DOWNGRADIENT GROUNDWATER MONITORING WELL INSTALLATION REPORT

Performed for:
Fife RV Center
VCP SW1565
3410 Pacific Highway East
Fife, Washington 98424

AEROTECH
Environmental Consulting Inc.

April 27, 2018

Anchorage Seattle Portland

Cost-effective environmental solutions
for the western United States and Alaska

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Clients:	**Fife RV Center** VCP SW1565 3410 Pacific Highway East Fife, Washington 98424
Point of Contact:	**Chris LaVerdiere** Representative of Ownership Group
Property:	**Fife RV Center** 3410 Pacific Highway East Fife, Washington 98424 Department Of Ecology VCP Site SW1565
County:	Pierce County, Washington Parcel Number: 0320111067
Commercial Activity:	RV Retail
Project Number:	218-4034
Licensed Geologist:	Justin Foslien (Washington State License No. 2540)
UST Site Assessor:	Nicholas Gerkin
Report Date:	April 27, 2018

EXECUTIVE SUMMARY

The subject Property consists of one irregularly-shaped 3.76-acre Parcel of commercial land located on the south side of Pacific Highway East in Fife, Washington. One approximately 10,763 square foot, 2- story structure, occupied by *Fife RV Center,* is situated near the southeastern corner of the Property. Asphalt parking areas surround the structure on all sides and are utilized to display RVs. A 0.77-acre gravel parking lot utilized to store RVs, and the subject of this investigation, is situated on the west side of the Property.

Adjoining to the south is a drainage ditch that appear to discharge to the east, followed by Interstate 5. The neighboring Parcel to the east includes approximately 5.24 acres, currently leased by the Fife RV Center for use as additional storage. The Puyallup River approaches the Site within 3,000 feet to the southwest, and the Blair Waterway and Commencement Bay are located over 3,500 feet to the north.

Formerly included within the same Parcel, and now adjoining to the north, is a Tahoma Express Gas Station and a Jack in the Box restaurant followed by Pacific Highway East and an *Econolodge.* The Tahoma Express Gas Station was listed on Ecology's Site Cleanup List as Site No. 5015. Petroleum hydrocarbons were documented at the Tahoma site prior to remediation, at concentrations above the State Cleanup Levels in soil and groundwater. Ecology issued a No Further Action determination for that site in 1993.

From the mid 1960's to the late l980's a *Gasamet* gasoline station occupied the western portion of the western gravel paved lot on the Subject Property and the southern portion of the Jack in the Box Property. Fuel dispenser islands were located south and east of the eastern terminus of the current restaurant drive-thru, with Underground Storage Tank Basins situated both to the east and west, and a building farther south. A triangular-shaped wooded water retention area (Bio-Swale) is located at the west side of the Site. In 2014, *Associated Earth Sciences,* Inc. conducted a *Supplemental Phase II Environmental Site Assessment* at the subject Property. Petroleum hydrocarbons were detected at concentrations above the Model Toxic Control Act ("MTCA") Method A Cleanup Levels in soil and groundwater samples in the vicinity of the former Gasamet pump islands and UST Basins. Based on these results, Mr. Chris LaVerdiere, the Client, requested *Langseth Environmental* ("Langseth") *and Aerotech Environmental Consulting, Inc.* ("Aerotech") initiate site remedial excavation and environmental consulting services to address petroleum impacted soils.

1,685.24 tons of petroleum impacted soil were removed in late 2016. The first six groundwater monitoring wells were installed immediately thereafter, followed by upgradient wells (MW7, MW8, and MW9) in July of 2017.

Groundwater Monitoring Well Installation: Conclusions & Recommendations:

Well Installation and Design: On February 23, 2018, BoreTec Drilling, Inc., along with Aerotech Environmental Consulting, Inc. installed three 2-inch diameter PVC Groundwater Monitoring Wells west and southwest of the former *Gasamet*-related station features. Two wells, MW11 and MW12, were installed on the southside of the Bio-Swale pond, downgradient groundwater flow direction to the west and southwest. The other well, MW10, was installed downgradient groundwater flow direction from groundwater monitoring well MW2. Groundwater Monitoring Wells MW10 and MW12 were screened from 4 to 14 feet bgs. MW11 was screened from 2 to 9 feet bgs. Wells were developed by surge block and pump method on February 28, 2018.

Soil Analytical Results: Nine soil samples collected during well installation operations were analyzed. petroleum constituents, lead, PCBs and VOCs were not detected above the MTCA Method A Cleanup Levels except for MW12(7), which contained gasoline concentrations above. Refer to Table 1.

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INTRODUCTION

Aerotech Environmental Consulting, Inc., was retained by Mr. Chris LaVerdiere, the Client to install six recommended groundwater monitoring wells at the subject Property at 3410 Pacific Highway East in Fife, Washington, following the completion of remediation activities at the Site in October 2016. Six groundwater monitoring wells were to be installed around the perimeter of fuel tanks and fuel dispenser pump islands associated with a former Gasamet retail station, formerly located at the western portion of the Fife RV Center gravel parking area. In response to comments in a Department of Ecology opinion letter dated May 31, 2017, the client approved the installation three additional groundwater monitoring wells south and east of the former fuel tank and fuel pump island area. Groundwater monitoring wells MW10-MW12 were installed downgradient of existing monitoring wells MW2 and MW4 that consistently contain concentrations of gasoline and benzene above MTCA Method A Cleanup Levels.

SECTION I.

SITE DESCRIPTION

Property Exterior Description:

The subject Property consists of one irregularly-shaped 3.76-acre Parcel of commercial land located on the south side of Pacific Highway East in Fife, Washington. One approximately 10,763 square foot, 2-story structure, occupied by *Fife RV Center,* is situated near the southeastern corner of the Property. An approximately 1,000 square foot, 1-story structure is situated northeast of the main building along the eastern Property boundary. Asphalt parking areas surround the structure on all sides and are utilized for the storage and display of the RV inventory. An approximately 0.77 acre gravel parking lot, the subject of this investigation, and utilized to store RV inventory, is situated on the west side of the Property.

Adjoining to the south is a drainage that appears to discharge to the east and then south, followed by Interstate 5. The neighboring Parcel to the east includes approximately 5.24 acres, currently leased by the Fife RV Center for use as additional storage. The Puyallup River is approaches the Site within 3,000 feet to the southwest, and the Blair Waterway and Commencement Bay are located over 3,500 feet to the north. Wapato Creek is situated 2,000 feet to the east and Hylobos Creek is located two miles to the east.

Formerly included within the same Parcel, and now adjoining to the north, is a Tahoma Express Gas Station and a Jack in the Box restaurant followed by Pacific Highway East and an Ecolodge. The Tahoma Express Gas Station was listed on Ecology's Site Cleanup List as Site No. 5015. Petroleum hydrocarbons were documented historically at the Tahoma site prior to remediation at concentrations above the State Cleanup Levels in soil and groundwater. Ecology issued a No Further Action determination in 1993.

Numerous utilities were located at the Site by private and public locators, included a water main oriented northwest ot southeast, extending from the northwest corner of the Property. Parallel and to the northeast, nearer the Tahoma building, are electrical and natural gas conduits, as well as a storm sewer line. Electrical lines also extend from a power pole along the southern perimeter of the Site toward both the restaurant and the Tahoma building. A storm sewer pipe also extends toward the southwestern corner of the gravel lot, from the vicinity of the Tahoma building. Refer to the attached figures. Updated maps will be

available in the April 2018 Groundwater Monitoring Report. A fenced and wooded water retention pond, known as a bioswale, is situated on the subject property, west of the area of this investigation.

Recognized Environmental Conditions

Site Discovery and Regulatory Status:

From the mid 1960's to the late 1980's a Gasamet gasoline station occupied the western portion of the western gravel paved lot on the Subject Property and the southern portion of the Jack in the Box Property. Fuel dispenser islands were located south and east of the eastern terminus of the current restaurant drive-thru, with Underground Storage Tank Basins situated both to the east and west, and a building farther south. A triangular-shaped wooded water retention area (Bio-Swale) is located at the west side of the Site. In 2014, *Associated Earth Sciences,* Inc. conducted a *Supplemental Phase II Environmental Site Assessment* at the subject Property. Petroleum hydrocarbons were detected at concentrations above the Model Toxic Control Act ("MTCA") Method A Cleanup Levels in soil and groundwater samples in the vicinity of the former Gasamet pump islands and UST Basins. Ecology accepted Fife RV Center into Voluntary Cleanup Program ("VCP") with the designation SW1565.

Previously Identified Contaminants of Concern:

Conclusions derived from previous investigations at the Site identified gasoline range petroleum constituents, benzene, ethyl benzene, toluene, and xylenes as Contaminants of Concern at the subject Property. One additional borehole (B-1) was advanced in the unexcavated water main hot zone northwest of MW-3 to document additional MCTA Table 830 parameters: PCBs, Carcinogenic PAHs, Chlorinated Volatile Organic Compounds, and fuel additives (EDB, EDC, and MTBE).

Site Observations and Reported Conditions:

With the exception of the above referenced environmental concern. There were not additional Recognized Environmental Conditions or concerns identified as potential impacts to the Site.

SECTION II.

FIELD WORK

Notifications – "Public Utilities":

A public utilities locate notification was performed prior to the start of work. Aerotech Environmental Consulting, Inc. Performed the "public" utilities notification on February 7, 2018, and was issued Ticket Number 18046656 by the Utilities Underground Location Center.

According to the Utilities Underground Location Center the utilities necessary for notification included:

District	Company	Marking Concerns	Customer Service	Repair
CC7711	COMCAST CABLE	(800)762-0592	(800)266-2278	(855)537-6296
ELCLT01	ZAYO FNA INTEGRA TELECOM	(888)267-1063	(443)403-2023	(888)267-1063
FIFE01	CITY OF FIFE	(253)922-9315	(253)922-9315	(253)922-9315
MCCHRD01	MC CHORD PIPELINE COMPANY	(253)383-1651	(253)383-1651	(253)383-1651
MTRMED01	ZAYO FNA ABOVENET	(888)267-1063	(443)403-2023	(888)267-1063
OLYPE01	BP/OLYMPIC PIPE LINE COMPANY	(425)981-2517	(425)981-2517	(888)271-8880
PUGE07	PUGET SOUND ENERGY ELECTRIC	(888)728-9343	(888)225-5773	(888)225-5773
PUGG07	PUGET SOUND ENERGY GAS	(888)728-9343	(888)225-5773	(888)225-5773
QLNWA24	CTLQL-CENTURYLINK	(800)778-9140	(800)283-4237	(800)573-1311
TACPWR01	TACOMA PWR & CLICK NETWORK	(253)502-8263	(253)502-8600	(253)383-0982
WSDOT10	WA DOT - OLYMPIC REGION	(360)357-2647	(360)357-2647	(360)357-2647

Site Landscaping:

Additionally, Aerotech engaged personnel of Larson Excavating Inc. of Tacoma, Washington to clear a path through vegetative overgrowth and enable access for vehicles and equipment related to private locating and monitoring well installation activities. The clearing of brush and trees occurred on February 12, 2018.

Private Utilities Location:

Additionally, Aerotech engaged personnel of Mountain View Locating Services of Bonney Lake, Washington to locate building and site utilities on February 22, 2018, prior to the start of the on Site drilling activities. No unanticipated or unexpected situations were discovered or encountered during the "private" locating activities.

Based in part upon pavement markings made by utility location technicians; the location of utility fixtures such as water, electrical, or manholes, and the presence of anomalies detected by induction or ground radar methodologies, monitoring well locations were chosen.

Ground Penetrating Radar Survey:

A Ground Penetrating Radar ("GPR") Survey conducted by Mountain View Locating Services staff on February 18, 2017 in order to augment the induced current methodology, and to verify the presence of utility trenches such as sewer and water main trenches. Mr. Dave Schaff of Mountain View Locating Services, LLC employed Radar equipment utilizing Dual Frequency Antennae (300 MHz/800 MHz) manufactured by Geophysical Survey Systems. The locations of the water main and storm sewers were confirmed by means of GPR activities.

Site Activities:

Three groundwater monitoring wells were installed on February 23, 2018, under contract with Aerotech Environmental Consulting, Inc. All the work was performed during normal business hours. No unusual or unforeseen circumstances occurred during the Site activities.

Drilling Activities:

Drilling operations utilized a Track-mounted Hollow Stem Auger Drilling Rig, equipped with 1.5-foot stainless steel split spoon sampling tools.

The subsurface soil borings were performed by equipment owned and operated by Licensed Driller from Boretech, Inc. of Valleyford, Washington. The on Site drilling equipment was operated by personnel employed by Boretech, Mr. Carlos Gardea (State of Washington Department of Ecology Well Drillers License No. 3143). All subsurface work was overseen by State of Washington Licensed Geologist, Mr. Justin Foslien (State of Washington License No. 2540). The laboratory analytical services were performed by a State of Washington licensed lab, Advance Analytical Labs located in Redmond, Washington.

Soil Borings:

A total of three borings were advanced and three groundwater monitoring wells were installed in the gravel lot situated south of the Tahoma Gasoline Station convenience store building, south and east of the former Gasamet Gasoline Station tank and fuel pump area (Figure 4).

Soil Sample Collection:

A total of 9 discrete soil samples were collected on February 23, 2018 at three soil boring locations.

Soils collected from each location were visually inspected for color quality and evidence of discoloration, and physically observed for the purpose of recording composition and noting odor, where distinctive. Each sample was handled with a fresh pair of clean latex gloves. Samples were placed in sterile four-ounce glass jars and/or 40cc glass vials preserved with 5ml methanol in accordance with procedures specified for USEPA Method 5035A.

Each sample was given a unique identifier number and placed in an iced cooler for sample preservation. Samples were held in the custody of the project manager, Nicholas Gerkin, and ice was checked and replenished while samples were held in the evening and maintained to the time of delivery to the lab. A Chain of Custody was maintained to record details associated with the collection and handling of each sample. The remaining soil samples were retained by the laboratory for analysis if the soil samples selected for laboratory analysis revealed elevated levels of constituents. Following the production of the initial Site sample results for soil, no follow-up laboratory analyses were requested for the subject Site, as of the date of this report.

Installation and Design of Groundwater Monitoring Wells:

On February 23, 2018, groundwater monitoring wells MW10, MW11 and MW12 were installed at the Site.

