REMEDIAL INVESTIGATION/FEASIBILITY STUDY AND PILOT STUDY

Prime Cleaners
VCP #NW2571
18001 Bothell Everett Highway
Bothell, Washington
ZGA Project No. 1001.22
June 24, 2014

Prepared For:

Mill Creek Crossing LLC
22833 Bothell Everett Highway
Bothell, Washington

Prepared By:

Zipper Geo Associates, LLC
Geotechnical and Environmental Consulting

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Zipper Geo Associates, LLC
Geotechnical and Environmental Consulting

June 24, 2014

Mill Creek Crossing LLC
22833 Bothell Everett Highway, Suite 207
Bothell, Washington 98021

Attn: Mr. Nicholas Echelbarger

Re: Remedial Investigation / Feasibility Study and Pilot Study
Prime Cleaners
18001 Bothell Everett Highway
Bothell, Snohomish County, Washington
ZGA Project No. 1001.22

Dear Mr. Echelbarger:

Zipper Geo Associates, LLC (ZGA) is pleased to submit this combined Remedial Investigation, Feasibility Study, and Pilot Study for the above referenced site.

We appreciate the opportunity to perform these services for Mill Creek Crossing LLC. Please contact the undersigned at (425) 582-9928 if you have questions regarding the information provided in the report.

Sincerely,

Zipper Geo Associates, LLC

Jon Einarsen, LG
Principal

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1.0 INTRODUCTION

Zipper Geo Associates, LLC (ZGA) is pleased to present this Remedial Investigation/ Feasibility Study and Pilot Study report addressing a historical release of dry cleaning solvents from a retail dry cleaning businesses housed in the Mill Creek Crossing retail center (the MCC), located at 18001 Bothell Everett Highway in Bothell, Snohomish County, Washington. The purpose of this report is to:

- Summarize land use characteristics in the vicinity of the Site.
- Summarize information regarding the extent of solvent impacts to soil and groundwater.
- Develop a conceptual site model that synthesizes information regarding hydrogeologic conditions, exposure pathways, human and ecological receptors, and threats to human health and the environment.
- Establish remedial action objectives.
- Evaluate remedial action alternatives and select a preferred alternative that is consistent with the remedial action objectives and complies with substantive requirements under the Model Toxics Control Act (MTCA).

Section 2 (General Facility Information) provides general information on the location of the MCC and the nature of the release. Section 3 (Remedial Investigation) provides a detailed analysis of soil and groundwater quality as derived from subsurface investigations completed at the Site, regional and site specific hydrogeologic conditions, land use, and sensitive receptors. These data are used to develop a Conceptual Site Model that generally consists of a synthesis of available information regarding groundwater and its interaction with surface water, including groundwater recharge and discharge areas, and groundwater and surface water flow directions. Section 4 (Feasibility Study) establishes the Remedial Action Objectives and describes the methods whereby remedial action alternatives were evaluated. Section 5 describes the results of pilot studies completed at the Site to evaluate two potential remedial alternatives. Section 6 identifies the recommended cleanup alternative.

1.1 Standard of Care

ZGA's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. ZGA makes no warranties, either express or implied, regarding the findings, conclusions or recommendations. Please note that ZGA does not warrant the work of laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report.

1.2 Additional Scope Limitations

This report is intended to reduce, but not eliminate, uncertainty regarding contaminant pathways and receptors and the effectiveness of alternative remedial actions. Our findings are based upon information derived from soil, soil gas, indoor air and groundwater sampling at the indicated locations and other

services performed under this scope of work; such information is subject to change over time. Subsurface conditions may vary from those described herein during future investigations. If different conditions from those described herein are discovered, ZGA must be notified so that we can review these conditions and modify our conclusions and recommendations where necessary.

1.3 Reliance

This report has been prepared for the exclusive use of Mill Creek Crossing LLC, and any authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the Site) is prohibited without the express written authorization of Mill Creek Crossing LLC, and ZGA. Any unauthorized distribution or reuse is at the client's sole risk.

2.0 GENERAL FACILITY INFORMATION

The property is commercially developed within the Mill Creek Crossing retail center (MCC), located at 18001 Bothell-Everett Highway in Bothell, Snohomish County, Washington. The MCC comprises approximately 3.15 acres and includes two strip mall buildings with a combined 18 tenants and standalone buildings occupied by an Ezell's Chicken restaurant, a Rite-Aid, a coffee shop, and a Plaid Pantry convenience store/gas station. A topographic map and aerial photograph indicating the approximate location of the MCC and adjoining area are included as Figure 1 and Figure 2A in Appendix A. The Plaid Pantry is a LUST site, located on the northwest part of the MCC (Figure 2B). The Plaid Pantry is identified as Plaid Pantry No. 306 (Facility ID #91937764, VCP #NW1896). Total petroleum hydrocarbons (TPH) and BTEX have been released at the Plaid Pantry site. Multiple rounds of ground water sampling and analysis indicate that the TPH/BTEX plume associated with the Plaid Pantry release is distinct and not co-mingling with the PCE plume associated with the historical dry cleaning activities that are the subject of this report.

Tenants of the southerly of the two strip mall buildings consist of a Money Tree, Prime Cleaners, the Osaka Grill, Sundia Tan, a florist, Pro Nails, Computer Concepts, a State Farm insurance agent, and a Divita Dialysis Center. Two tenant spaces in the southerly building are vacant. As discussed in Section 3, the source of the contamination at the property appears to be dry cleaning activities in part of the tenant space currently occupied by the Money Tree but formerly occupied by a dry cleaner from 1984 until about 2000.

Tenants of the easterly strip mall building consist of Molly Maid, Kumon Learning Center, Santana Salon & Spa, Home Realty, Extra Fitness, and Wild Vine Bistro.

The MCC is bounded to the south by a mini-warehouse storage facility, and to the west by the Bothell Everett Highway (SR 527) and its associated right-of-way. Several auto repair businesses are located west of the Bothell Everett Highway. The MCC is bounded to the east by a commercial business, beyond which lies a residential housing development.

This report addresses a historical release of dry cleaning solvents on the southwest part of the MCC.

Table 1. Facility Information

Facility Address	Mill Creek Crossing Retail Center (MCC) 18001 Bothell Everett Highway
Current Owner	Mill Creek Crossing LLC 22833 Bothell-Everett Highway Bothell, WA 98021 425.774.0205 Contact: Nicholas Echelbarger
Environmental Consultant	Zipper Geo Associates, LLC 19203 36th Avenue West, Suite D Lynnwood, WA 98036 425.582.9928 Contact: Jon Einarsen, L.G.
Tax Parcel Number	Snohomish County Tax Parcel #27051800106300 and #27051800100300. Former dry cleaning activities were located in Tax Parcel #27051800106300. Tax parcel locations within the MCC are indicated on Figure 2B
MTRS	T27N R05E Section 18 (NE¼ of NE¼)
Facility Industrial Classification #	NAICS 812320 Dry Cleaning
Site Zoning	General Commercial
Site Comprehensive Plan Designation	Urban Commercial
Source of Contamination	Releases from historical retail dry cleaning tenants
Location of Source Area	A tenant space formerly occupied by a dry cleaner on the southwest part of the MCC.
Contaminants of Concern	Tetrachloroethylene (PCE) and trichloroethylene (TCE)
Extent of Release	Soil impacts above applicable cleanup levels are limited to the immediate vicinity of the southwest part of the MCC. Groundwater impacts above applicable cleanup levels appear to be limited to a small area immediately south and southwest of the source area.

WAC 173-340-200 defines the Site as “any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located”.

In accordance with this definition, the Site is located near the southwest corner of Snohomish County Tax Parcel #27051800106300 and extends beneath the south adjoining mini-warehouse facility and the SR 527 right-of-way approximately 500 south of the intersection with 180th Street Southeast. A site plan indicating the approximate location of the "Site" as defined by WAC 173-340-200 is included as Figure 3.

3.0 REMEDIAL INVESTIGATION

3.1 Previous Investigations

ZGA has been provided with six previously completed environmental reports for the Site:

- Phase I Environmental Site Audit, Marketplace Plaza, prepared by Environmental Associates, Inc. (April, 1999).
- Preliminary Subsurface Sampling and Testing, Marketplace Plaza Gas Station & Dry Cleaner, Environmental Associates, Inc. (March, 1999).
- Phase I Environmental Site Assessment, Marketplace Retail Center, Adapt Engineering, Inc. (November 2007).
- Limited Phase II Environmental Site Assessment, Marketplace Retail Center, Adapt Engineering, Inc. (November 2007).
- Limited Site Investigation, Marketplace Retail Center, Terracon Consultants (August, 2009)
- Supplemental Limited Site Investigation, Marketplace Retail Center, Terracon Consultants, (June 2011).

Figure 3 is a Site and Exploration Plan that indicates the approximate locations of the soil explorations and groundwater monitoring wells in relation to the pertinent structures and general site boundaries (Appendix A). Boring logs for each of the explorations described below are included in Appendix B. Analytical results for soil and groundwater samples are summarized in Table 3 and Table 4 in Section 3.4.

