoranthene	0	0.00%
Benzo(k)fluoranthene	0	0.00%
Benzo(a)pyrene	0	0.00%
Chrysene	0	0.00%
Dibenz(a,h)anthracene	0	0.00%
Indeno(1,2,3-cd)pyrene	0	0.00%
Sum	1261.616	100.00%

Notes for Data Entry

Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:

Enter site-specific information here.....

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentration (if adjusted)

If you adjusted the target TPH ground water

concentration, enter adjusted value here: ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 5/27/2015

Site Name: Town Center Mini-Mart

Sample Name: MW-6-7.5

Measured Soil TPH Concentration, mg/kg: **1,261.616**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	4,335	4.18E-09	2.91E-01	Pass
	Method C	80,987	5.60E-10	1.56E-02	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	29	6.33E-06	2.55E+00	Fail
	Target TPH GW Conc. @ 800 ug/L	51	NA	NA	Fail

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

Warning! Check Residual Saturation (WAC340-747(10)).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	4,334.73	80,986.53
Most Stringent Criterion	HI =1	HI =1

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	4.33E+03	1.44E-08	1.00E+00	YES	8.10E+04	3.60E-08	1.00E+00
Total Risk=1E-5	NO	3.01E+06	1.00E-05	6.95E+02	NO	2.25E+07	1.00E-05	2.78E+02
Risk of Benzene= 1E-6	NO	3.01E+05	1.00E-06	6.95E+01	NA			
Risk of cPAHs mixture= 1E-6	NA	NA	NA	NA				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	HI=1
Protective Ground Water Concentration, ug/L	505.15
Protective Soil Concentration, mg/kg	29.30

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	5.05E+02	3.94E-07	1.00E+00	2.93E+01
Total Risk = 1E-5	NO	1.48E+03	9.43E-06	2.65E+00	100% NAPL
Total Risk = 1E-6	NO	1.02E+03	1.00E-06	1.95E+00	7.68E+01
Risk of cPAHs mixture= 1E-5	NA	NA	NA	NA	NA
Benzene MCL = 5 ug/L	NO	1.45E+03	6.29E-06	2.55E+00	1.24E+03
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 67000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 800 ug/L	8.00E+02	6.74E-07	1.56E+00	5.06E+01

APPENDIX E

Review of Potential Remedial Technologies

E.1 Institutional Controls

Institutional controls are measures that allow contaminated materials to remain onsite by controlling access or exposure to those materials through administrative means. An example of an institutional control is placing an environmental covenant on the property deed to limit or prohibit activities that may interfere with the integrity of a cleanup action or result in exposure to hazardous substances.

Advantages

- Can be easy to implement without disrupting operations.
- Relatively low cost.

Limitations

- Does not address the destruction or remediation of COCs.
- Not sufficient to prevent migration of COCs, if that is a risk.
- May result in restrictions on the property use.

Summary Evaluation

Because of its low cost and ease of implementation, institutional controls can be a valuable component of a remediation strategy at the Site; however, it will not achieve RAOs as a stand-alone alternative and would need to be combined with other technologies to address remediation of COCs.

E.2 Engineering Controls

Engineering controls are measures that allow contaminated materials to remain on site by controlling access or exposure to those materials through physical means. Engineering controls can be passive or active. Examples of passive engineering controls include permeable or impermeable caps or vapor barriers over impacted media to prevent contact or exposure to soil, groundwater, and/or vapor. An example of an active engineering control is an impermeable cap such as an asphalt parking lot that prevents direct contact with impacted media.

Advantages

- Can be easy to implement without disrupting operations.
- Relatively low cost.

Limitations

- Does not address the destruction or remediation of COCs.
- Not sufficient to prevent migration of COCs, if that is a risk.
- May result in restrictions on the property use.

Summary Evaluation

Because of its low cost and ease of implementation, engineering controls can be a valuable component of a remediation strategy at the Site; however, it will not achieve RAOs as a stand-alone alternative and would need to be combined with other technologies to address remediation of COCs.