At each well location, a two-inch diameter Schedule 40 PVC groundwater monitoring well was installed to a depth between 14 feet bgs or 9.6 and 10 feet of 2-inch diameter No. 10 PVC Slotted screen was installed between 4.0 and 14 feet bgs.to accommodate a wider range of fluctuations in groundwater levels.

The annular space in each case was completed with clean Colorado silica sand sized to the No. 10 screen (No. 10 to No. 20 grade), to a depth of 1.0 feet above the top of the well screen interval. The remaining annular space was sealed with bentonite chips to within one foot of the surface to prevent the infiltration of surface water or contaminants to the depth of the screen interval. The well was completed with a sealable

expansion cap and cement was placed above the bentonite to secure a traffic-rated flush mounted well-head monument.

Well design details are depicted in the attached Soil Boring Logs. The Department of Ecology does not permit groundwater to be collected from a newly installed groundwater well until the well system has been allowed to chemically equilibrate for a period of at least 72 hours. This waiting period is designed to allow the groundwater environment to return to its natural state, representing conditions prior to the disturbance caused by the well installation process. Groundwater monitoring wells were developed by Aerotech on April 5, 2018 and subsequently sampled on February 28, 2018. Standard operating procedures for well development as well as field documentation are included in the Appendices.

Well Identification	Well Tag	Total Depth (feet bgs)	Approximate Screened Interval (feet bgs)*	Elevation of Well Head (feet bgs)*
MW10	BJN085	15	4-14	TBD
MW11	NA (<10')	10	2-9	TBD
MW12	BJN086	15	4-14	TBD

Equipment Decontamination:

All sample acquisition equipment was decontaminated before and after the completion of each borehole to eliminate the potential for cross-contamination between borings, as required. All reusable sampling equipment for soil sampling, drive rods, and probes were decontaminated after each sampling point by washing with an Alconox-distilled water solution and rinsing with distilled water.

Site Restoration:

Each borehole was complete as a groundwater monitoring well. No landscape restoration was necessary.

SECTION III.

GEOLOGY AND HYDROGEOLOGY

Surface Characteristics:

The precise Property location is N 47 14' 34.44" / W 122 22' 58.80" as determined by DeLorme mapping data. The Site is located in Universal Transverse Mercator Zone 11, and has an elevation of approximately 9 to 12 feet above mean sea level. As observed during Site reconnaissance and confirmed on the USGS topographic map, the subject Property is relatively flat, with graded gravel or adjoining paved surfaces in the study area sloping toward two storm water catch basins located near the north fence line. The surface within five to ten feet of the southern Property margin slopes markedly to the level of the ditch to the south, which may perhaps as much as 6 to 8 feet below the average grade of the gravel lot.

Similarly, adjoining to the west is a triangular-shaped bioswale in which a pond exists near its center. The water level in this pond appears to be situated at depths of approaching 6 to 8 feet below the elevation of the gravel lot, consistent with groundwater depths documented at locations MW-4, MW-5, and MW-6. Although isopleth maps generated by the excavation team in the Remedial Excavation Report dated November 18, 2016, generated by the excavation team's software, were depicted with closed isoconcentration contours beyond (west of) the western perimeter of the current study area (within the fenced bioswale area), based upon observed but unsurveyed bioswale water levels in 2017 (not readily accessible in July and August 2017 due to thick overgrowth), it is assumed that the bioswale is likely unlined and that a hydraulic connection between groundwater at the Site and the adjoining bioswale and ditch does exist.

As is commonly the case in low-lying areas near sea level, many roads and properties appear to be elevated as much as four or more feet above the original grade. Evidence of the original grade may be seen in the decrease in elevation evident north of Pacific Highway East, north of the subject Property. The 1897 USGS 15-Minute Topographic Map depicts Commencement Bay estuaries and tidelands as they existed prior to development with fill. The subject Site is depicted as located within a few hundred feet of a small embayment, representing the relatively close approach of the high tide mark during that period.

A ditch is located a few tens of feet south of the Property. A second tributary ditch is located east of the property adjoining to the east. Pacific Avenue East is elevated approximately four feet above the Site. A Storm Water Systems Map update, published by the city of Fife, suggests that the adjoining ditch to the south discharges to the east, and is subsequently directed via pipe to the south, underneath Interstate 5, and ultimately to a ditch system parallel to the east side of the Puyallup River levee system, and to Commencement Bay.

The regional topography within the Commencement Bay tidal flats is that of the nearly planar surface generated by the placement of artificial fill material in the later decades of the nineteenth century and the early years of the twentieth century. Elevations on ridges over one mile to the south increase to more than 200 feet MSL, at the northernmost margins of the south Tacoma upland area.

Geology:

The Puget Sound lies within a tectonic trough situated between the Olympic Mountains to the west, and the northern Cascade Mountains to the east. This trough is characterized by fault zones accommodating north-south compressional rotation, commonly resulting in predominant north-south and northwest-southeast oriented faults and fault zones. Elliott Bay lies north of the Seattle Fault Zone while Tacoma's Commencement Bay lies south of the northernmost Tacoma Fault zone rupture. A major fault is mapped below the bluffs on which central Tacoma was developed, along the western margin of Commencement Bay. Commencement Bay and the Puyallup River Basin lie on the down dropped side of the fault. The original surface within Commencement Bay intertidal zone has been elevated by the emplacement of fill throughout the early 20th century. The uppermost soils in the Puyallup River Valley are dominated by alluvial and fluvial sediments.

Deep borehole data indicate a total of approximately 1 ,800 feet of unconsolidated glacial and interglacial sediments in the former tidal flats in the vicinity of the subject Property.

The subject Property and vicinity, south of the Blair Waterway, are mapped as Quaternary Alluvium. These soils are characterized as:

> "Gravel, sand, silt, and clay. Deposited chiefly by modem streams, but includes some swamp deposits. Includes marine deposits near the mouth of the Puyallup river.... thickness ranges from a few feet to as much as 600 feet. Yields small to moderate quantities of water to wells. Locally capable of large yields."

Hydrogeologic Framework, Groundwater Movement, and Water Budget in the Puyallup River Watershed and Vicinity, Pierce and King Counties, Washington, U.S. Geological Survey Scientific lnvestigations Report 2015-5068, Wendy B. Welch, et al, 2015.

Ground-Water Occurrence and Stratigraphy of Unconsolidated Deposits, Central Pierce County, Washington, Water Supply Bulletin No. 22, State of Washington, Department of Water Resources, Kenneth L. Walters and Grant E. Kimmel, 1968

Geologic Map of the Tacoma North 7.5' Quadrangle, King and Pierce Counties, Washington, US Geological Survey, unpublished draft.

Geologic Map of the City of Tacoma, Pierce County Washington, Mackey Smith, 1977, and unpublished maps on topographic base by Timothy J Walsh, Washington State Department of Natural Resources, circa 1987.

Groundwater Hydrology of the Tacoma-Puyallup Area, Pierce Country, Washington, USGS Water Resources Investigation 99-4013, M.A. Jones, L.A. Orr, J.C. Ebbert, and S.S. Surnioka, 1999.

The following soils were encountered during drilling activities: Approximately 5 to 6 feet of gravelly well-graded sand fill was generally underlain by 8 or more feet of silt or very fine sand and silt. Two 2-4-foot thick poorly graded sand lens(es) were encountered above or below the silt encountered. Consistent with historical evidence, MW10, MW11 and MW12 appear to have been advanced within a disturbed mixture of fill and natural alluvial sands, underlain by flood plain tidal flat estuary silt deposits.

Soils encountered during the February 2018 well installation and boring activities, are depicted in soil boring logs attached to this report. They are summarized as follows, with upper units indicated first:

UPPER: Gravel and Sand Fill - 2.5 to 10 feet thick; increasing fill thickness to the east
MIDDLE: Silt with some to little fine sand – 1 to 10 feet thick
LOWER: Sand, very fine - at least 2 to 5 feet thick

Subsurface and Hydrogeological Characteristics - Groundwater Flow:

The principal aquifers in the Puget Sound Region occur within a series of units of glacial drift, hydraulically separated by less permeable deposits commonly including interglacial deposits. One exception, the Vashon till, serves as an aquitard as well, restricting the vertical and lateral migration of groundwater and of contaminants. These deposits underlie the Puget Lowlands basin to depths often approaching 2,000 feet or more. Sand and gravel units within the glacial drift form the principle aquifers. These aquifers receive ample recharge from the typically heavy precipitation characteristic of western Washington. The glacial drift in the Puget Sound region varies greatly in composition and water yielding capacity. Typically, wells in glacial drift tapping sand- or gravel-rich glacial deposits or till in the region above depths of 100 feet may have yields of 100 gallons or more per minute. Deeper wells tapping thick, confined aquifers of highly permeable gravel and coarse sand, often at depths greater than 250 feet, can yield over 1,000 gallons per minute.

The calculated groundwater flow direction at the Site is to the west and west southwest. Flow, based upon the potentiometric surface map, consistent with that calculated during previous quarterly sampling events, is toward the bioswale to the west and the ditch to the west-southwest. Groundwater gradients increased markedly in close proximity to the ditch and bioswale areas, within a few tens of feet of the southwest corner of the Site. Surface water and groundwater data is not yet available for either the ditch or bioswale area. However, visual observations of water levels in the bioswale during 2016 and 2017 suggest hydraulic connectivity between groundwater and both the bioswale and ditch are likely.

Static water levels north and east of the subject Property have been recorded by other consultants between depths of three to six feet bgs. During the AESI Phase II, water levels were reported to range from three to seven feet bgs on the subject Property. Ditches in the vicinity are estimated to be as much as four to five feet deep. Groundwater flow direction has been documented at the property to the north as flowing to the south-southwest; to the west and southwest at the current Travelodge property, adjacent to the east; and at the former Texaco Station, adjacent to the northwest, as flowing to the west-southwest, or to the south or southwest. Topography is not always a reliable basis for predicting groundwater flow direction, and flow may vary considerably from site to site, according to local influences such as the presence of production or irrigation wells and variations in geologic material and the geometry of distinct geologic units.

A groundwater divide, north of which groundwater flow may be expected to flow toward Commencement Bay, is likely present perhaps as near as a few hundred feet to the north of the Site; this groundwater divide may migrate considerable. The straightened and levi-bound Lower Puyallup River channel is located approximately 3,000 feet south west of the subject Property. Groundwater in the vicinity of the Site, based upon water level data may flow predominantly in the direction of the Puyallup River channel, but may also flow to the west or northwest where the groundwater system is influence by elevated Puyallup River water levels during flood stage or the wet winter seasons.

Components of an extensive ditch system are visible south of the Site, along the northern and southern margins of Interstate 5, and north of Pacific Highway East. Portions of the ditch system to the north may discharge to Wapato Creek to the east. Ditches to the south do not appear to be connected to the system to the north. The ditch adjoining the Site appears to discharge to the east, and then to the south via pipe underneath Interstate 5. When the water table is low, during dry summer months, water entering ditches may, in part, infiltrate vertically to a seasonally low water table; when the water table is higher, during wet winter periods, groundwater may discharge to deeper drainage ditches.

Because tidal fluctuations approach 15 or more feet in the Tacoma area, rythmic fluctuations in ground water levels twice daily and flow direction may occur within some low lying areas near Commencement Bay. Under some conditions, tidal fluctuations may potentially influence groundwater flow at the subject Property, given its location approximately 3,000 feet from the Blair Waterway and approximately 3,000 feet northeast of the Puyallup River channel. Groundwater flow direction at low tide may potentially be diverted somewhat to the west or even northwest. The predominant groundwater flow direction south of this nearby section of Pacific Highway appears to be to the west-southwest or west. At this time, insufficient data is available and determinations associated with tidal influence upon groundwater flow direction cannot be made. The Puyallup River in the area has been straightened and is protected by a levy system. Aside from the immedate influence of the designed ditch system at and near the Site, it is at this time expected to represent the primary boundary condition likely to influence overall groundwater flow near the Site.

Jones, Orr and Ebbert depict the shallow alluvial aquifer of Commencement Bay as hydraulically connected to adjoining glacial aquifers above; in general groundwater is expected to flow from the bluffs above, toward Commencement Bay and the Puyallup River, with a significant flow component in the direction of river flow, toward Commencement Bay.

The upper alluvial aquifer is characterized as a distinct hydrogeologic unit, hydraulically connected to more permeable sandy or gravelly units along the valley margins, often lying underneath glacial till:

"Aquifer Qcl [Jones 1999] is generally a confined aquifer except where it is exposed at the surface, where it is unconfined, or not completely saturated beneath Qvt (Vashon Till). It consists largely of sand and gravel deposits but does contain silt and clay within the sand and gravel matrix.... The altitude of the top of this aquifer ranges from 50 feet below sea level to 509 feet above sea level."

Groundwater Hydrology of the Tacoma-Puyallup Area, Pierce Country, Washington, USGS Water Resources Investigation 99-4013, M.A. Jones, L.A. Orr, J.C. Ebbert, and S.S. Sumioka, 1999.

Ground-Water Occurrence and Stratigraphy of Unconsolidated Deposits, Central Pierce County, Washington, Water Supply Bulletin No. 22, State of Washington, Department of Water Resources, Kenneth L. Walters and Grant E. Kimmel, 1968

Lower Duwamish Waterway, Phase I Remedial Investigation Report, Final, Lower Duwamish Waterway Group, and *Development of a Three-Dimensional, Numerical Groundwater Flow Model for the Duwamish River Basin,* Booth and Herman 1998.

Tidal Along-shore Groundwater Flow in a Coastal Aquifer, L. Li, D.A. Barry, F. Stagnitti, and J.Y. Parlange, Environmental Modeling and Assessment 4 (1999), pp 179-188.

The shallow gravel and sand fill is generally expected to readily transmit groundwater, and where present, groundwater contaminants, while the underlying silts and sandy silts are generally expected to impede both the vertical and horizontal flow of groundwater, and where present, groundwater contaminants. Where porous fill materials associated with utility trenches, such as those that may be present underneath Pacific Highway East, are present, these trenches may serve to intercept and divert shallow groundwater. The ten-foot well screen intervals at the Site are designed to penetrate both the near-surface gravel fill and the underlying silts and sands.