Phase I Environmental Site Audit (Environmental Associates, 1999)

According to the 1999 Site Audit, construction of the multi-tenant portion of the Marketplace Plaza (now Mill Creek Crossing) was completed in 1984. An operational dry cleaner was reportedly present in the end cap unit located at the west end of the south wing of the multi-tenant building from 1984 until the time the report was completed in 1999.

Preliminary Subsurface Sampling and Testing (Environmental Associates, 1999)

Four subsurface explorations were advanced to evaluate the potential for releases due to dry cleaning activities. These included two hand-advanced explorations inside the dry cleaner unit to depths ranging from two to six feet (SP-1 and SP-2), and two borings immediately west (outside) of the end cap unit to depths of approximately 24 feet (B-1 and B-2). The approximate locations of these explorations are indicated on Figure 4. One soil sample was collected from each exploration. Tetrachloroethylene (PCE)

was detected in both of the interior soil samples at concentrations of 240 ug/kg and 560 ug/kg. PCE was not detected in concentrations above laboratory reporting limits in B-2, but was reported at a concentration of 200 ug/kg at a depth of approximately 22½ feet in B-1. These reported concentrations exceed the Model Toxics Control Act (MTCA, WAC 173-340) Method A cleanup level for PCE (50 ug/kg).

Phase I Environmental Site Assessment (Adapt Engineering, 2007)

The 2007 Phase I ESA indicated that the dry cleaner remained operational at that time, but did not indicate the unit in which the dry cleaner was located.

Limited Phase II ESA (Adapt Engineering, 2007)

The 2007 Limited Phase II ESA described the installation of three groundwater monitoring wells on the MCC. Two of the wells were completed near the Plaid Pantry service station on the northwest part of the MCC. One of the wells was advanced a few feet south of the building housing the current and historical dry cleaning operations, and was completed at a depth of approximately 35 feet. This well is referred to as MW-4 in this report. One soil sample collected at a depth of approximately 30 feet in MW-4 contained PCE at a concentration of 63 ug/kg, slightly exceeding the current MTCA Method A cleanup level. A groundwater sample collected from MW-4 contained PCE at a concentration of 45 ug/L, which exceeds the MTCA Method A cleanup level for groundwater (5 ug/L).

Limited Site Investigation (Terracon Consultants, 2009)

Terracon advanced a total of thirteen shallow direct-push borings inside the building at the locations of both the current and former dry cleaning tenant spaces, and in the alley immediately south and southwest of the current and former dry cleaning tenant spaces. In addition, three hollow-stem auger borings were completed with groundwater monitoring wells (MW-1, MW-2, and MW-3) outside of the tenant spaces on the southwest part of the MCC. The well installed by Adapt in 2007 was designated as MW-4 and is located south of the former dry cleaner tenant space currently occupied by Money Tree.

Eleven shallow soil samples were collected from within the tenant spaces, at depths ranging from 2½ to 5 feet. PCE and trichloroethylene (TCE) were detected in nearly all of the samples, and the Method A cleanup level was exceeded in three of the samples (110 ug/kg to 160 ug/kg PCE and 33 ug/kg to 36 ug/kg TCE). Four soil samples collected from a depth of three feet in the alley immediately south and southwest of the tenant spaces also contained PCE at concentrations below the cleanup level. The approximate locations of these shallow exploration are indicated on Figure 4.

Fifteen soil samples were collected from the MW-1 to MW-3 borings (five from each boring) at depths ranging from 7 ½ to 44 feet. PCE and TCE were not detected above the Method A cleanup levels in any of the samples.

Groundwater samples collected from the four on-site wells contained concentrations of PCE ranging from 6.6 to 170 ug/L and a single detection of cis-1,2-DCE at a concentration of 4.8 ug\L. Three of the four groundwater samples contained PCE at concentrations exceeding the MTCA Method A cleanup level (5 ug\L).

Supplemental Limited Site Investigation (Terracon Consultants, 2011)
Terracon advanced three hollow-stem auger borings west of the facility, along the west side of the SR 527 right-of way (MW-5, MW-6, MW-7) in 2010, and one hollow-stem auger boring south of the facility on the east side of the SR 527 right-of-way (MW-8) in 2011. Each boring was completed with a groundwater monitoring well. A total of 27 soil samples were collected from these three borings and none contained PCE or TCE above the cleanup level.

Groundwater samples were collected from all eight wells in 2011. PCE and TCE were detected above the cleanup level only in MW-3 (9.3 ug/L), MW-4 (110 ug/L), and MW-8 (22 ug/L).

Groundwater Monitoring Report (Zipper Geo Associates, 2012)
ZGA collected groundwater samples from MW-1, MW-2, MW-3, MW-4, and MW-8 in May of 2012. PCE was reported at a concentration exceeding the cleanup level in MW-3 (15 ug/L), MW-4 (140 ug/L) and MW-8 (36 ug/L).

In addition, ZGA documented the installation and sampling of two additional groundwater monitoring wells in October of 2013, as discussed in Section 3.2. The subsurface conditions, soil quality, and groundwater quality as revealed by these investigations are more fully discussed in Sections 3.2 to 3.5.

3.2 Supplemental Remedial Investigation

3.2.1 Monitoring Well Installation

ZGA documented the advancement of two borings completed with dedicated groundwater monitoring wells (MW-9 and MW-10) in September 2013 using a hollow-stem auger drill rig operated by Environmental Drilling. MW-9 was installed in a cross gradient position assumed to be beyond the east side of the plume. MW-10 was installed in an area assumed to be up gradient of the plume (Figure 3).

Soil samples were collected at five-foot intervals using a 2-inch O.D. split-spoon Standard Penetration Test (SPT) soil sampler driven with a 140-pound auto-hammer. MW-9 and MW-10 were advanced to depths of 39 feet and 40 feet, respectively. Eight soil samples from each boring were collected and field preserved in accordance with EPA Method 5035 and submitted for chemical analysis using EPA Method 8260. Analytical results are summarized in Section 3.4.1.

Both monitoring wells consist of 2-inch inside diameter, schedule 40, flush-threaded PVC. A ten foot section of 0.010-inch slotted screen was mated to an appropriate length section of blank riser, which extended to approximately 0.25 feet below the ground surface. The annular space between the well casing and the borehole wall was filled with #10-20 silica sand extending approximately two feet above

the screened interval. A hydrated bentonite seal was placed above this, and the wells were completed at the ground surface with lockable, flush-mount monuments that were cemented in place.

A field log of each exploration was maintained, including the thickness and depth of each soil unit encountered and the depth to the uppermost water table. Soil samples were observed to document soil lithology, color, and moisture content. Soils were logged in general accordance with the American Society for Testing and Materials (ASTM) Practice Designation D-2488, *Standard Practice for Description of Soils (Visual-Manual Procedure)*. Exploration logs are included in Appendix B of this report.

ZGA collected groundwater samples from all ten groundwater monitoring wells on March 5 to March 7, 2014. Prior to each sample collection event, monitoring wells were purged until consistent values (i.e., less than 10% variance between consecutive readings) were obtained for pH, turbidity, temperature and conductivity using a Horiba U-22 multi-parameter water quality meter equipped with a flow through cell. Groundwater was collected with a portable bladder pump utilizing low flow techniques. The intake of the pump was set at the approximate midpoint of the screened interval in each well, except for MW-8 where the intake was set near the top of the screened interval. Dedicated polyethylene tubing and bladders were used for each monitoring well. Discharge from the bladder pump was directed into glass 40-ml VOA sample containers supplied by the laboratory, and preserved with hydrochloric acid. Groundwater samples were analyzed for VOC using EPA Method 8260.

Several requests were made to Advance Management, Inc., the owner of the mini-warehouse property south of the MCC, to authorize access for collecting soil and groundwater samples on that property. The owner did not respond to any requests.

3.2.2 Soil Gas and Indoor Air Sampling

Three indoor air samples and one outdoor ambient air sample were collected using 6-liter Summa canisters equipped with 8-hour regulators on November 21, 2013 and again on June 3, 2014. Indoor air samples were collected from three adjoining tenant spaces – the Money Tree, Prime Cleaners, and Osaka Grill. The approximate locations of these tenant spaces are indicated on Figure 5.

The Prime Cleaners no longer uses chlorinated solvents in the dry cleaning machine. However spot cleaners such as Picrin (100% TCE) and several others with proprietary ingredients are used in the tenant space for spot cleaning (direct application to stains prior to loading the dry cleaning machine). The spot cleaners are stored in one-gallon containers with standard plastic screw caps, and also in small containers with open squirt tips.

The spot cleaners were not removed prior to the first indoor air sampling event. The spot cleaners that we could find were removed the evening prior to the second indoor air sampling event. We requested Prince Cleaners not move the spot cleaners back into the tenant space until the sampling event was completed. The Prime Cleaners and Osaka Grill tenant spaces were aerated using industrial fans for about two hours immediately prior to the second indoor air sampling event. After the aeration was complete we placed the indoor air canisters and proceeded with the soil gas sampling. We left the site about 2 PM.