E.3 Monitored Natural Attenuation

COCs in site soil and groundwater will be slowly removed *in situ* by natural processes, such as biodegradation by native bacteria. This technology involves periodic monitoring of soil, groundwater, and/or air to evaluate remediation progress and ensure continued protectiveness.

Advantages

- COCs are permanently destroyed.
- Easy to implement without disrupting operations.
- Relatively low cost.

Limitations

- Remediation time with this technology may be a decade or more.
- Not sufficient to prevent migration of COCs, if that is a risk.

Summary Evaluation

Because of its low short term cost and ease of implementation, monitored natural attenuation can be a valuable component of a remediation strategy at the Site; however, it is unlikely to achieve RAOs as a stand-alone alternative and would need to be combined with other technologies to ensure protectiveness during the relatively long restoration timeframe.

E.4 Soil Vapor Extraction

COCs in soil above the water table can be removed by applying a vacuum to wells and treating constituents removed in the extracted soil gas. Equipment required with this technology includes wells, piping, a vacuum blower, moisture knockout pot, and treatment equipment (e.g., activated carbon vessels or a catalytic oxidizer). General operational requirements include electricity for the vacuum blower and catalytic oxidizer, disposal of generated wastes (condensate water and spent carbon), equipment maintenance, and air monitoring.

Advantages

- COCs are permanently destroyed.
- Relatively non-disruptive technology (will require temporary disturbance to install wells and piping).
- Area of treatment can extend underneath otherwise inaccessible utility areas.

Limitations

- Removal of COCs from low-permeability soils can be limited by the rate of diffusion through these soils.
- Not effective in groundwater or soil below the water table.

Summary Evaluation

SVE is not considered an effective technology for low permeability soils, such as those found at the Site. Further, the relatively shallow contamination is beneath a higher permeability landscaped area, which would likely lead to short circuiting of surface air through preferential pathways into the system. Year-to-year operating costs are moderate but can accrue significantly if remediation progresses slowly. Therefore, SVE is unlikely to achieve RAOs and this technology is not considered to be a viable option for the Site.

E.5 Air Sparging

COCs can be physically removed from Site soil and groundwater by aggressively injecting air in wells screened below the water table. Volatile contaminants evaporate into the injected air, which is typically collected and treated by a soil vapor extraction system. Equipment required with this technology includes wells, piping, and an air compressor. Operation requirements include electricity for the air compressor, equipment maintenance, and air monitoring.

Advantages

- COCs are permanently removed and destroyed (if collected/treated with soil vapor extraction).
- Relatively non-disruptive technology (will require temporary disturbances to install wells and piping).
- Area of treatment can extend underneath otherwise inaccessible facility areas.

Limitations

- Preferential pathways for subsurface air movement may still result in incomplete treatment in some areas.

Summary Evaluation

Air sparging is not considered an effective technology for low permeability soils, such as those found at the Site. Year-to-year operating costs are moderate but can accrue significantly if remediation progresses slowly. Therefore, this technology is not considered to be a viable option for the Site.

E.6 Dual-Phase Extraction

This approach uses soil vapor extraction in conjunction with groundwater pumping to depress the water table, which exposes shallow saturated soils to treatment by soil vapor extraction, and provides hydraulic containment and removal of COCs in Site groundwater. Because the removal of groundwater COCs by groundwater pumping is generally not cost-effective, this technology is often applied in conjunction with air sparging to provide additional groundwater treatment. In addition to equipment required by soil vapor extraction, this technology requires either submersible pumps or a high-vacuum blower to remove water, and additional treatment equipment. Water disposal would require obtaining a sewer discharge authorization and possibly treatment prior to discharge.

Advantages

- COCs are permanently removed and destroyed.
- Provides hydraulic control of chemical migration as well as on-site treatment.
- Area of influence from pumping would extend underneath inaccessible areas of the facility.

Limitations

- Low permeability soils limit the groundwater yield.
- Will require significant above-ground space for required equipment.
- Relatively high cost for water disposal.