Puyallup River Levee and Flow:

The lower Puyallup River levee system was constructed in the 1940s: "The Flood Control Act of June 28, 1938 provided for the construction and maintenance of a channel conveyance project. The project provides for a channel with a capacity of 50,000 cfs between the East 11th Street bridge and the lower 2.2 miles at Commencement Bay, by straightening the channel, building levees, and making all necessary bridge changes. The East 11th Street bridge at the lower end of the project is 0.75 mile above the mouth of the Puyallup River. The project was completed in 1950."

During a period of record flooding in January 2009, Puyallup River flow peaked at 41,500 cfs; channel sedimentation during the last six decades is believed to have decreased the channel cross section and therefore capacity. The USACE estimates that, in the absence of flood control efforts imposed by the management of releases from the Mud Mountain Dam, "the peak flow in the Puyallup River at Puyallup would have exceeded 70,000 cfs" in January 2009.

"The Puyallup River enters Commencement Bay in the City of Tacoma. The estuary historically covered an area approximately 5,800 acres in size. From 1877 to 1988, over 98 percent of the estuary was modified, leaving only 187 acres of mudflat, 90 acres of subtidal and intertidal vegetated shallows, and only 57 acres of the original tidal marsh.... Additional alterations to the Commencement Bay contributed to the now degraded and filled delta region."

The lower Puyallup River levees are primarily constructed on fine-grained silt and clay, with deposits of clean sand to silty sand and gravelly sand. On a large scale, these soils are generally uniform .... the levees themselves are composed of a mixture of the existing native deposits with the embankments and nearby foundation soils containing cobbles, boulders, and wood pilings."

"Sediment transport has been estimated to range from 440,000 to 1,400,000 tons annually, with the majority of these sediments characterized as fine sediments..."

Puyallup River Section 905(b) WRDA 86 Analysis, U.S. Army Corps of Engineers, Seattle District, March 18, 2009.

The City of Tacoma supplies potable water within the city limits. The City of Tacoma reports its water source as the upper eastern sections of the Green River watershed along the western flanks of the Cascade Mountains; the city also maintains groundwater production wells within the same area, in the vicinity of the Eagle Gorge Reservoir and the Howard Hanson Dam, some twenty miles east of the subject Property. A municipal well field, utilized during high demand periods, is located near Interstate 5 in south Tacoma, over three miles west of the subject Property.

SECTION IV.
ANALYTICAL RESULTS

SUMMARY OF SAMPLE ACQUISITION

A total of 4 soil borings were advanced in the Area of Concern to a maximum depth of 16 feet below ground surface ("bgs"). Two soil samples were collected from each of four boreholes (8 soil samples in total). Three groundwater monitoring wells were subsequently installed in boreholes. Detailed descriptions of each soil boring location, observations made during the acquisition, sampling information, and the field screening process are documented in soil boring logs attached to this report.

Total Petroleum Hydrocarbons – Gasoline, Diesel and other Petroleum Constituents:

Gasoline was detected above the MTCA Method A completed on the soil sample collected from MW12 at 7 feet bgs. A summary of the remaining results may be found in Table 1, including results from the previous investigations.

APPLICABLE ANALYTICAL METHODOLOGIES AND PARAMETERS

The analytical parameters were chosen based upon the results of previous investigations to provide a comprehensive characterization of the subsurface soils and groundwater present at the Site Areas of Concern and to comply with State of Washington recommendations.

Analytical Methodology:

Soil: **Gasoline Range Organics & Benzene, Ethylbenzene, Toluene, and Xylenes**
State of Washington NWTPH-Gx
USEPA 8260B

Soil: **Diesel and Lubricant Range Organics**
State of Washington NWTPH-Dx/Dx Extended

Soil: **Metals (“MTCA-Lead”)**
USEPA 7010/7471

Soil: **Polynuclear Aromatic Hydrocarbons (“PAHs”)**
USEPA 8270 SIM

Soil: **Chlorinated Volatile Organic Compounds (“CVOCs”)**
USEPA 8260

Soil: **Polychlorinated Biphenyls (“PCBs”)**
USEPA 8082

Laboratory Analysis:

Laboratory analysis was provided by:

Advanced Analytical Laboratory, LLC
4078 148 Avenue NE
Redmond, WA 98052
425.702.8571
aachemlab@yahoo.com

STATEMENT OF THE UST SITE ASSESSOR

I have performed this *Remedial Excavation* with the degree of care and skill ordinarily exercised under similar circumstances by reputable environmental professionals practicing in this area.

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in § 312.10 of this part. I have the specific qualifications based upon education, training, and experience necessary to conduct Remedial Investigations.

Signature of Washington Certified UST Site Assessor:

Signature – Nicholas Gerkin (Certificate No. 8452487)

STATEMENT OF THE LICENSED GEOLOGIST

As stipulated in the Regulatory Code of the State of Washington Title 18, Chapter 18.220, the undersigned is a licensed Geologist in the State of Washington, and has met the statutory requirements of RCW § 18.220.060 for such licensing including, but not limited to, educational requirements, work and field experience, examination proficiency, and acceptance by the State Licensing Board.

The undersigned Licensed Geologist has supervised the geological work performed as described in attached Report – a majority of said work being performed by employees of the firm which employs undersigned Licensed Geologist – as delineated in RCW Title 18, Chapter 18.220, Paragraph 190.

Signature of Licensed Washington Geologist:

Signature – Justin Francis Foslien (License No. 2540)

DEFINITIONS SPECIFIC TO LIMITED & TARGETED PHASE II ASSESSMENT

Background Concentration..... the concentration of a target analyte in groundwater, surface water, air, soil gas, sediment, or soil at a referenced location near a release or potential release area under investigation, which is not attributable to the release under investigation. Background samples may contain the target analyte, due to either naturally occurring or manmade sources, but not due to the release(s) in question. (See, E 1903-97, § 3.1.3).

Phase II Environmental Site Assessment.... This practice (ASTM E 1903-97, Reapproved 2002) defines a commercially practical process for sound Phase II investigation that includes sampling and chemical testing. Such Phase II investigation is performed, at a minimum, to confirm the actual presence of contamination in environmental media at a property where prior assessment had indicated that contaminants may occur due to releases or potential releases of substances to the environment at the property, or to demonstrate prior to property acquisition that contamination by targeted analytes is absent. (See, E 1903-97, § 1.1.1).

Phase II Environmental Site Assessment Limitations..... "This practice [ASTM E1903-97, Reapproved 2002] recognizes that the Phase II ESA process can be applied either to an overall assessment of a property with respect to all releases and potential releases at the property, or to an evaluation targeted to a specific release or potential release. It a property-wide assessment is not necessary to meet the particular User objective, then the Phase II investigation process described herein should be applied to generate sound information regarding the specific question of problem to be resolved. If a Phase II investigation does not address all releases and potential releases identified at a property, the report of the assessment must be denoted as a "Targeted Phase II" Environmental Site Assessment. [E 1903-97, § 1.1.3]"

Phase II Targeted Environmental Site Assessment.... This Phase II Site Assessment is "targeted" as defined by the ASTM Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process, Designation E 1903-97 (Reapproved 2002); "an assessment performed in accordance with the process described in this [E 1903-97] practice, which addresses only certain releases or potential releases, or certain target analytes, at a property as selcted by the User but which does not address all releases, *potential releases*, and target *analytes*.[E1903-97, § 3.1.43]"

Prior Knowledge.... "This Standard Practice [ASTM E 1903-97, Reapproved 2002] assumes ... that all reasonably ascertainable information, including but not limited to prior Phase I Environmental Site Assessment Reports, will be considered in conducting a Phase II ESA and interpreting its results. [E 1903-97, § 1.1.2]."

Targeted Analytes.... substances that have been released or potentially have been released to environmental media at the site, and which are of interest in the context of the particular Phase II ESA and its objectives, the presence of which will be sought and concentrations of which will be quantified through field screening or chemical testing. (See, E 1903-97, § 3.

APPENDIX

- Analytical Results Tables & Figures
- Photographs
- Project Contract Documents
- Laboratory Analytical Reports and Chains of Custody
- Boring Logs
- Standard Operating Procedures

- Analytical Results Tables & Figures

TABLE 1
SOIL ANALYTICAL RESULTS
Fife RV Center
3410 Pacific Highway East
Fife, Washington

Aerotech Environmental Consulting, Inc. - Site Remedial Excavation Report - November 1, 2016

Sample ID	Soil Boring/Point Well ID	Sampling Date	Sample Depth	TPHg	TPHd	TPHo	Benzene	Toluene	Ethyl-benzene	Total Xylenes	EDB	EDC	MTBE	Methylene Chloride	TCE	Naph-thalene	PAHs	PCBs	Lead
			Feet BGS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
P1(10')	P1	10/03/16	10	9.0	<20	<50	**0.096**	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P2(5')	P2	10/03/16	5	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P3(10')	P3	10/03/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P4(5')	P4	10/03/16	5	8.5	<20	<50	<0.020	<0.050	0.10	<0.050	--	--	--	--	--	--	--	--	--
P5(5')	P5	10/03/16	5	**53**	<20	<50	**0.16**	0.071	0.84	0.15	<0.005	<0.02	<0.1	<0.02	<0.02	--	--	--	7.8
P5(10')	P5	10/04/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P6(10')	P6	10/04/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P7(3')	P7	10/04/16	3	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P8(10')	P8	10/04/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	
P9(5')	P9	10/04/16	5	**110**	<20	<50	**0.15**	<0.050	5.1	<0.050	--	--	--	--	--	--	--	--	5.2
P9(10')	P9	10/04/16	10	23	<20	<50	<0.020	<0.050	0.34	<0.050	--	--	--	--	--	--	--	--	--
P10(10')	P10	10/04/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P11(10')	P11	10/04/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P12(5')	P12	10/05/16	5	**100**	<20	<50	**0.42**	0.18	1.7	0.54	--	--	--	--	--	--	--	--	--
P12(10')	P12	10/05/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P13(5')	P13	10/05/16	5	6.7	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P13(10')	P13	10/05/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P14(5')	P14	10/05/16	5	**60**	<20	<50	**0.15**	0.17	0.096	0.16	--	--	--	--	--	--	--	--	--
P14(10')	P14	10/05/16	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P15(10')	P15	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P16(5')	P16	10/06/16	5	**1,100**	<20	<50	**0.72**	0.072	**7.5**	**32**	--	--	--	--	--	--	--	--	7.0
P16(10')	P16	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P17(5')	P17	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P17(10')	P17	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P18(5')	P18	10/06/16	5	**130**	--	--	**0.29**	<0.050	1.5	2.4	--	--	--	--	--	--	--	--	--
P18(10')	P18	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P19(5')	P19	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P19(10')	P19	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP1(5')	TP1	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP2(5')	TP2	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP2(10')	TP2	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP3(3')	TP3	10/06/16	3	**2,500**	--	--	**0.34**	0.35	**15**	**10**	<0.005	<0.02	<0.1	<0.02	<0.02	--	--	--	--
TP3(5')	TP3	10/06/16	5	**650**	--	--	**0.53**	5.3	**7.5**	**7.3**	<0.005	<0.02	<0.1	<0.02	<0.02	--	--	--	--
TP3(10')	TP3	10/06/16	10	27	--	--	<0.020	<0.050	0.18	0.25	--	--	--	--	--	--	--	--	--
TP4(3')	TP4	10/06/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP4(5')	TP4	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP4(10')	TP4	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP5(5')	TP5	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP5(10')	TP5	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP6(5')	TP6	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP6(10')	TP6	10/06/16	10	12	--	--	**0.071**	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP7(5')	TP7	10/06/16	5	**690**	<20	<50	**0.90**	1.9	**32**	0.33	--	--	--	--	--	--	--	--	--
TP8(3')	TP8	10/06/16	3	**60**	--	--	<0.020	<0.050	1.2	<0.050	--	--	--	--	--	--	--	--	--
TP8(5')	TP8	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MTCA Method A Cleanup Levels				30	2,000	2,000	0.03	7	6	6	0.005	0.0232*	0.1	0.02	0.03	5	0.1^	1	250

TABLE 1
SOIL ANALYTICAL RESULTS
Fife RV Center
3410 Pacific Highway East
Fife, Washington

Aerotech Environmental Consulting, Inc. - Site Remedial Excavation Report - November 1, 2016 (continued)

Sample ID	Soil Boring/Point Well ID	Sampling Date	Sample Depth	TPHg	TPHd	TPHo	Benzene	Toluene	Ethyl-benzene	Total Xylenes	EDB	EDC	MTBE	Methylene Chloride	TCE	Naph-thalene	PAHs	PCBs	Lead
			Feet BGS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TP9(5')[1]	TP9	10/06/16	5	**6,090**	<20	<50	**4.0**	4.0	**66**	**130**	<0.005	<0.02	<0.1	<0.02	<0.02	--	--	--	--
TP9(10')[1]	TP9	10/06/16	10	**240**	--	--	**0.59**	1.5	1.6	3.7	--	--	--	--	--	--	--	--	--
TP11(5')	TP11	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP12(5')	TP12	10/06/16	5	18	--	--	<0.020	<0.050	<0.050	0.082	--	--	--	--	--	--	--	--	--
TP13(5')	TP13	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP14(5')	TP14	10/06/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP14(10')	TP14	10/06/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP15(5')	TP15	10/07/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP15(10')	TP15	10/07/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP16(3')	TP16	10/07/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP16(5')	TP16	10/07/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP17(3')	TP17	10/07/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP17(5')	TP17	10/07/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP18(3')	TP18	10/07/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP19(3')	TP19	10/07/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
TP19(5')	TP19	10/07/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P20(5')	P20	10/20/16	5	**57**	--	--	**0.065**	0.101	0.15	0.16	--	--	--	--	--	--	--	--	--
P20(10')	P20	10/20/16	10	20	--	--	**0.24**	<0.050	0.09	0.084	--	--	--	--	--	--	--	--	--
P21(5')	P21	10/20/16	5	**1,200**	--	--	**0.65**	0.59	**8.1**	**24**	--	--	--	--	--	--	--	--	--
P21(10')	P21	10/20/16	10	**66**	--	--	**0.11**	0.14	0.34	0.74	--	--	--	--	--	--	--	--	--
P22(5')	P22	10/20/16	5	**1,100**	--	--	**0.83**	1.9	**20**	**7.9**	--	--	--	--	--	--	--	--	--
P22(10')	P22	10/20/16	10	**34**	--	--	0.029	<0.050	0.43	0.19	--	--	--	--	--	--	--	--	--
P22(12')	P22	10/20/16	12	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P23(5')	P23	10/20/16	5	**760**	--	--	**0.46**	0.74	4.8	2.4	--	--	--	--	--	--	--	--	--
P23(10')	P23	10/20/16	10	16	--	--	<0.020	<0.050	0.22	0.10	--	--	--	--	--	--	--	--	--
P24(5')	P24	10/20/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P24(10')	P24	10/20/16	10	**50**	--	--	**0.26**	<0.050	1.5	0.86	--	--	--	--	--	--	--	--	--
P25(5')	P25	10/21/16	5	**5,200**	--	--	**4.6**	**25**	**35**	**230**	--	--	--	--	--	--	--	--	--
P25(10')	P25	10/21/16	10	**350**	--	--	**0.16**	3.4	1.6	**16**	--	--	--	--	--	--	--	--	--
P26(10')	P26	10/21/16	10	12	--	--	<0.020	<0.050	<0.050	0.41	--	--	--	--	--	--	--	--	--
P27(5')	P27	10/21/16	5	**58**	--	--	<0.020	<0.050	0.095	0.39	--	--	--	--	--	--	--	--	--
P28(5')	P28	10/21/16	5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P28(10')	P28	10/21/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P29(3')	P29	10/24/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P30(5')	P30	10/24/16	5	**200**	--	--	**0.086**	0.19	0.28	0.40	--	--	--	--	--	--	--	--	--
P30(10')	P30	10/24/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P31(10')	P31	10/24/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P32(3')	P32	10/24/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P33(3')	P33	10/24/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
P34(3')	P34	10/24/16	3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MTCA Method A Cleanup Levels				30	2,000	2,000	0.03	7	6	6	0.005	0.0232*	0.1	0.02	0.03	5	0.1^	1	250