When we returned at about 6 PM to retrieve the indoor canisters, we noted that all of the spot cleaner containers had been returned to the Prime Cleaners tenant space. Based on these conditions it is our opinion that indoor air quality sample results for both sampling events is compromised by the presence of TCE emitters in The Prime Cleaners tenant space. We have included the indoor air data in this report because it is likely representative of indoor air quality. However the data should not be used to access the potential for vapor intrusion.

Two permanent soil gas probes were installed in each of the three tenant spaces at the approximate locations indicated in Figure 5. Soil gas probes consisted of a Vapor Pin™ driven into a 5/8-inch hole that was advanced through the slab and about two inches into the underlying subgrade. Sub-slab soil gas samples were collected on November 25, 2013 (SGP-1, SGP-2, SGP-5, and SGP-6) and December 6, 2013 (SGP-3 and SGP-4). All six soil gas probes were resampled on June 3, 2014. All samples were collected using 1-liter Summa canisters with a flow rate of approximately 200 ml/minute. All samples were analyzed by Eurofins Air Toxics for volatile organic compounds using EPA Method TO-15.

All three tenant spaces were open for businesses at the time we completed both of the indoor air and soil gas sampling events. Both the north and south doors at the Money Tree were closed. The back (south) door of the Prime Cleaners and Osaka Grill were open. The indoor air canister in the Money Tree tenant space was placed on a countertop at an elevation of about three feet in a back room (south part of the tenant space) for the first sampling event and on top of a refrigerator in the same back room for the second event. The indoor air canister in the Prime Cleaners was placed at an elevation of about seven feet on top of a shelf near the front counter (north part of the tenant space) for both events. The indoor air canister at the Osaka Grill was placed at an elevation of about seven feet on a cooler in the dining area (central part of the tenant space) for both events. The canister for ambient outdoor air was placed on the roof, about 150 feet east of the Osaka Grill for both events.

3.3 Site Specific Hydrogeologic Conditions

Detailed lithologic descriptions are presented on the soil boring logs included in Appendix B. In general, subsurface soil conditions identified during this investigation are similar to those identified during previous investigations. Soils generally consist of dense to very dense sand, sandy gravel, gravelly sand and occasional cobbles, all with varying amounts of silt. We interpret these soils to consist of Vashon advance outwash.

The relative location and elevation of the PVC casing for each groundwater monitoring well were surveyed for horizontal and vertical location by a licensed surveyor. Static groundwater levels were subsequently measured in the monitoring wells as indicated in Table 2.

Table 2. Relative Groundwater Elevations (Feet)

Well	Relative Casing Elevation (Feet)	Depth to Groundwater				Relative Groundwater Elevation			
		8-25-10	5-9-11	5-23-12	6-12-14	8-25-10	5-9-11	5-23-12	3-5-14
MW-1	296.31	25.22	21.18	22.73	23.95	271.09	275.13	273.58	272.36
MW-2	296.47	25.58	21.61	22.97	24.28	270.89	274.86	273.50	272.19
MW-3	296.96	26.17	22.21	23.49	24.88	270.79	274.75	273.47	272.08
MW-4	296.56	25.76	21.77	23.10	24.47	270.80	274.79	273.46	272.09
MW-5	289.85	18.71	14.96	16.18	17.49	271.14	274.89	273.67	272.36
MW-6	289.94	18.91	15.06	16.30	17.54	271.03	274.88	273.64	272.40
MW-7	289.72	19.14	15.22	16.41	17.85	270.58	274.50	273.31	271.87
MW-8	290.56		16.02	17.21	18.69		274.54	273.35	271.87
MW-9	298.98				26.30				272.68
MW-10	297.49				25.19				272.30

Approximately four feet of groundwater elevation variation was observed near the end of the dry season (August 2010) and the end of the rainy season (May 2011). Less variation was noted during the May 2012 sampling event. A groundwater contour map for the most recent sampling event is presented in Figure 7. It should be noted that the depth to groundwater and groundwater flow directions may vary depending upon seasonal variations in rainfall and other factors. The estimated groundwater flow direction at the Site is generally consistent with a southerly flow direction described by Thomas and others (1997).

The average groundwater seepage velocity (V) for the uppermost aquifer underlying the Site was calculated using data from the May 2012 groundwater sampling event and by utilizing a form of Darcy's Law as represented by the following formula:

$$V = (K/n)*(dh/dl)$$

Where: V = Seepage velocity

K = Hydraulic conductivity

n = Effective porosity.

dh/dl = Hydraulic gradient.

The hydraulic gradient observed during the May 2012 sampling event was approximately 0.0013 ft./ft. measured from MW-1 to MW-8. The results of the calculation indicated a seepage velocity of approximately 0.047 feet/day and was based on an assumed hydraulic conductivity of 100 feet/day (Thomas and others, 1997) and an effective porosity of 30 percent.

3.4 Analytical Laboratory Results

Soil and groundwater quality summary results for volatile organic compounds (VOC) are presented in Table 3 and Table 4, respectively. The tables include the analytical results for investigations completed by Terracon in 2009, 2010, and 2011 and groundwater sampling completed by ZGA in 2012. The results for soil are compared to the MTCA Method A cleanup levels (for the soil to groundwater pathway) and MTCA Method B cleanup levels (for the direct contact pathway). The results for groundwater are compared to the Method A cleanup levels. Complete laboratory reports and chains-of-custody are included in Appendix C. Additional discussion and interpretation of analytical results relative to applicable cleanup levels is included in Section 3.5. Summarized analytical results are also presented in Figure 6 and Figure 7 (Appendix A).

3.4.1 Soil Quality

Volatile organic compounds (VOC), including dry cleaning solvents and their degradation products (PCE, TCE, dichloroethylene, and vinyl chloride) were not detected above the laboratory reporting limits (10 ug/kg) in any of the 16 soil samples from the MW-9 and MW-10 explorations. Summary analytical results for PCE, TCE, and cis-1,2-dichoroethylene (cis-1,2-DCE) for all soil samples collected since 2009 are presented in Table 3 and are compared to MTCA Method A and Method B cleanup levels. Other VOC were not detected, or were detected in concentrations below cleanup levels. Please refer to Appendix B for the complete analytical results for samples collected from MW-9 and MW-10, and to the 2009 and 2011 Terracon reports for the other explorations. Soil analytical results are also indicated on Figure 4 and Figure 6.

Table 3. Summarized Analytical Results (Soil)

Sampling Event	Sample	Depth (Feet)	Location	Volatile Organic Compounds (ug/kg)		
				PCE	TCE	Cis-1,2-DCE
Environmental Associates (1999)	B-1	22.5	West Alley	**200**	ND	330
	B-2	~20		ND<57	ND	ND<57
	SP-1	~5	Former Drycleaner	**240**	ND	ND<54
	SP-2	~1		**560**	ND	ND<53
Adapt (2007)	B-7	30	MW-4	**63**	ND<30	ND<50
Terracon (2009)	B1	3	Existing Drycleaners	**160**	**38**	ND<1.5
	B2	3		1.1	18	ND<1.0
	B3	2½		1.9	20	ND<1.0
	B4	2½		17	29	ND<1.1
	B5	3	South Alley	ND<1.1	24	ND<1.1
	B6	3		1.2	15	ND<1.0
	B7	3		15	22	ND<1.1
	B8	3		28	30	28
	B9	2½	Money Tree (Former Drycleaner)	**110**	9.2	ND<1.1
	B9	5		4.1	27	ND<1.1
	B10	3		5.2	14	ND<1.1
	B10	5½		**160**	10	ND<1.1
	B11	3		ND<1.0	ND<1.0	ND<1.0
	B12	3		3.8	**38**	ND<1.1
	B13	3½		16	**33**	ND<1.0
	MW1-1	7½	Parking Lot	ND<1.1	ND<1.1	ND<1.1
	MW1-2	17½		ND<1.1	ND<1.1	ND<1.1
	MW1-3	25		2.1	ND<1.1	ND<1.1
	MW1-4	37		ND<1.3	ND<1.3	ND<1.3
	MW1-5	41		ND<1.2	ND<1.2	ND<1.2
	MW2-6	7½	West Alley	ND<1.1	ND<1.1	ND<1.1
	MW2-7	18		ND<1.0	ND<1.0	ND<1.0
	MW2-8	23		ND<1.1	ND<1.1	ND<1.1
	MW2-9	44		ND<1.1	ND<1.1	ND<1.1
	MW2-10	33		ND<1.0	ND<1.0	ND<1.0
	MW3-11	7½	South Alley	4.5	ND<1.2	ND<1.2
	MW3-12	13		3.9	ND<1.1	ND<1.1
	MW3-13	27½		9.3	ND<1.1	ND<1.1
	MW3-14	31		2.3	ND<1.1	ND<1.1
	MW3-15	37		ND<1.1	ND<1.1	ND<1.1
Terracon (2011)	MW5 S-1	12½	West Side of the Bothell Everett Highway	ND<1.2	ND<1.2	ND<1.2
	MW5 S-2	20		ND<1.2	ND<1.2	ND<1.2
	MW5 S-3	25		ND<1.1	ND<1.1	ND<1.1
	MW5 S-4	30		ND<1.2	ND<1.2	ND<1.2
	MW5 S-5	35		ND<1.2	ND<1.2	ND<1.2
	MW6 S-1	15		ND<1.2	ND<1.2	ND<1.2
	MW6 S-2	20		ND<1.0	ND<1.0	ND<1.0
	MW6 S-3	26		ND<1.1	ND<1.1	ND<1.1
	MW6 S-4	30		ND<1.1	ND<1.1	ND<1.1
	MW6 S-5	35		1.3	ND<1.1	ND<1.1
	MW7 S-1	16		ND<1.2	ND<1.2	ND<1.2
	MW7 S-2	20		ND<1.1	ND<1.1	ND<1.1
	MW7 S-3	26		ND<1.1	ND<1.1	ND<1.1
	MW7 S-4	32.5		ND<1.1	ND<1.1	ND<1.1
	MW7 S-5	40		13	ND<1.2	ND<1.2
MTCA Method A Cleanup Level (Soil to Groundwater Pathway)				*50*	*30*	*NE*
MTCA Method B Cleanup Level (Direct Contact Pathway)				*476,000*	*12,000*	*1.6E5*