Summary Evaluation

Groundwater removal and soil vapor extraction are not considered effective technologies in low permeability soils. Hydraulic control does not appear to be necessary given the age of the release and the delineated groundwater impacts at the Site to date. Given the technical challenges and cost associated with this technology, it is not considered to be a viable option for the Site.

E.7 Enhanced Aerobic Biodegradation

Enhanced aerobic bioremediation is the practice of adding oxygen (an electron acceptor) to groundwater and/or soil to increase the number and vitality of indigenous microorganisms already naturally performing biodegradation of COCs at the site. Application is typically accomplished via injection of a liquid or slurry compound to provide oxygen to the subsurface. This process is performed in several discrete injection events and does not require continuously-operating equipment on-site.

Advantages

- COCs are permanently destroyed *in situ*.
- Easy to implement without significantly disrupting operations.
- Can enhance remediation in otherwise inaccessible areas by altering groundwater conditions over a localized area.

Limitations

- Although faster than natural attenuation, the benefits may be difficult to measure as compared to natural attenuation alone. Remediation time with this technology may be a decade or more.
- Shallow injections and preferential pathways may pose a challenge for effective injection of amendments.
- Generally, not effective in soil above the water table.

Summary Evaluation

Enhanced aerobic biodegradation is not typically cost-effective for source removal, but is applicable at the Site as a polishing technology. Although faster than unassisted natural attenuation, this is still a somewhat slow process that can take several years to reach closure and may require multiple injection events. Low permeability soils, such as those found at the Site, prevent adequate distribution throughout the subsurface. Additionally, high concentrations of soil impacts will continue to act as a source to groundwater; therefore, this is not considered a viable technology at the Site.

E.8 *In Situ* Chemical Oxidation

For chemical oxidization, a strong oxidizing chemical (e.g., ozone, Fenton's reagent, activated persulfate, permanganate) is injected into groundwater or mixed into soil to react and mineralize (i.e., convert to carbon dioxide and water) organic contaminants. Ozone is typically applied in gas form as part of air sparging; Fenton's reagent and activated persulfate are typically injected as liquid solutions into groundwater.

Advantages

- COCs are permanently destroyed *in situ*.
- Does not require installation of permanent wells, piping, or equipment which may help minimize disruption to business operations.
- Potential area of influence could extend underneath inaccessible areas of the Site.

Limitations

- Shallow injections and preferential pathways may pose a challenge for effective injection of amendments.
- Generally, not effective in soil above the water table.

Summary Evaluation

The success of this technology is highly dependent on the chemical oxidant physically coming into contact and reacting with COCs in soil and groundwater and may be limited by the potential for "day-lighting" and preferential flow of the injected amendment as a result of the relatively shallow treatment zone and utility corridors. Due to the low permeability soils found at the Site, and the proximity of impacts next to a utility corridor with relatively higher-permeability soils, *in-situ* chemical oxidation is not considered a viable technology for addressing residual source area contamination at this Site.

E.9 Soil Excavation

This technology involves removing contaminated soils and transporting the soil to a permitted disposal facility (e.g., landfill or soil recycler). Soil can be removed by a variety of techniques; shallow soil is typically removed with an excavator, while deeper soil may be removed using overlapping augers or a shored excavation.

Advantages

- For soil that can be accessed, this is the most certain method of removing COCs from the site.
- For shallow impacted soils, excavation coupled with off-site disposal is typically the most cost-effective active remedial measure.

Limitations

- Excavation costs increase significantly with depth and proximity to load bearing structures and buildings, particularly when shoring and/or dewatering is required.
- Impacted soil beneath buildings and roadways requires the demolition of those structures and surfaces to access soil.
- Excavation is disruptive, particularly when the removal is not consistent with site development plans.

Summary Evaluation

Impacted soil at the site is relatively shallow and appears to be bounded within the property line, in the parking area and landscaped area away from buildings and other structures that prevent access. Subsurface utilities that pass through the excavation area would need to be protected or temporarily re-routed. Parking would be disrupted during excavation activities, but access to the pump islands and store would remain. Due to the accessibility of impacted soil and relatively shallow depth, this technology is a viable option for the Site.