TABLE 1
SOIL ANALYTICAL RESULTS
Fife RV Center
3410 Pacific Highway East
Fife, Washington

Aerotech Environmental Consulting, Inc. - Groundwater Monitoring Well Installation Report - November 17, 2016

Sample ID	Soil Boring/Point Well ID	Sampling Date	Sample Depth	TPHg	TPHd	TPHo	Benzene	Toluene	Ethyl-benzene	Total Xylenes	EDB	EDC	MTBE	Methylene Chloride	TCE	Naph-thalene	PAHs	PCBs	Lead
			Feet BGS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MW-1 (4.5')	MW-1	11/10/16	4.5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW-1 (10')	MW-1	11/10/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW-2 (4')	MW-2	11/10/16	4	**250**	--	--	**0.53**	0.54	3.8	0.84	--	--	--	--	--	--	--	--	--
MW-2 (9')	MW-2	11/10/16	9	24	--	--	<0.020	0.065	0.6	0.16	--	--	--	--	--	--	--	--	--
MW-3 (4.5')	MW-3	11/10/16	4.5	**13,000**	--	--	**9.3**	2.6	**470**	5.4	--	--	--	--	--	--	--	--	--
MW-3 (9')	MW-3	11/10/16	9	**51**	--	--	<0.020	<0.050	0.27	0.096	--	--	--	--	--	--	--	--	--
MW-3 (14.5')	MW-3	11/10/16	14.5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW-4 (5')	MW-4	11/10/16	5	**55**	--	--	**0.061**	0.27	0.22	0.2	--	--	--	--	--	--	--	--	--
MW-4 (10.5)	MW-4	11/10/16	10.5	**150**	--	--	**0.51**	1.2	1.1	1.7	--	--	--	--	--	--	--	--	--
MW-4 (14.5)	MW-4	11/10/16	14.5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW-5 (6')	MW-5	11/10/16	6	**34**	--	--	**0.090**	0.66	0.25	0.31	--	--	--	--	--	--	--	--	--
MW-5 (10')	MW-5	11/10/16	10	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW-6 (9')	MW-6	11/11/16	9	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW-6 (10.5')	MW-6	11/11/16	10.5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MTCA Method A Cleanup Levels				30	2,000	2,000	0.03	7	6	6	0.005	0.0232*	0.1	0.02	0.03	5	0.1^	1	250

Aerotech Environmental Consulting, Inc. - Upgradient Delineation Groundwater Monitoring Well Installation Report - August 16, 2017

Sample ID	Soil Boring/Point Well ID	Sampling Date	Sample Depth	TPHg	TPHd	TPHo	Benzene	Toluene	Ethyl-benzene	Total Xylenes	EDB	EDC	MTBE	Methylene Chloride	TCE	Naph-thalene	PAHs	PCBs	Lead
			Feet BGS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B1(5)	B1	07/13/17	5	**1,200**	350[2]	<50	**2.1**	2.4	**51**	**26**	<0.005	<0.02	<0.1	**0.22**	**0.29**	0.97	0.0068	<0.20	14
B1(9)	B1	07/13/17	9	--	--	--	--	--	--	--	<0.005	<0.02	<0.1	<0.02	<0.02	--	--	--	--
MW7(11)	MW7	07/13/17	11	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW8(5)	MW8	07/13/17	5	--	<20	<50	--	--	--	--	--	--	--	--	--	--	--	--	--
MW8(10)	MW8	07/13/17	10	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	2.9
MW9(3)	MW9	07/13/17	3	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	37
MTCA Method A Cleanup Levels				30	2,000	2,000	0.03	7	6	6	0.005	0.0232*	0.1	0.02	0.03	5	0.1^	1	250

Aerotech Environmental Consulting, Inc. - Downgradient Groundwater Monitoring Well Installation Report - April 27, 2018

Sample ID	Soil Boring/Point Well ID	Sampling Date	Sample Depth	TPHg	TPHd	TPHo	Benzene	Toluene	Ethyl-benzene	Total Xylenes	EDB	EDC	MTBE	Methylene Chloride	TCE	Naph-thalene	PAHs	PCBs	Lead
			Feet BGS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MW10(4)	MW10	02/23/18	4	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	<0.005	<0.02	<0.1	<0.02	<0.02	<0.10	<0.10	<0.20	5.3
MW10(9)	MW10	02/23/18	9	14	<20	<50	<0.020	<0.050	0.110	<0.050	<0.005	<0.02	<0.1	<0.02	<0.02	<0.10	<0.10	<0.20	6.9
MW10(14)	MW10	02/23/18	14	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW11(3.3)	MW11	02/23/18	3.3	<5.0	<20	<50	<0.020	<0.050	<0.050	<0.050	<0.005	<0.02	<0.1	<0.02	<0.02	<0.10	<0.10	<0.20	16
MW11(6.3)	MW11	02/23/18	6.3	6.3	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW11(9.3)	MW11	02/23/18	9.3	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW12(4.5)	MW12	02/23/18	4.5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	<0.10	<0.10	--	7.9
MW12(7)	MW12	02/23/18	7	**32**	<20	<50	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MW12(12.5)	MW12	02/23/18	12.5	<5.0	--	--	<0.020	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--
MTCA Method A Cleanup Levels				30	2,000	2,000	0.03	7	6	6	0.005	0.0232*	0.1	0.02	0.03	5	0.1^	1	250

TABLE 1

SOIL ANALYTICAL RESULTS

Fife RV Center

3410 Pacific Highway East

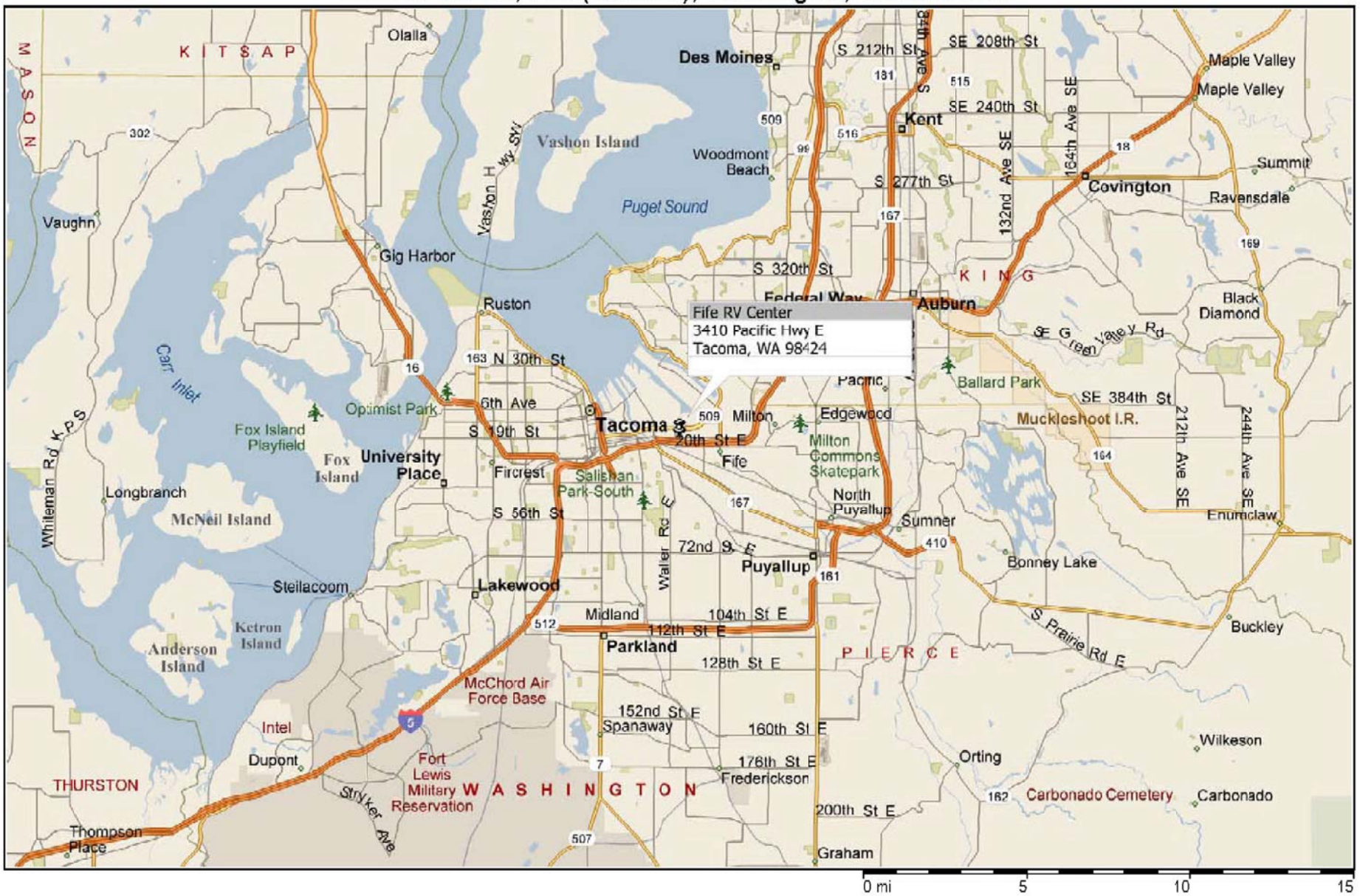
Fife, Washington

EXPLANATION

MTCA = Model Toxic Control Act Cleanup Level (WAC173-340-900)
BGS = Below Ground Surface mg/kg = milligram of analyte per kilogram of soil
< = not detected at indicated Laboratory Detection Limits -- = not analyzed
Benzen , Toluene, Ethylbenzene, Xylenes by EPA Method 8021B
TPHg - Total Petroleum Hydrocarbons - Gasoline by NWTPH-Gx
TPHd - Total Petroleum Hydrocarbons - Diesel by NWTPH-Dx
TPHo - Total Petroleum Hydrocarbons - Motor Oil by NWTPH-Dx extended
MTBE = Methyl-tert-butyl-ether EDC = 1,2-Dichloroethane EDB = 1,2-Dibromoethane TCE = Trichloroethene Methylene Chloride; by EPA Method 8260B
Lead by EPA Method 7010
ND = Not Detected (minimum detection limit unknown)
Bolded numbers and red-shaded cells denote concentrations above the MTCA Method A Cleanup Levels for soil
* = Method B Cleanup Level, Ecology does not have a Method A Cleanup Level designated for EDC
1 = Soil from which this sample originated was removed during the Remedial Excavation
2 = Unidentifiable petroleum product in diesel range, possibly creosote (see lab report for further detail and chromatograph)
^ = Effective concentration using Toxic Equivalency Factor per WAC 173-340-708{e}: SUM(Benzo(a)pyrene (x1), Benzo(a)anthracine (x0.1), Benzo(b)fluoranthene (x0.1), Benzo(k)fluoranthene (x0.1), Chrysene (x0.01), Dibenz(a,h)anthracene (x0.1), Indeno(1,2,3-cd)pyrene (x0.1)