Table 3. Summarized Analytical Results (Soil, Continued)

Sampling Event	Sample	Depth (Feet)	Location	Volatile Organic Compounds (ug/kg)		
				PCE	TCE	Cis-1,2-DCE
2011 Supplemental LSI (Terracon, 2011)	MW-8 S1	10	East Side of the Bothell Everett Highway	1.8	ND<1.2	ND<1.2
	MW-8 S2	15		ND<1.0	ND<1.0	ND<1.0
	MW-8 S3	20		8.9	ND<1.2	ND<1.2
	MW-8 S4	25		7.3	ND<1.1	ND<1.1
	MW-8 S5	30		45	ND<1.2	ND<1.2
	MW-8 S6	35		16	ND<1.2	ND<1.2
	MW-8 S7	40		25	ND<1.1	ND<1.1
	MW-8 S8	45		12	ND<1.1	ND<1.1
	MW-8 S9	50		16	ND<1.1	ND<1.1
	MW-8 S10	55		ND<1.0	ND<1.1	ND<1.1
	MW-8 S11	60		8.7	ND<1.1	ND<1.1
	MW-8 S12	70		7.0	ND<1.2	ND<1.2
This Report	MW 9-1	3	South Alley	ND<10	ND<10	ND<10
	MW 9-2	8		ND<10	ND<10	ND<10
	MW 9-3	13		ND<10	ND<10	ND<10
	MW 9-4	18		ND<10	ND<10	ND<10
	MW 9-5	23		ND<10	ND<10	ND<10
	MW 9-6	28.5		ND<10	ND<10	ND<10
	MW 9-7	34		ND<10	ND<10	ND<10
	MW 9-8	38.5		ND<10	ND<10	ND<10
	MW 10-1	3.5	North Parking Lot	ND<10	ND<10	ND<10
	MW 10-2	9		ND<10	ND<10	ND<10
	MW 10-3	13.5		ND<10	ND<10	ND<10
	MW 10-4	18		ND<10	ND<10	ND<10
	MW 10-5	23.5		ND<10	ND<10	ND<10
	MW 10-6	28		ND<10	ND<10	ND<10
	MW 10-7	33.5		ND<10	ND<10	ND<10
	MW 10-8	38.5		ND<10	ND<10	ND<10
MTCA Method A Cleanup Level (Soil to Groundwater Pathway)				*50*	*30*	*NE*
MTCA Method B Cleanup Level (Direct Contact Pathway)				*476,000*	*12,000*	*1.6E5*

ug/kg: micrograms per kilogram (parts-per-billion); NE: Not established; <: Not detected above indicated laboratory reporting detection limit. Shaded values exceed MTCA Method A cleanup levels. PCE, tetrachloroethylene; TCE, trichloroethylene; Cis-1,2-DCE, cis-1,2-dichoroethylene. Reported sample depths are approximate. Please refer to Appendix C for the complete set of analytes and analytical results for VOC for the most recent sampling event.

The only VOC exceeding the Method A cleanup levels in soil are PCE and TCE in the immediate vicinity of the current and former dry cleaning tenant spaces. The maximum reported concentration of PCE and TCE is 560 ug/kg and 38 ug/kg, respectively. None of the samples exceeded the Method B cleanup level.

3.4.2 Groundwater Quality

Groundwater samples were collected by Terracon in June 2009 from MW-1, MW-2, and MW-3 and the pre-existing well (MW-4); in August 2010 from MW-1 to MW-7; and from MW-1 to MW-8 in May 2011. Please refer to Terracon's reports for additional information regarding these sampling events.

Groundwater samples were collected by ZGA from MW-1 to MW-4 and MW-8 in May 2012 and from all ten wells in March of 2014 as discussed below. Analytical results for all groundwater sampling events are summarized in Table 4. Analytical results for the March 2014 sampling event are included on Figure 7. The results are compared to the MTCA Method A cleanup levels.

May 2012 Groundwater Sampling Event

MW-1 to MW-4 and MW-8 were sampled. PCE was not detected above laboratory reporting limits in MW-1 and MW-2. PCE was reported in concentrations of 15 ug/L, 140 ug/L and 36 ug/L in MW-3, MW-4, and MW-8 respectively. These concentrations exceed the Model Toxics Control Act (WAC 173-340) Method A cleanup level (5 ug/L) and are slightly higher than concentrations measured the last time the wells were sampled (May, 2011). No other volatile organic compounds were detected above laboratory reporting limits.

March 2014 Groundwater Sampling Event

All ten wells were sampled. PCE was not detected above laboratory reporting limits in MW-1, MW-2, MW-5, MW-6, MW-9 or MW-10. PCE was detected at a concentration of 5.6 ug/L in MW-3, 44 ug/L in MW-4, 8.0 ug/L in MW-7, and 13 ug/L in MW-8. No other volatile organic compounds were detected above laboratory reporting limits.

Table 4. Summarized Analytical Results (Groundwater)

Monitoring Well	Date	Volatile Organic Compounds (ug/L)													
		PCE	TCE	Cis-1,2-DCE	Benzene	Ethylbenzene	Isopropylbenzene	p-Isopropyltoluene	Naphthalene	n-Propylbenzene	Toluene	1,2,4-Trimethylbenzene	1,2,3-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes
MW-1	6-17-09	**12**	ND<1	**4.8**	**1.7**	**1.1**	ND<1	ND<1	ND<5	ND<1	**6.9**	**1.2**	ND<1	ND<1	**5.6**
	8-10-10	ND<1	**3.2**	**1.4**	ND<1	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<3
	5-10-11	**1.3**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
	5-23-12	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
	3-05-14	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MW-2	6-16-09	ND<1	ND<1	ND<1	**27**	**35**	**1.8**	ND<1	**9.5**	**7.7**	**190**	**48**	**10**	**13**	**210**
	8-12-10	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<3
	5-10-11	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
	5-24-12	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
	3-05-14	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MW-3	6-17-09	**6.6**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<3
	8-12-10	**6.4**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<3
	5-10-11	**9.3**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
	5-24-12	**15**	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
	3-07-14	**5.6**	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MW-4	10-31-07	**45**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1		ND<1	ND<3
	6-16-09	**170**	ND<1	ND<1	**8.1**	**11**	ND<1	ND<1	ND<5	**2.8**	**55**	**12**	**2.6**	**3.6**	**63**
	8-12-10	**140**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<3
	5-10-11	**110**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
	5-24-12	**140**	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
	3-07-14	**44**	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MW-5	8-10-10	**0.61**	ND<1	ND<1	**1.4**	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<3
	5-09-11	**0.60**	ND<1	ND<1	**0.61**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
	3-06-14	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MW-6	8-10-10	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<1
	5-09-11	**2.2**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
	3-06-14	**4.7**	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MW-7	8-10-10	**0.55**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<3
	5-09-11	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
	3-06-14	**8.0**	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MTCA Method A Cleanup Level		*5*	*5*	*NE*	*5*	*700*	*NE*	*NE*	*160*	*NE*	*1,000*	*NE*	*NE*	*NE*	*1,000*

Monitoring Well	Date	Volatile Organic Compounds (ug/L)													
		PCE	TCE	Cis-1,2-DCE	Benzene	Ethylbenzene	Isopropylbenzene	p-Isopropyltoluene	Naphthalene	n-Propylbenzene	Toluene	1,2,4-Trimethylbenzene	1,2,3-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes
MW-8	5-10-11	**22**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
	5-24-12	**36**	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
	3-07-14	**13**	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MW-9	3-05-14	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
MW-10	3-06-14	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<4
PP-MW-2	6-16-09	ND<1	ND<1	ND<1	**1,800**	**1,100**	41	11	140	130	**8,000**	770	180	210	**6,200**
Equipment Blank	6-16-09	ND<1	ND<1	ND<1	**12**	10	ND<1	ND<1	7	2.4	61	18	4.6	4.4	66
Equipment Blank	8-12-10	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<5	ND<1	ND<5	ND<1	ND<1	ND<1	ND<3
MTCA Method A Cleanup Level		*5*	*5*	*NE*	*5*	*700*	*NE*	*NE*	*160*	*NE*	*1,000*	*NE*	*NE*	*NE*	*1,000*

ug/L: micrograms per liter (parts-per-billion); ND<: Not detected above indicated laboratory reported detection limit; NE: Not established; Shaded values exceed MTCA Method A cleanup levels. Please refer to Appendix C for the complete set of analytes and analytical results for VOC for the most recent sampling event. Monitoring well PP-MW-2 is located on the Plaid Pantry LUST site, located on the northwest corner of the overall Mill Creek Crossing retail center (Figure 2B).