N

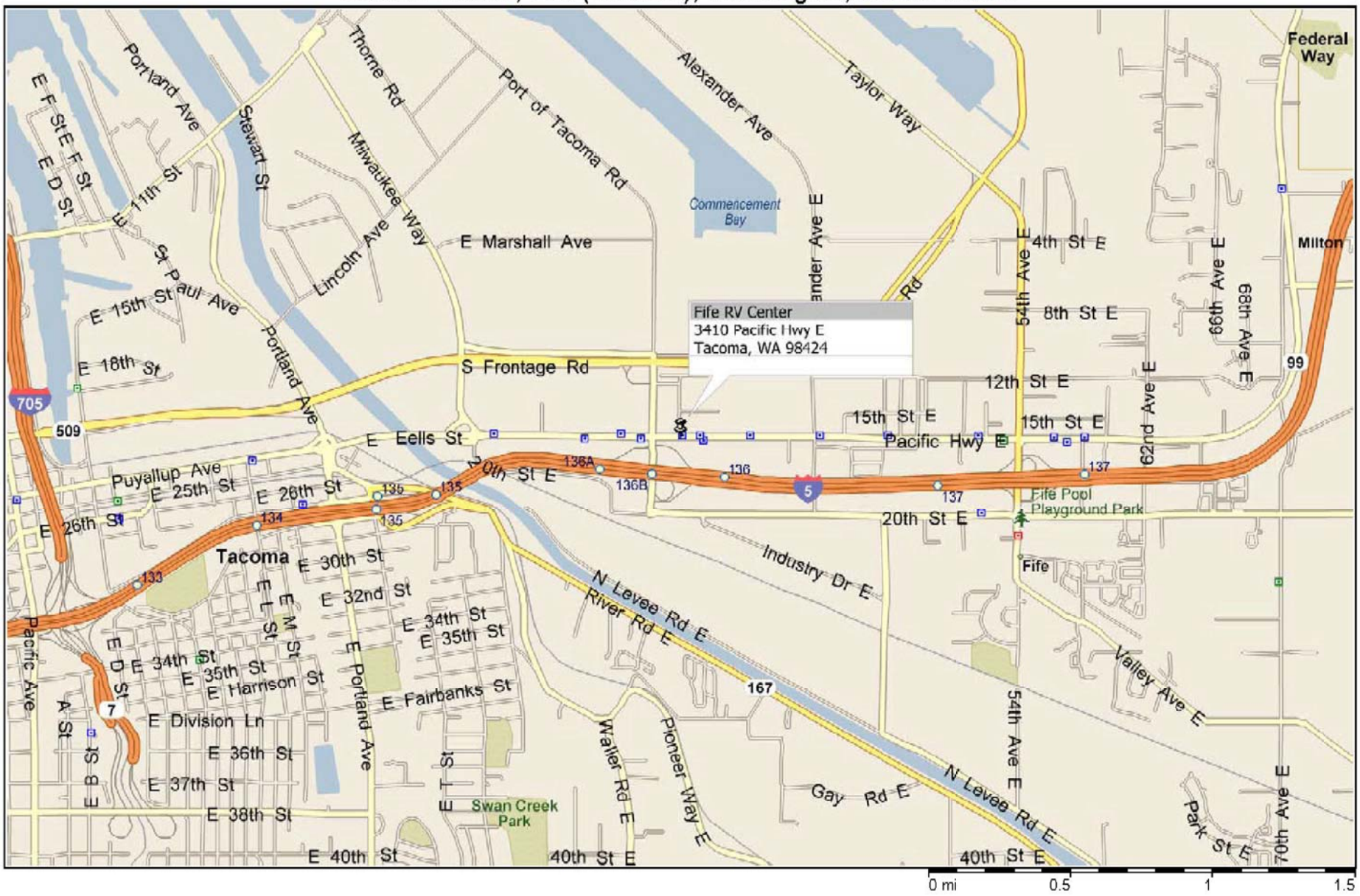
Fife RV Center, Fife (Tacoma), Washington, United States



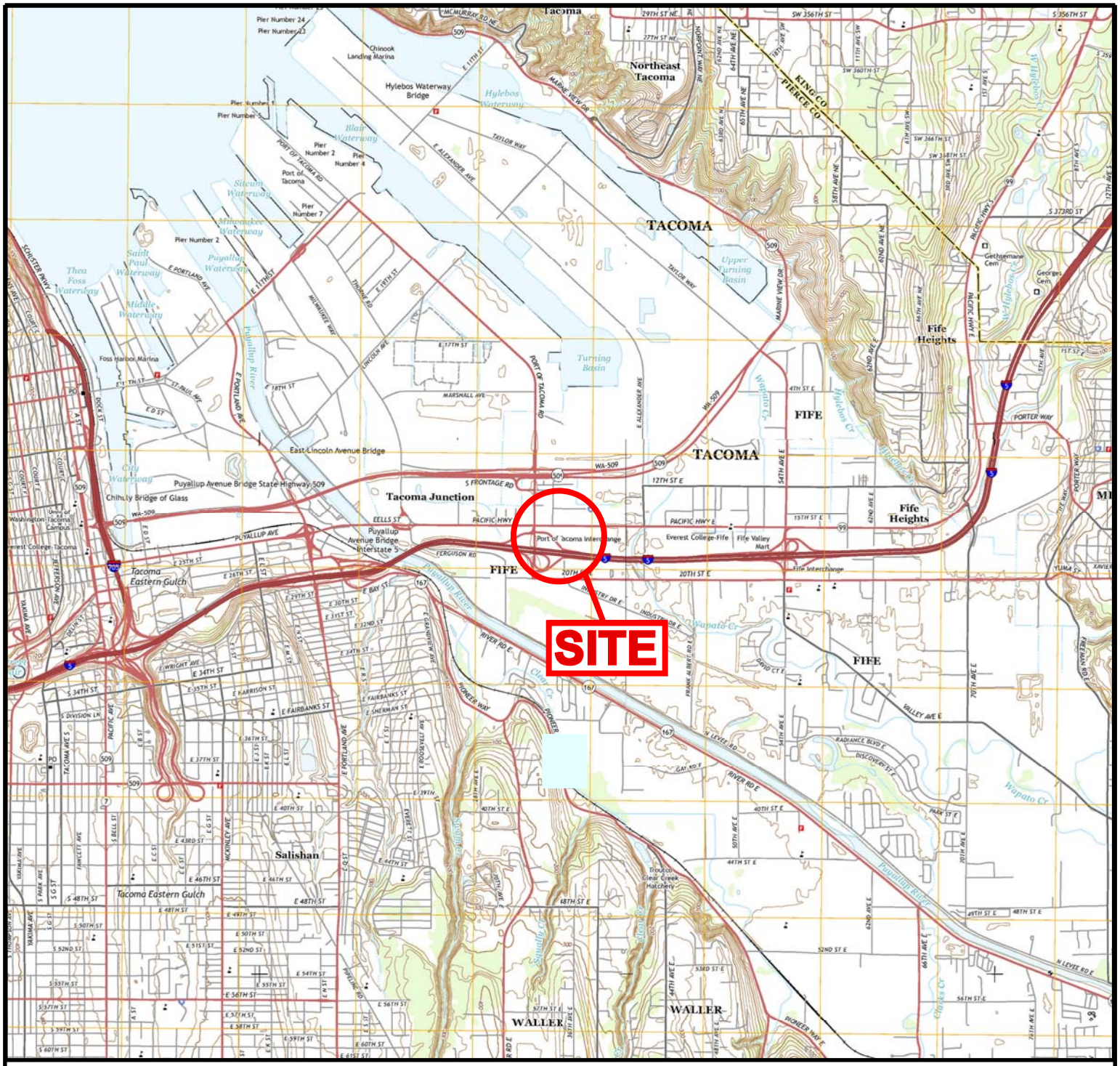
AEROTECH ENVIRONMENTAL CONSULTING	**REGIONAL MAP**	**Fife RV Center** **3410 Pacific Highway East** **Fife, Washington**	**Date:** 12/08/16 **By:** Nick Gerkin **Figure:** 1

N

Fife RV Center, Fife (Tacoma), Washington, United States



AEROTECH ENVIRONMENTAL CONSULTING	**NEIGHBORHOOD STREET MAP**	**Fife RV Center** **3410 Pacific Highway East** **Fife, Washington**		**Date:** 12/08/16 **By:** Nick Gerkin **Figure:** 2



0 1 2

SCALE (mile)

MN 16° 11' 288 MILS

GN 0° 25' 7 MILS

UTM GRID AND 2014 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

AEROTECH ENVIRONMENTAL CONSULTING

USGS TOPOGRAPHIC MAP

Fife RV Center
3410 Pacific Highway East
Fife, Washington

Date: 10/30/16
By: Nick Gerkin
Figure: 3

EXPLANATION

Extents of Site Remedial Excavation Figures

Property Boundary

AEROTECH ENVIRONMENTAL CONSULTING

SITE VICINITY MAP

Fife RV Center
3410 Pacific Highway East
Fife, Washington

0 150 300

SCALE (feet)

Date: 04/27/18

By: Nick Gerkin

Figure: 4

N

Landscaping

JACK IN THE BOX
DRIVE-THRU

ACCESS EASEMENT
Pacific Highway East
100 Feet to the North

UST BASIN
(25 Feet to the North)

MW12(7)
32
<0.020
TPHg Concentration
Benzene Concentration

All Concentrations are reported in mg/kg

Landscaping

MW10(4)	MW10(9)	MW10(14)
<5.0	14	<5.0
<0.020	<0.020	<0.020

MW10

MW2

Discharge to
Drainage Ditch
(3'D Perforated Pipe)

BIO-SWALE
POND

MW11

MW11(3.3)	MW11(6.3)	MW11(9.3)
<5.0	6.3	<5.0
<0.020	<0.020	<0.020

MW12(4.5)	MW12(7)	MW12(12.5)
<5.0	32	<5.0
<0.020	<0.020	<0.020

MW12

MW4

MW1

TACOMA EXPRESS
(Former Unocal Service Station 7343)
Ecology Cleanup Site ID 5015

FORMER
PUMP
ISLANDS

POSSIBLE FORMER
UST BASIN

POSSIBLE FORMER
UST BASIN

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16 P17 P18 P19 P20 P21 P22 P23 P24 P25 P26 P27 P28 P29 P30 P31 P32 P33 P34

TP1 TP2 TP3 TP4 TP5 TP6 TP7 TP8 TP9 TP10 TP11 TP12 TP13 TP14 TP15 TP16 TP17 TP18 TP19

B1

MW3 MW5 MW6 MW7 MW8 MW9

Fire
Hydrant

0 15 30
SCALE (feet)

Green numbers and symbols indicate concentrations below the MTCA Method A Cleanup Levels

Red numbers and symbols indicate concentrations above the MTCA Method A Cleanup Levels

AEROTECH
ENVIRONMENTAL CONSULTING

EXPLANATION

MW12 — Groundwater Monitoring Well

Property Boundary

Fencing

Cool Guard HRL36 Liner Installed to 10-Foot Depth

All other analytes were not detected at or above the Laboratory Minimum Reporting Llimits

SOIL ANALYTICAL RESULTS MAP
02/23/18

Fife RV Center
3410 Pacific Highway East
Fife, Washington

Date: 04/10/18
By: Nick Gerkin
Figure: 5

- Photographs

Looking Souhwest to the Overgrown Bio-Swale from MW2 Location

Surveying Property Boundaries Prior to Well Installation

Logger removing a Cottonwood to allow Drill Rig Access

South Bank of the Bio-Swale Pond (subject of first picture)

Utility Locate and GPR Prior to Subsurface Work

Drilling at MW10 Location

SAND FILL at 9 Feet BGS at MW10 Location (Possible Tank Basin)

Native SILT Present at 14 Feet BGS at MW10 Location

MW11 Installation Atop a Mound and 1-Foot of Concrete

MW12 Installation

Technician Using a Surge Block to Develop MW11

Turbid Water Pumped and Drummed in Between Surge Block Sessions

- Project Contract Documents

ENVIRONMENTAL CONTRACTOR'S CERTIFICATION

Fife RV Center
3410 Pacific Highway East
Fife, Washington 98424

1. Contractor's Name: Aerotech Environmental Consulting, Inc.

2. Contractor's Address: 13925 Interurban Avenue South, Ste. 210, Seattle, Washington 98168

3. Name and title of person completing this certification: Alan T. Blotch / President

4. Answer the following questions about each employee that contractor will have perform the assessment or prepare the report showing the results of the inspection:

   a. Name and Title of Employee: Alan T. Blotch – Environmental Professional

   b. Length of experience doing environmental assessments: 31 years

   c. Education degrees received: Masters of Business Administration
   Juris Doctor – Environmental Law

   d. Relevant training received: ASTM E50 Environmental Assessment Committee Meetings

5. Identify any certifications and approvals issued to contractor pursuant to an official Federal, State of local program or policy to conduct environmental assessments: Registered Environmental Assessor
   Issued by State of California

6. Describe the generally recognized standards which the contractor will use to perform the assessment. *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process* (ASTM E 1903)

7. Disclose the nature of any previous environmental inspections contractor has ever performed for the Owner of the property: Phase I Environmental Site Assessment

8. Disclose the nature of any affiliation or association contractor now has, or ever had, with the above referenced seller of the property, of the above referenced buyer of the property: N/A

9. Describe the liability insurance carried by contractor to cover claims in the event that ir fails to discover adverse environmental conditions during an environmental inspection.
   Professional Errors & Omissions Coverage $1,000,000 / claim and $1,000,000 aggregate liability

THE UNDERSIGNED HEREBY CERTIFIES, UNDER PENALTY OF THE CRIMINAL AND/OR CIVIL PENALTIES IN 18 U.S.C. § 1001 FOR FALSE STATEMENTS TO THE UNITED STATES GOVERNMENT, THAT THE ABOVE INFORMATION IS TRUE AND CORRECT.

Signature _____ Date 4-27-18

- Laboratory Analytical Reports and Chains of Custody

ADVANCED ANALYTICAL

Environmental Testing Laboratory

March 06, 2018

Nick Gerkin
Aerotech Environmental, Inc.
13925 Interurban Avenue South, Suite 210
Seattle, WA 98168

Dear Mr. Gerkin:

Please find enclosed the analytical data report for the *Fife RV Center (**C80226-1**)* Project.

Samples were received on *February 26, 2018.* The results of the analyses are presented in the attached tables. Applicable reporting limits, QA/QC data and data qualifiers are included. A copy of the chain-of-custody and an invoice for the work is also enclosed.

ADVANCED ANALYTICAL LABORATORY appreciates the opportunity to provide analytical services for this project. Should there be any questions regarding this report, please contact me at (425) 702-8571.

It was a pleasure working with you, and we are looking forward to the next opportunity to work together.

Sincerely,

V. Ivanov

Val G. Ivanov, Ph.D.
Laboratory Manager

4078 148 Ave NE■ Redmond, WA 98052
425.702-8571
E-mail: aachemlab@yahoo.com

Advanced Analytical Laboratory
(425) 702-8571

AAL Job Number:	C80226-1
Client:	Aerotech Environmental
Project Manager:	Nick Gerkin
Client Project Name:	Fife RV Center
Client Project Number:	na
Date received:	02/26/18

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

8260B, µg/kg		MTH BLK	LCS	MW10(4)	MW10(9)	MW11(3.3)
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18
Date analyzed	Limits	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18
MTBE	100	nd		nd	nd	nd
Chloromethane	50	nd		nd	nd	nd
Vinyl chloride	50	nd		nd	nd	nd
Bromomethane	50	nd		nd	nd	nd
Chloroethane	50	nd		nd	nd	nd
Trichlorofluoromethane	50	nd		nd	nd	nd
1,1-Dichloroethene	50	nd		nd	nd	nd
Methylene chloride	20	nd		nd	nd	nd
trans-1,2-Dichloroethene	50	nd		nd	nd	nd
2,2-Dichloropropane	50	nd		nd	nd	nd
Chloroform	50	nd		nd	nd	nd
1,1,1-Trichloroethane	50	nd		nd	nd	nd
Carbontetrachloride	50	nd		nd	nd	nd
1,1-Dichloropropene	50	nd		nd	nd	nd
1,2-Dichloroethane(EDC)	20	nd		nd	nd	nd
Trichloroethene	20	nd	106%	nd	nd	nd
1,2-Dichloropropane	50	nd		nd	nd	nd
Dibromomethane	50	nd		nd	nd	nd
Bromodichloromethane	50	nd		nd	nd	nd
cis-1,3-Dichloropropene	50	nd		nd	nd	nd
trans-1,3-Dichloropropene	50	nd		nd	nd	nd
1,1,2-Trichloroethane	50	nd		nd	nd	nd
Tetrachloroethene	50	nd		nd	nd	nd
1,3-Dichloropropane	50	nd		nd	nd	nd
Dibromochloromethane	20	nd		nd	nd	nd
1,2-Dibromoethane (EDB)*	5	nd		nd	nd	nd
Chlorobenzene	50	nd	93%	nd	nd	nd
1,1,1,2-Tetrachloroethane	50	nd		nd	nd	nd
1,2,3-Trichloropropane	50	nd		nd	nd	nd
1,1,2,2-Tetrachloroethane	50	nd		nd	nd	nd
2-Chlorotoluene	50	nd		nd	nd	nd
4-Chlorotoluene	50	nd		nd	nd	nd
1,3-Dichlorobenzene	50	nd		nd	nd	nd
1,4-Dichlorobenzene	50	nd		nd	nd	nd
1,2-Dichlorobenzene	50	nd		nd	nd	nd
1,2-Dibromo-3-Chloropropane	50	nd		nd	nd	nd
1,2,4-Trichlorobenzene	50	nd		nd	nd	nd
1,2,3-Trichlorobenzene	50	nd		nd	nd	nd

*-instrument detection limits

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

8260B, µg/kg		MTH BLK	LCS	MW10(4)	MW10(9)	MW11(3.3)
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18
Date analyzed	Limits	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18
Surrogate recoveries						
Dibromofluoromethane		128%	113%	124%	123%	122%
1,2-Dichloroethane-d4		112%	94%	124%	115%	112%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
M-matrix interference
C - coelution with sample peaks
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

8260B, µg/kg		MS	MSD	RPD
Matrix	Soil	Soil	Soil	Soil
Date extracted	Reporting	03/02/18	03/02/18	03/02/18
Date analyzed	Limits	03/02/18	03/02/18	03/02/18
MTBE	100			
Chloromethane	50			
Vinyl chloride	50			
Bromomethane	50			
Chloroethane	50			
Trichlorofluoromethane	50			
1,1-Dichloroethene	50			
Methylene chloride	20			
trans-1,2-Dichloroethene	50			
2,2-Dichloropropane	50			
Chloroform	50			
1,1,1-Trichloroethane	50			
Carbontetrachloride	50			
1,1-Dichloropropene	50			
1,2-Dichloroethane(EDC)	20			
Trichloroethene	20	101%	102%	1%
1,2-Dichloropropane	50			
Dibromomethane	50			
Bromodichloromethane	50			
cis-1,3-Dichloropropene	50			
trans-1,3-Dichloropropene	50			
1,1,2-Trichloroethane	50			
Tetrachloroethene	50			
1,3-Dichloropropane	50			
Dibromochloromethane	20			
1,2-Dibromoethane (EDB)*	5			
Chlorobenzene	50	79%	82%	3%
1,1,1,2-Tetrachloroethane	50			
1,2,3-Trichloropropane	50			
1,1,2,2-Tetrachloroethane	50			
2-Chlorotoluene	50			
4-Chlorotoluene	50			
1,3-Dichlorobenzene	50			
1,4-Dichlorobenzene	50			
1,2-Dichlorobenzene	50			
1,2-Dibromo-3-Chloropropane	50			
1,2,4-Trichlorobenzene	50			
1,2,3-Trichlorobenzene	50			

*-instrument detection limits

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

8260B, µg/kg		MS	MSD	RPD
Matrix	Soil	Soil	Soil	Soil
Date extracted	Reporting	03/02/18	03/02/18	03/02/18
Date analyzed	Limits	03/02/18	03/02/18	03/02/18

Surrogate recoveries			
Dibromofluoromethane	120%	124%	
1,2-Dichloroethane-d4	101%	110%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
M-matrix interference
C - coelution with sample peaks
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

NWTPH-Gx / BTEX		MTH BLK	LCS	MW10(4)	MW10(9)	MW10(14)	MW11(3.3)
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18
Date analyzed	Limits	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18
NWTPH-Gx, mg/kg							
Mineral spirits/Stoddard	5.0	nd		nd	nd	nd	nd
Gasoline	5.0	nd		nd	14	nd	nd
BTEX 8021B, µg/kg							
Benzene	20	nd	83%	nd	nd	nd	nd
Toluene	50	nd	82%	nd	nd	nd	nd
Ethylbenzene	50	nd		nd	110	nd	nd
Xylenes	50	nd		nd	nd	nd	nd
Surrogate recoveries:							
Trifluorotoluene		91%	118%	95%	104%	106%	94%
Bromofluorobenzene		74%	82%	95%	87%	71%	92%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
M - matrix interference
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

NWTPH-Gx / BTEX		MW11(6.3)	MW11(9.3)	MW12(4.5)	MW12(7)	MW12(7) Dupl
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18
Date analyzed	Limits	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18
NWTPH-Gx, mg/kg						
Mineral spirits/Stoddard	5.0	nd	nd	nd	nd	nd
Gasoline	5.0	6.3	nd	nd	32	42
BTEX 8021B, µg/kg						
Benzene	20	nd	nd	nd	nd	nd
Toluene	50	nd	nd	nd	nd	nd
Ethylbenzene	50	nd	nd	nd	100	130
Xylenes	50	nd	nd	nd	56	62
Surrogate recoveries:						
Trifluorotoluene		91%	90%	88%	87%	90%
Bromofluorobenzene		79%	91%	91%	90%	92%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
M - matrix interference
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

NWTPH-Gx / BTEX		RPD MW12(7)	MS	MSD	RPD	MTH BLK	LCS
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	02/27/18	02/27/18	02/27/18	02/27/18	03/05/18	03/05/18
Date analyzed	Limits	02/27/18	02/27/18	02/27/18	02/27/18	03/05/18	03/05/18
NWTPH-Gx, mg/kg							
Mineral spirits/Stoddard	5.0					nd	
Gasoline	5.0	26%				nd	
BTEX 8021B, µg/kg							
Benzene	20		83%	85%	2%	nd	87%
Toluene	50		82%	86%	5%	nd	84%
Ethylbenzene	50	26%				nd	
Xylenes	50	10%				nd	
Surrogate recoveries:							
Trifluorotoluene			110%	109%		86%	109%
Bromofluorobenzene			87%	90%		75%	82%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
M - matrix interference
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results			Dupl
NWTPH-Gx / BTEX		**MW12(12.5)**	**MW12(12.5)**
Matrix	Soil	Soil	Soil
Date extracted	Reporting	03/05/18	03/05/18
Date analyzed	Limits	03/05/18	03/05/18
NWTPH-Gx, mg/kg			
Mineral spirits/Stoddard	5.0	nd	nd
Gasoline	5.0	nd	nd
BTEX 8021B, µg/kg			
Benzene	20	nd	nd
Toluene	50	nd	nd
Ethylbenzene	50	nd	nd
Xylenes	50	nd	nd
Surrogate recoveries:			
Trifluorotoluene		106%	103%
Bromofluorobenzene		99%	101%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
M - matrix interference
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

NWTPH-Dx, mg/kg		MTH BLK	MW10(4)	MW10(9)	MW11(3.3)	MW12(4.5)	MW12(7)	Dupl MW12(7)
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18
Date analyzed	Limits	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18	02/27/18
Kerosene/Jet fuel	20	nd	nd	nd	nd	nd	nd	nd
Diesel/Fuel oil/Creosote	20	nd	nd	nd	nd	nd	nd	nd
Heavy oil	50	nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries:								
Fluorobiphenyl		99%	95%	97%	94%	94%	94%	95%
o-Terphenyl		121%	99%	102%	98%	101%	100%	91%

Data Qualifiers and Analytical Comments
na - not analyzed
Results reported on dry-weight basis
M - matrix interference
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

PAH (8270 sim), mg/kg		MTH BLK	LCS	MW10(4)	MW10(9)	MW11(3.3)	MW12(4.5)
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	02/26/18	02/26/18	02/26/18	02/26/18	02/26/18	02/26/18
Date analyzed	Limits	02/26/18	02/26/18	02/26/18	02/26/18	02/26/18	02/26/18
1-Methylnaphthalene	0.10	nd		nd	nd	nd	nd
2-Methylnaphthalene	0.10	nd		nd	nd	nd	nd
Naphthalene	0.10	nd		nd	nd	nd	nd
Acenaphthylene	0.10	nd		nd	nd	nd	nd
Acenaphthene	0.10	nd	102%	nd	nd	nd	nd
Fluorene	0.10	nd		nd	nd	nd	nd
Phenanthrene	0.10	nd		nd	nd	nd	nd
Anthracene	0.10	nd		nd	nd	nd	nd
Fluoranthene	0.10	nd		nd	nd	nd	nd
Pyrene	0.10	nd	118%	nd	nd	nd	nd
Benzo(a)anthracene	0.10	nd		nd	nd	nd	nd
Chrysene	0.10	nd		nd	nd	nd	nd
Benzo(b)fluoranthene	0.10	nd		nd	nd	nd	nd
Benzo(k)fluoranthene	0.10	nd		nd	nd	nd	nd
Benzo(a)pyrene	0.10	nd		nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene	0.10	nd		nd	nd	nd	nd
Dibenzo(ah)anthracene	0.10	nd		nd	nd	nd	nd
Benzo(ghi)perylene	0.10	nd		nd	nd	nd	nd
Surrogate recoveries:							
2-Fluorobyphenyl		146%	94%	132%	123%	118%	127%
o-Terphenyl		109%	107%	107%	108%	109%	101%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
M - matrix interference
Results reported on dry-weight basis
Acceptable Recovery limits: 50% TO 150%
Acceptable RPD limit: 50%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

PAH (8270 sim), mg/kg		MS	MSD	RPD
Matrix	Soil	Soil	Soil	Soil
Date extracted	Reporting	02/26/18	02/26/18	02/26/18
Date analyzed	Limits	02/26/18	02/26/18	02/26/18
1-Methylnaphthalene	0.10			
2-Methylnaphthalene	0.10			
Naphthalene	0.10			
Acenaphthylene	0.10			
Acenaphthene	0.10	100%	101%	1%
Fluorene	0.10			
Phenanthrene	0.10			
Anthracene	0.10			
Fluoranthene	0.10			
Pyrene	0.10	122%	125%	3%
Benzo(a)anthracene	0.10			
Chrysene	0.10			
Benzo(b)fluoranthene	0.10			
Benzo(k)fluoranthene	0.10			
Benzo(a)pyrene	0.10			
Indeno(1,2,3-cd)pyrene	0.10			
Dibenzo(ah)anthracene	0.10			
Benzo(ghi)perylene	0.10			

Surrogate recoveries:

2-Fluorobyphenyl	95%	98%	
o-Terphenyl	109%	108%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
M - matrix interference
Results reported on dry-weight basis
Acceptable Recovery limits: 50% TO 150%
Acceptable RPD limit: 50%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

Metals (7010), mg/kg		MTH BLK	LCS	MW10(4)	MW10(9)	MW11(3.3)	MW12(4.5)
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	02/28/18	02/28/18	02/28/18	02/28/18	02/28/18	02/28/18
Date analyzed	Limits	02/28/18	02/28/18	02/28/18	02/28/18	02/28/18	02/28/18
Lead (Pb)	1.0	nd	98%	5.3	6.9	16	7.9

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
M- matrix interference
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

Metals (7010), mg/kg		MS	MSD	RPD
Matrix	Soil	Soil	Soil	Soil
Date extracted	Reporting	02/28/18	02/28/18	02/28/18
Date analyzed	Limits	02/28/18	02/28/18	02/28/18
Lead (Pb)	1.0	113%	105%	8%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
M- matrix interference
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

AAL Job Number: C80226-1
Client: Aerotech Environmental
Project Manager: Nick Gerkin
Client Project Name: Fife RV Center
Client Project Number: na
Date received: 02/26/18

Analytical Results

8082 (PCBs), mg/kg		MTH BLK	LCS	MW10(4)	MW10(9)	MW11(3.3)	MS	MSD	RPD
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18
Date analyzed	Limits	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18	03/02/18
A1221	0.20	nd		nd	nd	nd			
A1232	0.20	nd		nd	nd	nd			
A1242 (A1016)	0.20	nd		nd	nd	nd			
A1248	0.20	nd		nd	nd	nd			
A1254	0.20	nd		nd	nd	nd			
A1260	0.20	nd	114%	nd	nd	nd	104%	106%	2%
Surrogate recoveries:									
Tetrachloro-m-xylene		95%	97%	93%	92%	98%	94%	93%	
Decachlorobiphenyl		111%	110%	120%	98%	126%	108%	111%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
M - matrix interference
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

ADVANCED ANALYTICAL

Chain of Custody Record

Page of

Laboratory Job #: C80226-1

4078 148 Avenue NE
Redmond, WA 98052
(425) 702-8571
aachemlab@yahoo.com

Client: Aerotech

Project Name: Fife RV Center

Project Manager: Nick Gerkin

Project Number: —

Address: 13925 Interurban Ave S, Tukwila, WA

Collector: Nick Gerkin

Phone: 206 482 2287 Fax:

Date of collection: 2/23/18

	Sample ID	Time	Matrix	Container type	8260 Volatiles	HVOC 8260	BTEX	BTEX/NWTPH-Gx	NWTPH-Gx	NWTPH-Dx	NWTPH-HCID	8270 Semivolatiles	8270 PAH	8082 PCBs	8081 Pesticides	RCRA 8 Metals	Lead	MTCA5 Metals	Notes, comments	# of containers
1	MW10(4)	0825	S	1VOA 1Jar		X	X		X			X	X			X				2
2	MW10(9)	0835				X	X		X			X	X			X				
3	MW10(14)	0845					X												~~HOLD~~ VAS	
4	MW11(3.3)	1130				X	X		X			X	X			X				
5	MW11(4.8)	1135																		
6	MW11(6.3)	1140					X													
7	MW11(7.8)	1145																		
8	MW11(9.3)	1155					X													
9	MW12(4.5)	1310					X		X			X				X				
10	MW12(7)	1320					X		X										@Added by N Gerkin	
11	MW12(12.5)	1325	↓	↓			⊗												HOLD VAS	↓
12																				

Relinquished by:	Date/Time	Received by:	Date/Time
	2/26/18 0730		2/26/18 0730
Relinquished by:	Date/Time	Received by:	Date/Time
	2/26/18 1224		02/26/18 1203

Sample receipt info:

Total # of containers:

Condition (temp, °C)

Seals (intact?, Y/N)

Comments:

Turnaround time:

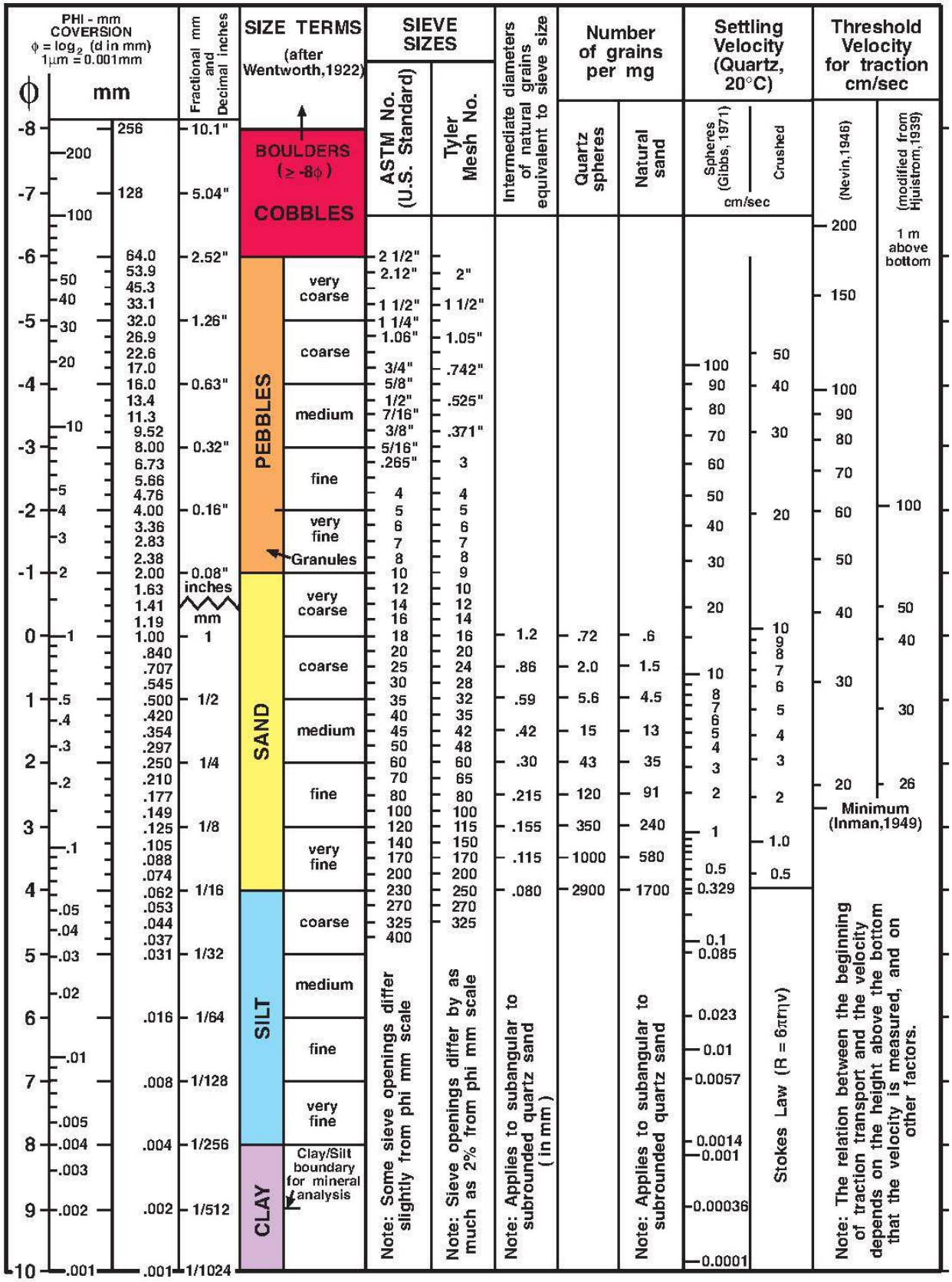
Same day ○

24 hr ○

48 hr ○

Standard ⊗

- Boring Logs



US Geological Survey

CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)		
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)		
		SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)		
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

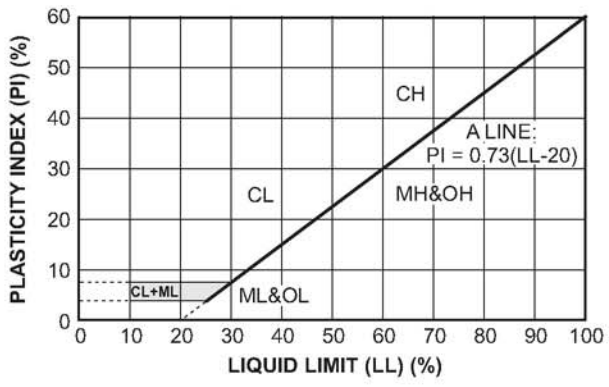
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



AEROTECH
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www.AerotechEnvironmental.com

Depth (ft)	Groundwater		Visual or Olfactory Evidence	Blow Counts	Recovery		USCS Classification	Soil Classification/ Description **UNIFIED SOIL CLASSIFICATION SYSTEM EXPLANATION**	Well Construction		
							GW	**GRAVELS**, well-graded* OR Gravel+Sand mix, little-no fines			
							GP	**GRAVELS**, poorly-graded* OR Gravel+Sand mix, little-no fines			
							GM	**GRAVELS**, silty OR Gravel-sand-silt mix			
							GC	**GRAVELS**, clayey OR Gravel-sand-clay mix			
							SW	**SAND**, well-graded OR **Gravelly Sands**, little-no fines			
							SP	**SAND**, poorly-graded OR **Gravelly Sands**, little-no fines			
							SM	**SAND**, silty OR Sand-silt mix			
							SC	**SAND**, clayey OR Sand-clay mix			
							ML	**SILT**, inorganic (very fine sands, rock flour, silty or clayey fine			
								sands) OR Clayey silts with slight plasticity			
							CL	**CLAY**, inorganic, low-med plasticity (gravelly, sandy, silty, lean)			
							OL	**SILT**, organic, AND **SILT-CLAY**, organic, low plasticity			
							MH	**SILT**, inorganic (micaceous or diatomaceous fn sndy/silty soils)			
								OR SILTY SOILS, elastic SILTS			
							CH	**CLAY**, inorganic, high plasticity, fat clays			
							OH	**CLAY**, organic, med-high plasticity OR Organic SILTS			
							PT	**PEAT** and other highly organic SOILS			
								**** Terminology clarification:*** *The term "**Well graded**" is a synonym for "**Poorly sorted**," both meaning that a wide range of particle sizes are present. The former term is employed in geotechnical descriptions, while the latter is preferred by the USDA in characterizing topsoils and subsoils.*			

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BORING LOG #: MW10

Site Name: Fife RV Center
Project Number: 217-4034

Drilling Contractor:	Boretec, Valleyford
Drilling Method:	HSA 8.25"
Sampler Type:	Split Soon
ECY Well Tag:	BJN085
Licensed Driller:	Carlos Gardea 3143
Surveyed Casing Elev.:	12.94' above MSL
Work Date:	02/23/18

Site Location: 3410 Pacific Highway East, Fife, WA
AOC: West of MW2, Northeast Corner of Bio-Swale
Borehole Location: 16' West of MW2

Logged by: N. Gerkin **Boring Depth:** 14.5 feet **GW Encountered:** YES

Depth (ft)	Groundwater	PID (ppm)	Sample	Blow Counts	Recovery	USCS Classification	Soil Classification/ Description	Well Construction (Casing within Bollard)
							Gravel	
4		0.4	Lab	3, 2, 1		GW	FILL - GRAVEL and SAND with Silt, light brown to gray, damp, fine to coarse sand and gravel, subangular to subrounded gravel, Well graded. No petrol odor.	
9		9.1	Lab	2, 2, 2		SP	SAND with Silt, gray, saturated, slight petrol odor. (Possible Northwestern Tank Basin)	
13				2		ML	SILT with some very fine Sand, maroon to brown, wet, slight petrol odor.	
14		0.0	Lab	1, 2				
20							2" Diameter Schedule 40 PVC, 0.020" Screen from 4 to 14 ft bgs Well completed with Colorado Silica Sand from 3 to 14 ft bgs Bentonite from 1 to 3 ft bgs and Concrete from 0.5 to 1 ft bgs	

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BORING LOG #: MW11

Site Name: Fife RV Center
Project Number: 217-4034

Drilling Contractor:	Boretec, Valleyford
Drilling Method:	HSA 8.25"
Sampler Type:	Split Soon
ECY Well Tag:	NA (<10')
Licensed Driller:	Carlos Gardea 3143

Surveyed Casing Elev.: 9.12' above MSL
Work Date: 02/23/18

Site Location: 3410 Pacific Highway East, Fife, WA
AOC: Furthest Downgradient Well, 33' NW of MW12
Borehole Location: Western Corner of Bioswale

Logged by: N. Gerkin **Boring Depth:** 14.5 feet **GW Encountered:** YES

Depth (ft)	Groundwater	PID (ppm)	Sample	Blow Counts	Recovery		USCS Classification	Soil Classification/ Description	Well Construction (Casing within Bollard)
+2								Concrete Pad	
+1								Earthen Mound (Built Prior to Drilling to Allow for Well Seal)	
1									
2				2			SW	SAND, coarse to medium, well graded, brown, moist. No foul odor.	
3				2					
		0.8	Lab	1				Sandy SILT, very fine sand, very moist to wet, mottled staining. greyish brown . No foul odor.	
4				4					
				3					
5		0.5		2				As above, saturated	
				2					
6				3					
		0.8	Lab	4				As above	
7				4					
				3					
8		4.1		1					
				1					
9				1					
		0.0	Lab	1				As above	
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									

Though exempt per WAC per shallow depth (- 9.5 ft below constructed mound) / - 8.3 ft bgs), the objective was to meet or exceed the seal requirements for wells extending more than - 10 ft bgs in order to adhere to the 'spirit' of the code'. An additional objective was to place at least one downgradient well (on property) at which the top of screen would be present above the water table at those times at which water levels were present at the rim of the steel riser drain pipe controlling maximum bioswale water levels.

So, in order to achieve this, as the pipe rim was estimated at or slightly less than 18 inches below the - 0.0 bgs (at well location):

+1.2 to + 2.0 ft bgs Concrete Pad
+0.0 to +1.2 ft bgs Earthen mound - compacted
+0.3 to - 1.1 ft bgs Bentonite pellets
'Geo-barrier': 6 folded layers of 0.7mm thick plastic sheeting
- 1.1 to - 2.1 ft bgs Riser pipe with annular sand pack
- 2.1 to - 9.6 ft bgs Screened interval with annular sand pack

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BORING LOG #: MW12

Site Name: Fife RV Center
Project Number: 217-4034

Drilling Contractor:	Boretec, Valleyford
Drilling Method:	HSA 8.25"
Sampler Type:	Split Soon
ECY Well Tag:	BJN087
Licensed Driller:	Carlos Gardea 3143

Surveyed Casing Elev.: 11.74' above MSL
Work Date: 02/23/18

Site Location: 3410 Pacific Highway East, Fife, WA
AOC: West of MW2, Northeast Corner of Bio-Swale
Borehole Location: 30' Northwest of MW5

Logged by: N. Gerkin **Boring Depth:** 14.5 feet **GW Encountered:** YES

Depth (ft)	Groundwater	PID (ppm)	Sample	Blow Counts	Recovery	USCS Classification	Soil Classification/ Description	Well Construction (Casing within Bollard)
1–3								
4		0.8	Lab	5 4 3		GW	FILL - GRAVEL and SAND with Silt, light brown to gray, damp, saturated @5', fine to coarse sand and gravel, subangular to subrounded gravel, Well graded. Trace Organics, No petrol odor.	
5–6								
7		4.1	Lab	1 1 2		ML	SILT with some very fine Sand, maroon to brown, wet, plastic, slight petrol odor. (Possible Northwestern Tank Basin)	
8–9								
10				7 2 1			As above	
11								
12		0.0	Lab	2 1 2		ML	As above, increased organics	
13–14								
15–18								
19–20							2" Diameter Schedule 40 PVC, 0.020" Screen from 4 to 14 ft bgs Well completed with Colorado Silica Sand from 3 to 14 ft bgs Bentonite from 1 to 3 ft bgs and Concrete from 0.5 to 1 ft bgs	
21–23								

- Standard Operating Procedures

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SOIL BORING AND WELL INSTALLATION STANDARD OPERATING PROCEDURE

EQUIPMENT *(Items in italic provided by drilling subcontractor, verify according to the site sampling plan they bring the appropriate equipment and material.)*

- Sampling and Analyses Plan (SAP)
- Site-specific sampling plan
- Sample location map
- Sample table
- Safety equipment, as specified in the Health and Safety Plan
- Permanent pens/marker (e.g. Sharpies®)
- Site logbook, boring log and/or sampling form
- Camera
- Candlestick/cones/barricade
- Caution tape
- Trash bags/plastic sheeting
- Assorted tools (e.g. shovels, wrenches, etc.)
- *Annular materials: silica sand, bentonite pellets and chips, grout*
- *Monitoring well materials: 2-inch schedule 40 PVC riser, well screen and end caps*
- *Completion materials: posts or traffic rated steel monuments, concrete mix, concrete forms*
- *Drilling rig (e.g. hollow stem auger, air/mud rotary, direct push, or sonic)*
- *Disposable acetate liners for direct push*
- *Decontamination equipment such as pressure washer to decontaminate rig and bucket with water and phosphate-free soap (e.g. Alconox®, Liquinox®) for split spoon samplers*

Preliminary Activities

Prior to the onset of field activities at the site, Aerotech obtains the appropriate permit(s) from the governing agency(s). Advance notification is made as required by the agency(s) prior to the start of work. Aerotech marks the borehole locations and contacts the local one call utility locating service at least 2 full business days prior to the start of work to mark buried utilities. Borehole locations may also be checked for buried utilities by a private geophysical surveyor. Additionally, borehole locations may be cleared via air-knife and vacuum operations where proposed locations are in close proximity of buried utilities. Fieldwork is conducted under the advisement of a state registered professional geologist. Monitoring well construction will

comply with Monitoring Well Construction: General, 690-240-100 through Well Seals, WAC 173-160.