During Terracon's initial sampling event in 2009, groundwater in PP-MW-2 on the Plaid Pantry site was sampled first. The reported analytical results for this well indicate the presence of a wide variety of gasoline components (i.e., all the analytes listed in Table 2 except PCE, TCE, and cis-1,2-DCE). These analytical results for PP-MW-2 are generally consistent with the overall groundwater quality data set that we have reviewed for the Plaid Pantry site. Due to the strong odor in groundwater extracted from this well, we collected an equipment blank after cleaning our equipment and before sampling the four wells near the dry cleaner tenant spaces. An equipment blank is created by pouring distilled water over the sampling equipment after it has been cleaned, and analyzing that water to evaluate the potential for cross-contamination. Analysis of the equipment blank revealed that the blank contained significant amounts of gasoline components. Therefore, the reported detection of gasoline components, particularly in MW-2 and MW-4 which were sampled on the same day as PP-MW-2 in 2009, is the result of cross-contamination. The suspect nature of the reported concentrations of gasoline components in MW-2 and MW-4 may be supported by the relatively low concentrations of these compounds in MW-1 and the complete lack of these compounds in MW-3, both of which were sampled on June 17, 2009 after the sampling equipment had been cleaned multiple times. Additionally, gasoline components have not been detected in MW-1 and MW-2 in four subsequent sampling events.

Benzene has been detected in concentrations below the MTCA Method A cleanup level two times in MW-5,which we attribute to the release at the Plaid Pantry No. 306 LUST site (Figure 3). Except as described above, BTEX has not been detected in any of the nine other groundwater monitoring wells. Based on these results we conclude that the TPH/BTEX plume associated with the Plaid Pantry and the PCE plume discussed herein are not co-mingled.

PCE is the only compound detected in groundwater at the Site in concentrations above the MTCA Method A cleanup level. The concentration of PCE has exceeded the cleanup level during every sampling event in MW-3, MW-4, and MW-8 and during the most recent sampling event in MW-7.

Groundwater Geochemistry

An evaluation of groundwater geochemistry was completed in an effort to characterize the oxidation state of groundwater in the vicinity of the Site. Geochemical field parameters were measured by Terracon in 2009, 2010, and 2011 and by ZGA in 2012 and 2014. The oxidation state can be estimated by measurement with oxidation–reduction potential (ORP) and dissolved oxygen (DO) field instruments, and can be further refined by laboratory analysis of natural electron acceptors (nitrate, manganese, sulfate) and reduction products (ferrous iron).

Groundwater geochemistry results are summarized in Table 5. We interpret these results to indicate the aquifer is in an aerobic condition near and down gradient of the dry cleaning tenant spaces.

Table 5. Geochemical Parameters

Monitoring Well	Date	DO	ORP	pH	Nitrate (mg/L)	Ferrous Iron (mg/L)	Manganese (mg/L)	Sulfate (mg/L)
MW-1	6-17-09	1.3	212	5.24	4.0	0.1	0.93	54
	8-10-10	2.25	-55	5.34				
	5-10-11	7.11	292	5.32				
	5-23-12	2.55	318	5.06				
	3-05-14	4.82	136	6.57				
MW-2	6-16-09	1.5	97	6.08	1.3	ND	0.73	43
	8-12-10	3.75	329	5.79				
	5-10-11	2.04	226	5.97				
	5-24-12	1.03	236	6.10				
	3-05-14							
MW-3	6-17-09	2.3	186	5.86	18	0.2	0.79	33
	8-12-10	4.64	326	5.89				
	5-10-11	5.34	275	5.97				
	5-24-12	5.01	247	5.93				
	3-07-14	7.02	236	6.90				
MW-4	6-16-09	2.6	211	5.63	16	0.2	0.20	52
	8-12-10	6.48	400	5.75				
	5-10-11	6.10	291	5.83				
	5-24-12	5.86	244	5.88				
	3-07-14	7.66	213	7.44				
MW-5	8-10-10	3.56	-49	5.41				
	5-09-11	1.87	204	5.27				
	3-06-14	8.71	215	7.10				
MW-6	8-10-10	3.85	-14	5.86				
	5-09-11	2.96	276	5.64				
	3-06-14	7.16	216	7.15				
MW-7	8-10-10	4.10	13	5.86				
	5-09-11	5.80	285	5.94				
	3-06-14	7.35	202	7.27				
MW-8	5-10-11	3.39	180	6.21				
	5-24-12	5.24	244	5.79				
	3-07-14	7.90	228	7.17				
MW-9	3-05-14	8.89	163	6.93				
MW-10	3-06-14	6.82	227	6.75				

3.4.3 Indoor Air and Soil Gas Quality

Two sampling events were completed for indoor air and soil gas in the Money Tree, Prime Cleaners, and Osaka Grill tenant spaces. As discussed in Section 3.2.2 indoor air quality data cannot be used to access the potential for vapor intrusion due to the presence of TCE emitters in the Prime Cleaners tenant space.

The analytical results for indoor air are compared to Method B cleanup levels defined in the Washington State Department of Ecology's *Cleanup Level and Risk Calculation* (CLARC) database and to permissible occupational exposure levels defined by the Washington Department of Labor and Industries (L&I, Table 3 of WAC 296-841). The permissible exposure levels are expressed as an 8-Hour Time Weighted Average (TWA), consistent with the eight hour collection period we used for indoor air samples. Indoor and ambient air results are summarized in Table 6. The analytical results for soil gas are compared to screening levels defined in the Washington State Department of Ecology's *Draft Guidance for Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (2009). Summary results are presented in Table 7.

Indoor and Ambient Air

Very low concentrations BTEX (benzene, ethylbenzene, toluene, and xylenes) were detected in the tenant spaces during one or both sampling events, but in concentrations similar to those measured in outdoor ambient air. These results suggest that BTEX in indoor air is the result of BTEX in ambient air.

The measured concentrations of TCE and PCE did not exceed the permissible exposure levels in any of the tenant spaces during either sampling event. TCE was detected at concentrations ranging from 1.3 ug/m^3 (Money Tree) to 280 ug/m^3 (Prime Cleaners) in all three tenant spaces during the initial sampling event, which exceeds the Method B indoor air cleanup level (0.37 ug/m^3). PCE was detected in the Prime Cleaners and Osaka Grill tenant spaces, but in concentrations less than the Method B cleanup level. TCE and PCE were not detected in ambient air.

The second indoor air and soil gas sampling event occurred after the spot cleaners had been removed from the Prime Cleaners, but the spot cleaners were returned by the tenant prior to the completion of the event. TCE and PCE were not detected in indoor air in the Money Tree tenant space. TCE was detected at a concentration of 2.1 ug/m^3 in indoor air at the Prime Cleaners (only slightly exceeding the MTCA Method B cleanup level of 0.37 ug/m^3) and 0.37 ug/m^3 in the Osaka Grill, which is equivalent to the cleanup level. PCE was detected in the Prime Cleaner and Osaka tenant spaces but in concentrations below the Method B Cleanup level.

Table 6. Summarized Indoor and Ambient Air Analytical Results

Analyte (ug/m^3)	Sample								296-841 WAC TWA (ug/m^3)	Method B Cleanup Level (ug/m^3)
	Prime Cleaners		Osaka Grill		Money Tree		Ambient Air			
	11-21-13	6-3-14	11-21-13	6-3-14	11-21-13	6-3-14	11-21-13	6-3-14		
TCE	280	2.1	210	0.37	1.3	ND<0.88	ND<0.17	ND<0.18	268,712	0.37
PCE	1.1	3.5	3.6	3.2	ND<0.20	ND<1.1	ND<0.21	ND<0.23	169,581	9.62
Benzene	0.96	0.30	1.1	0.69	1.0	ND<1.3	0.66	ND<0.27	3,195	0.32
Toluene	5.5	2.3	4.4	2.2	4.8	2.4	2.4	0.92	376,810	2,200
Ethylbenzene	0.42	0.22	0.83	ND<0.30	0.49	ND<0.71	0.32	ND<0.15	434,192	460
m,p-Xylene	1.4	0.66	3.1	0.80	1.7	ND<1.4	1.0	0.35	434,233	46
o-Xylene	0.57	0.26	1.2	0.34	0.58	ND<0.71	0.37	ND<0.15	434,233	46

ND, not detected above laboratory reporting limit.

Table 7. Summarized Soil Gas Results

Analyte (ug/m^3)	Sample												Screening Level (ug/m^3)
	Money Tree				Prime Cleaners				Osaka Grill				
	SGP-1		SGP-2		SGP-3		SGP-4		SGP-5		SGP-6		
	11-25-13	6-3-14	11-25-13	6-3-14	12-6-13	6-3-14	12-6-13	6-3-14	11-25-13	6-3-14	11-25-13	6-3-14	
TCE	ND<1.3	ND<12	440	470	68	160	420	840	220	360	ND<630	ND<3.2E4	1
PCE	500	1,600	7,700	9,900	11,000	24,000	3,400	5,400	5,400	8,700	ND<790	ND<4.0E4	4.2
Cis-1,2-Dichloroethylene	ND<0.94	ND<8.9	22	ND<190	ND<22	ND<38	ND<5.5	ND<19	ND<13	ND<19	ND<460	ND<2.4E4	160
Trans-1,2-Dichloroethylene	ND<0.94	ND<8.9	ND<19	ND<190	ND<22	ND<38	6.8	ND<19	ND<13	ND<19	ND<460	ND<2.4E4	320
Benzene	ND<0.76	ND<7.2	ND<15	ND<150	ND<18	ND<31	4.7	ND<15	ND<10	ND<15	ND<370	ND<1.9E4	3.2
2-Propanol	99	19,000	160	66,000	220	8,100	820	6,600	450	960	200,000	$5.9E^6$	NE
Toluene	1.1	ND<8.4	ND<18	ND<180	ND<21	ND<36	6.6	ND<18	ND<12	ND<18	840	ND<2.2E4	22,000
Chlorobenzene	1.3	ND<10	ND<22	ND<220	ND<26	ND<45	8.5	ND<22	ND<15	ND<22	ND<540	ND<2.7E4	80
Chloroform	ND<1.2	ND<11	160	ND<230	30	120	ND<6.8	ND<23	50	71	ND<570	ND<2.9E4	1.1

ND, not detected above laboratory reporting limit.

NE, not established.

Soil Gas

Two soil gas probes were sampled in each of the Money Tree, Prime Cleaners, and Osaka Grill tenant spaces. We were able to collect useable soil gas data from five of the six probes during both sampling events (SGP-6 in the Osaka Grill failed a leak test both times).

TCE was not detected in SGP-1 (Money Tree) during either sampling event. The screening level for TCE (1 ug/m^3) was exceeded in the other viable probes in each tenant space during both sampling events, with concentrations ranging from 440 ug/m^3 to 470 ug/m^3 in SGP-2 in the Money Tree, 68 ug/m^3 to 840 ug/m^3 in the Prime Cleaners, and 220 ug/m^3 to 360 ug/m^3 in the Osaka Grill.

The screening level for PCE (4.2 ug/m^3) was exceeded in all five viable probes during both sampling events. Concentrations ranged from 500 ug/m^3 to 9,900 ug/m^3 in the Money Tree; 3,400 ug/m^3 to 24,000 ug/m^3 in the Prime Cleaners; and 5,400 ug/m^3 to 8,700 ug/m^3 in the Osaka Grill.

The screening level for chloroform was exceeded in one probe in each of the three tenant spaces. The source of the chloroform is unknown, but could be related to a leaky waterline (potable water conveyed to the Property is chlorinated) or bleach from a leaky wastewater pipe.

The sampling apparatus (sample train) for soil gas contains several detachable fittings that serve to connect the soil gas probe to the Summa canisters. Sub-slab soil gas samples can be compromised by the introduction of indoor air via the sampling train or via the penetration in the slab used to install the soil gas probe. We used 2-Propanol (isopropanol) as a liquid tracer for leak detection purposes. According to the Interstate Technology Regulatory Council's *Vapor Intrusion Pathway: A Practical Guideline* (2007):

> "A small amount of tracer in a sample does not necessarily indicate an unreliable sample. Some agencies, such as the New York State Department of Environmental Conservation, allow tracer concentrations up to 10% of the starting concentration before considering the soil gas sample compromised. For gaseous tracers, the starting concentration is the measured concentration under the shroud. For liquid tracers, the starting concentration either is assumed as equal to the vapor pressure of the compound at ambient temperature or can be measured if on-site analysis is available. For liquid tracers such as isopropanol, a 10% leak would give a value in the sample of approximately 10,000 ug/L (10E6 ug/m^3), assuming a starting concentration equivalent to its vapor pressure. To account for the possibility that the starting concentration is not equal to the vapor pressure, some agencies have established a specific concentration level, such as 100 µg/L (100,000 ug/m^3) that cannot be exceeded. This value corresponds to a 0.1% leak, assuming a starting concentration equal to the vapor pressure of the compound or a 1% leak if the starting concentration is only 10% of the vapor pressure, a conservative assumption."

For the purposes of our evaluation we have assumed that up to 100,000 ug/m^3 isopropanol in the sample is acceptable. Under these criteria only SGP-6 failed the leak test, which resulted in elevated detection limits for the other compounds. Therefore, the results for SGP-6 do not appear to be reliable. Reliable data appear to have been collected from the other five soil gas probes.

3.5 Data Evaluation

3.5.1 Potential Contaminants of Concern

Based on the analytical results described in this report, potential contaminants of concern consist of PCE and TCE in soil and soil gas, and PCE in groundwater.

3.5.2 Cleanup Levels

Cleanup standards are set forth in the Model Toxics Control Act (MTCA) Chapter 173-340 WAC. The MTCA cleanup levels for PCE and TCE are summarized in Table 8 along with the maximum measured concentration.

Table 8. MTCA Cleanup Levels

Media	PCE			TCE		
	Method A	Method B	Maximum Measured Concentration	Method A	Method B	Maximum Measured Concentration
Soil (mg/kg)	0.05	476	0.56	0.03	12	0.038
Groundwater (ug/L)	5	5	170	5	5	3.2
Indoor Air (ug/m^3)	NE	9.62	3.5	NE	0.37	2.1

NE – Not established

3.5.3 Soil Quality

PCE and TCE were not detected in concentrations above the MTCA Method B cleanup levels in any of the samples. PCE was reported in concentrations exceeding the MTCA Method A cleanup level in only 7 of 78 soil samples, with a maximum concentration of 0.56 mg/kg (560 ug/kg). TCE was reported in concentrations exceeding the Method A cleanup level in only 3 of 78 soil samples, with a maximum concentration of 0.038 mg/kg (38 ug/kg). All of the soil samples with PCE and/or TCE exceedances were collected in the immediate vicinity of the dry cleaning tenant space (Figure 4). PCE and TCE were not detected or were detected in concentrations below the Method A cleanup level in nine of the ten borings completed with groundwater monitoring wells. The Method A cleanup levels for PCE and TCE were not exceeded beyond the Property boundaries.

3.5.4 Groundwater Quality

TCE has not been detected in groundwater, except for a single detection below the cleanup level in MW-1 in 2010. The cleanup level for PCE in groundwater has been exceeded in MW-3 and MW-4 during every sampling event, at concentrations ranging from 5.6 ug/L to 15 ug/L (MW-3) and 44 ug/L to 170 ug/L (MW-4). MW-4 is located immediately adjacent to the former dry cleaning tenant space and MW-3 is approximately 50 feet away. The cleanup level for PCE in groundwater was also been exceeded in the down gradient MW-8 for every sampling event (13 ug/L and 36 ug/L), and in the down gradient MW-7 (8 ug/L) in one of three events.

3.5.5 Estimated Extent of Soil and Groundwater Contamination and Contaminant Mass

Based on the analytical results for the locations explored as described above, soil impacts are limited to the area beneath and adjoining the former dry cleaning tenant space on the southwest part of the Mill Creek Crossing facility. The estimated extent of soil contamination for PCE and TCE comprise about 105 square meters and 35 square meters, respectively, and is approximately indicated on Figure 4. If we assume that the vadose zone is contaminated to a depth of about 25 feet (7.62 meters), the volume of soil contaminated with PCE and TCE comprises about 800 cubic meters and 267 cubic meters, respectively.

The mass of contaminant in soil can be estimated using the following formula:

Contaminant Mass =
(Volume of Soil)*(Density of Soil)*(Average Contaminant Concentration).

In our experience the average density of Vashon advance outwash is about 2,250 kg/m^3. The average concentration of PCE (the primary contaminant) in soil in those areas on the Site where PCE is measured above the cleanup level is 213 ug/kg. We estimate the mass of PCE in soil as follows:

Estimated Mass of PCE in Soil =
(800 m^3)*(2,250 kg/m^3)*(213 ug/kg) = 383.4E6 ug = 383.4 g

The geometry of the groundwater plume is well established north, west, and east of the source area moderately well established in the southerly (down gradient) direction. Groundwater elevation contours and the estimated extent of the PCE plume for the March 2014 sampling event are indicated on Figure 7. The area of the plume is about 1,065 square meters. Using an estimated contaminated thickness of 20 feet (6.1 meters), the volume of contaminated aquifer is about 6,497 cubic meters. The mass of contaminant dissolved in groundwater can be estimated using the following formula:

Contaminant Mass =
(Volume of Impacted Aquifer)*(Porosity of the Aquifer)*(Average Contaminant Concentration).