Drilling

Aerotech contracts a licensed driller to advance each boring and collect soil samples. The specific drilling method (e.g., hollow-stem auger, direct push method, or sonic drilling), sampling method [e.g., core barrel or California-modified split spoon sampler (CMSSS)] and sampling depths are documented on the boring log and may be specified in a work plan. Soil samples are typically collected at the capillary fringe and at 5-foot intervals to the total depth of the boring. To determine the depth of the capillary fringe prior to drilling, the static groundwater level is measured with a water level indicator in the closest monitoring well to the boring location, if available.

The borehole is advanced to just above the desired sampling depth. For CMSSSs, the sampler is placed inside the auger and driven to a depth of 18 inches past the bit of the auger. The sampler is driven into the soil with a standard 140-pound hammer repeatedly dropped from a height of 30 inches onto the sampler. The number of blows required to drive the sampler each 6-inch increment is recorded on the boring log. For core samplers (e.g., direct push), the core is driven 18 inches using the rig apparatus.

Soil Sampling

Soil is collected according to Aerotech's SOIL SAMPLING STANDARD OPERATING PROCEDURE.

Grab Groundwater Sampling from Soil Boring

In the event that undeveloped grab-groundwater samples are necessary for the scope of work, a temporary well screen is placed across the desired interval of the soil boring. The sample can be collected via disposable bailer or peristaltic pump and disposable tubing. Additionally if direct push technology has been utilized for advancing the soil boring, a groundwater sample, is collected from the boring by using HydropunchTM sampling technology. In the case of using HydropunchTM technology, after collecting the capillary fringe soil sample, the boring is advanced to the top of the soil/groundwater interface and a sampling probe is pushed to approximately 2 feet below the top of the static water level. The probe is opened by partially withdrawing it and thereby exposing the screen. New polyethylene tubing with a peristaltic pump or decontaminated bailer is used to collect a water sample from the probe. The water sample is then emptied into laboratory-supplied containers constructed of the correct material and with the correct volume and preservative to comply with the proposed laboratory test. The container is slowly filled with the retrieved water sample until no headspace remains and then promptly sealed with a Teflon-lined cap, checked for the presence of bubbles, labeled, entered onto a COC record and placed in chilled storage at 4° Celsius. Laboratory-supplied trip blanks accompany the water samples as a quality assurance/quality control procedure. Equipment blanks may be collected as required. The samples are kept in chilled storage and transported under COC protocol to a client-approved, state-certified laboratory for analysis.

Field Screening Procedures

Aerotech staff place the soil from the middle of the sampling interval into a plastic re-sealable bag. The bag is then labeled with the sample number. The tip of a photoionization detector (PID) or similar device is inserted through the plastic bag to measure organic vapor concentrations in the headspace. The highest sustained PID measurement is recorded on the boring log. At a minimum, the PID or organic vapor monitoring device is calibrated on a daily basis in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration are recorded on a calibration log. Instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but they do not measure the concentration of petroleum hydrocarbons in the soil matrix with the same precision as laboratory analysis. Aerotech trained personnel describe the soil in the bag according to the Unified Soil Classification System and record the description on the boring log, which is included in the final report.

Backfilling of Soil Boring

If a well is not installed, the boring is backfilled from total depth to approximately 5 feet below ground surface (bgs) with either neat cement or bentonite grout using a tremie pipe. The boring is backfilled from 5 feet bgs to approximately 1 foot bgs with hydrated bentonite chips. The borehole is completed from 1 foot bgs to surface grade with material that best matches existing surface conditions and meets local agency requirements. Site-specific backfilling details are shown on the respective boring log.

Monitoring Well Construction

A well (if constructed) is completed using materials documented on the boring log or specified in a work plan. The well is constructed with slotted casing across the desired groundwater sampling depth(s) and completed with blank casing to within 6 inches of surface grade. No further construction is conducted on temporary wells. For permanent wells, the annular space of the well is backfilled with Monterey sand from the total depth to approximately 2 feet above the top of the screened casing. A hydrated granular bentonite seal is placed on top of the sand filter pack. Grout may be placed on top of the bentonite seal to the desired depth using a tremie pipe. The well may be completed to surface grade with a 1-foot thick concrete pad. A traffic-rated well vault and locking cap for the well casing may be installed to protect against surface-water infiltration and unauthorized entry. Site-specific well construction details including type of well, well depth, casing diameter, slot size, length of screen interval and sand size are documented on the boring log or specified in the work plan.

Monitoring Well Development

Following well construction, each monitoring well is developed and surveyed according to Aerotech's MONITORING WELL DEVELOPMENT AND SURVEYING STANDARD OPERATING PROCEDURE.

Well Sampling

Following development, groundwater is collected according to Aerotech's LOW-FLOW GROUNDWATER SAMPLING STANDARD OPERATING PROCEDURE.

Decontamination Procedures

Aerotech and/or the contracted driller decontaminate soil and water sampling equipment between each sampling event with a non-phosphate solution, followed by a minimum of two tap water rinses. Deionized water may be used for the final rinse. Downhole drilling equipment is steam-cleaned prior to drilling the borehole and at completion of the borehole.

Waste Treatment and Soil Disposal

Soil cuttings and decontamination fluids generated from the drilling or sampling are stored on site in labeled, Department of Transportation-approved, 55-gallon drums or other appropriate storage container. Unless otherwise specified in the contract with Aerotech, the client is responsible for disposal of investigation derived waste. Should Aerotech be contracted to complete disposal for the client, drums containing investigation derived waste are subsequently transported under manifest to a client- and regulatory-approved facility for disposal.

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SOIL SAMPLING STANDARD OPERATING PROCEDURE

EQUIPMENT

- Sampling and Analyses Plan (SAP)
- Site-specific sampling plan
- Sample location map
- Sample table
- Safety equipment, as specified in the Health and Safety Plan
- Permanent pens/marker (e.g. Sharpies®)
- Site logbook and/or sampling form
- Camera
- Screening equipment (e.g. Photoionization detector (PID))
- Survey stakes or flags
- Tape measure or measuring wheel
- Plastic sheet
- Soil collection device, heavy equipment (e.g. spoons spade shovel, hand auger, hollow stem auger – split spoon sampler, direct push rig – macro core, shelby tube, backhoe)
- Syringes for EPA Method 5035
- Syringe tool for EPA Method 5035 (e.g. En Core® sampler)
- Pre-weighed and preserved sample vials for EPA Method 5035
- Stainless steel and/or plastic bowls (only if homogenizing composite samples)
- Sample containers, precleaned (e.g., I-Chem)
- Chain-of-custody forms, custody seals, sample labels
- Ziploc® Bags
- Insulated cooler
- Ice
- Plastic bags for sample containers and ice
- Decontamination equipment including tap water and/or deionized water and phosphate-free soap (e.g. Alconox®, Liquinox®)

Soil Sampling

Soil samples are preserved in the metal or plastic sleeve used with the California-modified split spoon sampler (CMSSS) or core sampler, in glass jars or other containers according to the test method and regulatory guidelines (e.g., Environmental Protection Agency Method 5035). Sleeves are removed from the sample barrel, and the lowermost sample sleeve is labeled. Soil is collected from the split spoon sample or direct push core sample into appropriate containers based on the planned test method. Besides the use of a drilling rig, soil may also be collected via hand auger or with a scoop or spoon from the surface or a selected interval from an excavation, trench or test pit.

Soil Sample Collection

Aerotech field personnel are to review the SAP for sample locations and analysis as well as obtain photograph(s) of the material before sampling. If the soil sample is to be a discrete sample, collect soil using a clean/decontaminated stainless-steel (organic analyses) or plastic (inorganic analyses) spoon. If the soil sample is to be a composite, collect soil from all locations to be sampled into one stainless-steel (organic analyses) or plastic (inorganic analyses) bowl and homogenize the soil. If the soil sample is to be a discrete sample for volatile analyses, collect soil using a syringe and place into appropriate pre-weighed sample vial (Volatiles samples may not be composited.).

Next, use the syringe, stainless-steel or plastic spoon to transfer soil sample as appropriate into sample container as specified by the analytical test method. Label and manage sample containers. Decontaminate sampling equipment between each sampling event with a non-phosphate solution, followed by a minimum of two tap water rinses. Deionized water may be used for the final rinse. Ensure activities are well documented in the site logbook or on a designated sampling form. (i.e. collection method, presence of sheen or odor and PID measurement.

Field Screening Procedures

Aerotech field staff place soil from sampling interval into a plastic re-sealable bag. The bag is then labeled with the sample number. The tip of a photoionization detector (PID) or similar device is inserted through the plastic bag to measure organic vapor concentrations in the headspace. The highest sustained PID measurement is recorded on the boring log. At a minimum, the PID or organic vapor monitoring device is calibrated on a daily basis in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration are recorded on a calibration log. Instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but they do not measure the concentration of petroleum hydrocarbons in the soil matrix with the same precision as laboratory analysis. Aerotech trained personnel describe the soil in the bag according to the Unified Soil Classification System and record the description on the boring log, sampling form or logbook. Selected soil samples for analysis are then placed Samples are placed in a cooler chilled to 4º Celsius and transported to a state-certified laboratory under chain-of custody (COC) protocol.

Extractable Petroleum Hydrocarbons (EPH)/Volatile Petroleum Hydrocarbons (VPH)

To evaluate the potential utilization of site specific cleanup levels (e.g. Ecology's Method B or Method C cleanup levels), Aerotech field personnel will collect additional sample volume to complete EPH/VPH analysis. This test will be completed on samples that are containing petroleum hydrocarbons only, utilizing the previously discussed field screening procedures as well as contaminant source data from previous investigation work.

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MONITORING WELL DEVELOPMENT AND SURVEYING

EQUIPMENT

- Well location map
- Safety equipment, as specified in the Health and Safety Plan
- Permanent pens and markers (e.g. Sharpies®)
- Field notebook and/or sampling form
- Survey equipment
- Surge Block
- 55-Gallon Drums
- 5-Gallon Buckets
- 3/8" Tubing
- DC Power Source
- Whale® Pump
- Water Level Indicator
- Hand Tools (e.g. socket set, screw drivers)
- Watch
- Decontamination equipment including tap water and/or deionized water and phosphate-free soap (e.g. Alconox®, Liquinox®)

Preliminary Activities

Prior to the onset of field activities at the site, Aerotech obtains permission from the client to perform activities and obtains any appropriate permit(s) from potential governing agencies. Aerotech field personnel acquires surge block, tubing, down well pump, water quality monitoring equipment, containers for storing purge water and decontamination fluids and survey equipment, and verifies all are in operating condition. Fieldwork is conducted under the advisement of a state registered professional geologist.

Monitoring Well Development

When a permanent groundwater monitoring well is installed, proper well development is necessary to ensure that complete hydraulic connection is made and maintained between the well and the aquifer material surrounding the well screen and filter pack. Well development should

begin no sooner than 48 to 72 hours after well installation to allow grout to cure prior to improvement.

A surge block is used to move sediments from the filter pack into the well casing. A surge block consists of a rubber and metal plunger attached to Schedule 80 PVC sections of sufficient length to reach the bottom of the well. The surge block is constructed of materials that will not introduce contamination into the well. The surge block is moved up and down the well screen interval and then removed, followed by pumping with a downwell pump to remove any sand and silt brought into the well by the surging action. Care is taken to not surge too strongly with subsequent casing deformation or collapse. Surging will be followed by additional pumping to remove fine materials that may have entered the well during the surging effort.

After surging has been completed and the sand content of the pumped water has decreased, a submersible pump is used to continue well development. The pump should be moved up and down the well screen interval until the obtained water is relatively clear. Well development will continue until the water in the well clarifies. It should be noted that where very fine-grained formations are opposite the screened interval, continued well development until clear water is obtained might be impossible. Decisions regarding when to cease development where silty conditions exist will be made between amongst Aerotech personnel.

During well development, the primary criteria used to evaluate whether the well has been completely developed is water clarity. As mentioned above, clear water can often be impossible to obtain with environmental monitoring wells.

The minimum volume of water purged from the well during development will be approximately a minimum of 3 borehole volumes (wells will typically not reach stabilization of water quality parameters before this condition is achieved and may not have reached stability even after this threshold has been achieved). The above is a general guideline for difficult well development. Development water will be stored in 55-gallon Department of Transportation (DOT) -approved drums.

Surveying

If required, wells are surveyed relative to an established benchmark of known elevation above mean sea level to an accuracy of +/- 0.005 foot. The casing is notched or marked on one side to identify a consistent surveying and measuring point.

Decontamination Procedures

Aerotech personnel completing the monitoring well development equipment will also decontaminate between each monitoring well. The decontamination procedure will consist of washing with a non-phosphate solution, followed by a minimum of two tap water rinses. Deionized water may be used for the final rinse.

Waste Storage and Disposal

Decontamination fluids and purge water from well development and sampling activities are stored on site in labeled, DOT-approved storage containers. No containers will be left on-site

without a label indicating the material matric, accumulation date, project name, project address and Aerotech contact information. Unless otherwise specified in the contract with Aerotech, the client is responsible for disposal of investigation derived waste. Should Aerotech be contracted to complete disposal for the client, drums containing investigation derived waste are subsequently transported under manifest to a client- and regulatory-approved facility for disposal.