Using an estimated porosity of 40% for coarse sand (Domenico and Schwartz, 1990) and the average concentration measured in MW-3, MW-4, MW-7, and MW-8 during the March 2014 sampling event (17.65 ug/L), we estimate the mass of PCE in groundwater as follows:

Estimated Mass of PCE in Groundwater =
(6,497 m^3)*(0.4)*(17.65 ug/L)*(1000 L/m^3) =45.869E6 ug =45.869 g

3.5.6 Soil Gas and Indoor Air Quality

TCE was not detected in soil gas collected from SGP-1 (Money Tree) during either sampling event. The screening level for TCE (1 ug/m^3) was exceeded in the other viable probes in each tenant space during both sampling events. The screening level for PCE (4.2 ug/m^3) was exceeded in all five viable probes during

both sampling events. However, these exceedances are not reflected in the indoor samples collected for this investigation.

Some fraction of the contaminants in the vadose zone void spaces will tend to partition into infiltrating water. Equilibrium conditions exist when the rate of contaminant entering the water equals the rate of contaminant volatilizing from the liquid:

$$G=HC \quad \text{(Kuo, 1999, Equation II.3.5)}$$

Where G = concentration in soil gas
C = concentration in water
H = Dimensionless Henry's Constant

For PCE at 13°C, H=1.104 (Kuo, 1999, Table II.3.B and II.3.C). Using the measured concentration of PCE in soil gas probe SGP-3 on June 3, 2014 (24,000 ug/m^3 or 24 ug/L), the equilibrium concentration of PCE in groundwater is about 21.8 ug/L. This value is consistent with the concentration of PCE measured in groundwater (5.6 ug/L to 44 ug/L) on March 7, 2014.

PCE did not exceed the MTCA Method B indoor air cleanup level during either sampling event. PCE and TCE did not exceed the occupational exposure levels for indoor air defined by the Washington Department of Labor and Industries during either sampling event.

The concentration of TCE exceeded the MTCA cleanup level in all three tenant spaces during the first sampling event but in our opinion those data are not reliable due to the presence of known TCE emitters (spot cleaners) inside the Prime Cleaners while the test was underway. These suspect emitters were removed prior to initiation of the second indoor air sampling event, but were returned by the tenant prior to the completion of the event.

TCE was not detected in the Money Tree during the second event. The concentration of TCE slightly exceeded the MTCA cleanup level (0.37 ug/m^3) in the Prime Cleaners (2.1 ug/m^3) and equaled the cleanup level in the Osaka Grill during the second sampling event. It is our opinion that a significant fraction of the TCE measured in indoor air in the Prime Cleaners and Osaka tenant spaces is due to TCE emitters known to be present in the Prime Cleaners tenant space.

ZGA completed an assessment of the heating, ventilation, and air conditioning (HVAC) systems for the Money Tree, Prime Cleaners, and Osaka Grill tenant spaces on May 20, 2014. We met on site with a representative of Comfort Mechanical, the HVAC maintenance contractor for the facility. According to the contractor, each tenant space has their own HVAC unit. The Money Tree has two HVAC units that are fully operational and providing good air exchange The HVAC unit at the Prime Cleaners is operational, but the thermostat was set to off. Osaka Grill has two HVAC units, one has been turned off at the roof by the tenants, and the thermostat for the other was set to off. The HVAC contractor is of the opinion that the HVAC units for Prime Cleaners and Osaka Grill are rarely, if ever, turned on. These HVAC conditions are consistent with our indoor air sample results – lower at the Money Tree than at Prime Cleaners and Osaka Grill.

In our observation the exterior building doors for the Money Tree are kept closed, and were closed during both indoor air sampling events. Thus the operational HVAC system likely keeps this tenant space under a slight positive pressure. It is our opinion that the low to non-detectable concentrations of PCE and TCE in indoor air at the Money Tree can be at least partially attributed to these conditions.

Business activities at the Prime Cleaners and Osaka Grill generate significant amounts of heat. In our observation the back (south) doors of both of these tenant spaces are nearly always open and were open throughout both indoor air sampling events. Combined with the disabled HVAC systems, the Prime Cleaners and Osaka Grill are probably neutral (at atmospheric pressure) most of the time and are thus more susceptible to vapor intrusion.

3.5.7 Outdoor Air Quality

PCE and TCE were not detected in outdoor air during two sampling events. The low concentrations of PCE and TCE measured at the Site are not expected to have an impact on outdoor air quality.

3.6 Regional Hydrogeologic Conditions

Unconsolidated Quaternary sediments (surficial deposits) overlie bedrock in most coastal areas in northwestern Washington. The thickness of these soils ranges from a few feet to greater than 3,200 feet in parts of Whidbey Island and Camano Island. The Quaternary sediments consist predominantly of gravel, sand, silt, and clay deposited during several glacial and inter-glacial periods that occurred in northwest Washington over the past 12 million years. Most of the sediments that can be observed at the present day ground surface are 11,000 to 15,000 years old, and are derived from the last major glaciation, referred to as the Vashon glaciation. Quaternary sediments also include stream sediment, beach deposits, and landslide debris that began forming near the end of the last glacial period. These sediments continue to accumulate along streams, beaches, and in areas of moderate to steep slopes.

According to Minard (1985), most of the area within approximately one mile of the site is underlain by the Vashon advance outwash, with a few isolated areas underlain by the Vashon till (Figure 9). Although Minard's map indicates that most of the Site is underlain by Vashon till, our site specific observations indicate that the Site is underlain by dense to very dense sand and gravel of the Vashon advance outwash.

Thomas and others (1997) described four aquifers and two confining beds in the vicinity of the Site. The two upper aquifers consist of recent alluvium and Vashon recessional outwash. The Vashon till underlies the recent alluvium and Vashon recessional outwash and is the uppermost confining unit. The Vashon advance outwash underlies the till and is the principal aquifer in the vicinity of the Site. The transitional beds form a confining unit that underlies the advance outwash. Thick undifferentiated sediments underlie the transitional beds, but are not well understood due to a lack of data. The undifferentiated sediments are generally defined as coarse grained and can be considered a single aquifer for the purposes of this RI/FS. The base of the unconsolidated groundwater system is defined by bedrock.

The Vashon till confining bed is generally an unsorted mixture of fine- and coarse-grained sediments. It typically consists of some gravel in a silt and clay matrix that is very compact and concrete-like in most areas. According to Thomas and others (1997), the typical thickness of the Vashon till confining bed is about 70 feet, with a maximum thickness of about 250 feet.

The Vashon advance outwash aquifer underlies the Vashon till confining bed. The Vashon aquifer typically has fine-grained sediments at the base that grade upward into coarse-grained deposits. Typical thickness of the Vashon advance outwash aquifer is about 120 feet with a maximum thickness of about 350 feet. We interpret the Site to be underlain by the upper Vashon advance outwash. The transitional beds confining bed underlies the Vashon advance outwash. The transitional beds are fine-grained, consisting of sandy to silty blue to gray clay with lenses of sand and some gravel.

We interpret the uppermost aquifer beneath the site to be the Vashon advance outwash aquifer, which is unconfined in the vicinity of the Site. A regional groundwater contour map for the Vashon advance aquifer prepared by Thomas and others (1997) is presented in Figure 10. Thomas and others (1997) interpret groundwater in the Vashon advance aquifer to be moving in a southerly direction near the Site. This interpretation is generally consistent with measured groundwater elevations at the Site, as described in Section 3.3 of this report.

3.7 Conceptual Hydrogeologic Model

A conceptual hydrogeologic model was developed for the Site and immediate vicinity. The model generally consists of a synthesis of available information regarding groundwater and its interaction with surface water for the Vashon advance outwash aquifer, including groundwater recharge and discharge areas, and groundwater and surface water flow directions. The purpose of the model is to aid our evaluation of the extent of the PCE plume and predictions of plume migration over time, particularly with regard for potential human and aquatic interaction with the plume.

A primary element of the conceptual hydrogeologic model consists of groundwater recharge and groundwater discharge areas for each aquifer. The spatial relationship between groundwater recharge, discharge, and topography typically control groundwater flow directions in shallow unconfined aquifers.

We have assumed that the Vashon advance outwash aquifer is recharged by direct infiltration of precipitation in those areas where precipitation and storm water runoff are not intercepted by the public storm water system. Groundwater in the Vashon advance outwash is perched above the low permeability transitional beds. The transitional beds are exposed at the ground surface within the North Creek drainage, approximately one mile south of the site. The conceptual hydrogeologic model assumes that groundwater in the Vashon advance aquifer flows in a southerly direction, and discharges to North Creek approximately one mile south of the site (Figure 11).

3.8 Land Use

Land use within one mile of the Site consists of mixed light industrial, commercial, multi-family and single family residential development. A zoning map and comprehensive plan map for the vicinity of the Site are included as Figure 12 and Figure 13, respectively.

The Site as defined by WAC 173-340-200 lies on the southwest corner of the Marketplace retail center, the northwest corner of the south adjoining mini-warehouse facility, and the east side of the SR 527 right-of-way approximately 500 feet south of the intersection with 180th Street Southeast. The Site is zoned as General Commercial (GC) and down gradient parcels are zoned Light Industrial (LI). The Comprehensive Plan indicates that future land use of the Site will consist of Urban Commercial and Urban Industrial.

The Site is bounded to the north and northeast by retail and service businesses in the Mill Creek Crossing Retail Center and a Plaid Pantry min-mart and service station, beyond which lies 180th Street Southeast. Commercial and light industrial businesses are located north of 180th Street. Land use further north consists of single family residential development.

The Site is bounded to the east by commercial businesses. Single family residential housing is present further east, beyond 19th Drive Southeast. The Site is bounded to the south by the mini-warehouse facility and light industrial land use. The Site is bounded to the west by the Bothell-Everett Highway (SR 527) and light industrial land use.

The nearest potential residential receptors are located approximately 600 feet east of the Site, in a cross-gradient position.

3.9 Natural Resources and Ecological Receptors

Martha Lake lies approximately two miles northwest of the Site, and a small pond is located approximately 500 feet north of the Site. North Creek and Silver Creek lie approximately 3,100 feet west and 1,400 feet east of the Site, respectively. Review of the U.S. Fish and Wildlife National Wetlands Inventory Map indicates that a relatively large wetland is associated with North Creek. The eastern edge of this wetland is mapped approximately 1,500 feet west of the Site. Two smaller wetlands are mapped about 1,000 feet southwest of the Site. A map indicating the location of wetlands near the Site is presented in Figure 14. As described in Section 3.5 (Data Evaluation) and Section 3.8 (Conceptual Hydrogeologic Model), the available regional and site specific hydrogeological and chemical data suggest that the extent of the soil and groundwater impacts is very small and groundwater flows in a southerly direction, away from the wetlands, and likely discharges to surface water at least one mile south of the Site. Therefore, it does not appear likely that the release at the MRC has impacted surface waters, wetlands, or aquatic receptors.

The Site is located in a commercial area with no undisturbed natural habitat for terrestrial wildlife. All of the Site is paved or contains roofed structures, except for a small landscaped area near MW-8. The commercial and highly developed nature of the Site makes it unlikely that ecological receptors will encounter contaminated soil at the Site.

In accordance with WAC 173-340-7490, ZGA completed a terrestrial ecological evaluation, as summarized in Table 6. The evaluation indicates that the simplified terrestrial ecological evaluation may be ended under WAC 173-340-7492 (2)(a)(ii).

Table 9. Simplified Terrestrial Ecological Evaluation

Estimate the area of contiguous (connected) undeveloped land on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre). "Undeveloped land" means land that is not covered by existing buildings, roads, paved areas or other barriers that will prevent wildlife from feeding on plants, earthworms, insects or other food in or on the soil.	
1) From the table below, find the number of points corresponding to the area and enter this number in the box to the right. Area (acres) / Points 0.25 or less / 4 0.5 / 5 1.0 / 6 1.5 / 7 2.0 / 8 2.5 / 9 3.0 / 10 3.5 / 11 4.0 or more / 12	4
2) Is this an industrial or commercial property? See WAC 173-340-7490(3)(c). If yes, enter a score of 3 in the box to the right. If no, enter a score of 1.	3
3) Enter a score in the box to the right for the habitat quality of the site, using the rating system shown below [1, 2]. (High = 1, Intermediate = 2,Low = 3)	1
4) Is the undeveloped land likely to attract wildlife [c]? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2.	2
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene, hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.	4
6) Add the numbers in the boxes on lines 2 through 5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified terrestrial ecological evaluation may be ended under WAC 173-340-7492 (2)(a)(ii).	10

[1] It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score (1) for questions 3 and 4.

[2] Habitat rating system. Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:

> Low: Early successional vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.
>
> High: Area is ecologically significant for one or more of the following reasons: Late-successional native plant communities present; relatively high species diversity; used by an uncommon or rare species; priority habitat (as defined by the Washington Department of Fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.
>
> Intermediate: Area does not rate as either high or low.

[3] Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: Birds frequently visit the area to feed; evidence of high use by mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

3.10 Water Supply

The Site vicinity is served by the Alderwood Water and Wastewater District. According to an online database maintained by the Washington State Department of Health, no wellhead protection areas are located within one mile of the Site (Figure 14). We also reviewed the online driller well log database maintained by the Washington State Department of Ecology. According to the database there are 36 domestic water supply wells within approximately one mile of the Site. A summary of well location and construction details is presented in Table 10.

Table 10. Water Supply Wells

Depth	Diameter	SWL	Well Owner	T	R	S	1/4 Section	1/4 1/4 Section	Completion Date
89	6		W M N GACHART	27	5E	7			
195	6	117	CHARLES CANFIELD	27	5E	7	NE	SE	Jan-94
178	6	106	DON MATYAS	27	5E	7	NE	SE	Feb-79
	10		ROGNAR PETERSON	27	5E	7	NE	SW	May-88
136	6		E F AXELSEN	27	5E	7	NE	SW	May-64
40	5		M V SPENCER	27	5E	7	NW	NE	
166	8	43	EVERETT SCHOOL DISTRICT	27	5E	7	NW	NW	Apr-82
72	5		E G AUERSWALD	27	5E	7	NW	NW	Mar-48
26	6	9	ART OWENSON	27	5E	7	SE	NW	Dec-79
59	6	30	KEN CROW	27	5E	7	SE	NW	Oct-78
19	8		INFRASTRUCTURE SYSTEMS	27	5E	7	SE	NW	Apr-05
87	6	32	BOB VIVOLO	27	5E	7	SW	NW	Aug-80
40	6	17	KEVIN AND LACEY POOLE	27	5E	7	SW	SE	Aug-03
145	6	0	ED MAXFIELD	27	5E	7	SW	SW	Sep-79
19	8		SITE DEVELOPMENT SERVICES	27	5E	7	SW	SW	Aug-03
58	6	23	CARL LEWAN	27	5E	8	NE	NE	Oct-78
64	6		MR. JACK MCPHERSON	27	5E	8	NE	SE	Nov-77
64	6		MR. GARY MAXFIELD	27	5E	8	NE	SE	
147	6	120	JOHN BUCHAN CONC.	27	5E	8	NW		Oct-96
45	6	6	JIM INGRUM	27	5E	8	SE	NE	Aug-74
37	6		RON TAM	27	5E	8	SE	NE	Aug-82
		35	DAVID RHOADES	27	5E	8	SE	SE	Oct-89
79	6	39	DICK UNRUE	27	5E	8	SE	SE	Apr-78
	6	25	DON OLSON	27	5E	8	SE	SE	
46	6		STELLA SLOCUM	27	5E	8	SW	SW	
108	6	19	BOB HANSON	27	5E	17	NE	NW	Mar-79
155	6		SOREN JENSEN	27	5E	17	NE	NW	May-99
53	6	artesian	DEBBIE NICELY	27	5E	17	SE	NE	Jun-97
380	6		WILLIAM WHITBECK	27	5E	17	SE	SE	Oct-84
25	10		METCO CONSTRUCTION	27	5E	17	SW	NW	Oct-97
20	10	10	ABANCE GROUP IV	27	5E	17	SW	SW	Oct-98
8	8	4	D PETERSON INC	27	5E	17	SW	SW	Oct-07
53	6	20	LARRY HOWARD	27	5E	18	NE	NE	Feb-08
49	6	2	IRVIN DECKER JR.	27	5E	18	NE	NW	
58	6	19	KENNETH WOOD	27	5E	18	NE	NW	May-80
65	30	artesian	ALDERWOOD WATER	27	5E	18	SE	NE	Aug-09
21	6		RON MOORE	27	5E	18	SE	SW	Jul-91

SWL: Depth to groundwater measured from the top of the well; T: Township; R: Range; S: Section

Of the 36 wells, 25 are reportedly located in Section 7 and Section 8, which are located north and up gradient of the Site. Twelve wells lie in a potentially down-gradient position from the Site in Section 17 and Section 18. None of these wells lie within the Site, as defined by WAC 173-340-200.

3.11 Conceptual Site Model

A conceptual site model includes consideration of sources and release mechanisms for contamination at the Site, potential human and ecological receptors, and potential routes of exposure for identified receptors. Data collected during the RI provide the information necessary to understand the nature and extent of contamination and potential exposure to human health and the environment. The site conceptual model was used to identify exposure scenarios and as an aid in the selection of remedial action alternatives.

The use of PCE associated with historical operations and practices at the current and former dry cleaner businesses are believed to be the primary source for the documented site contamination. Release mechanisms for PCE likely involved spills during normal operations and possibly other actions associated with site operations. Contaminated soils then became a secondary source of contamination, with migration of contaminants down to the groundwater aquifer system.

The fate and transport of the PCE is governed by the specific properties of the chemical and the surrounding environmental conditions at the Site. PCE is most effectively degraded by biologically mediated reductive dechlorination under anaerobic conditions. Under optimum conditions, microbes degrade PCE to form trichloroethylene (TCE), which degrades to form dichloroethylene (DCE), which subsequently degrades to vinyl chloride (VC). Complete reductive dechlorination results in the production of ethene and carbon dioxide.

Except for single detection of TCE and DCE in MW-1 in 2010, daughter products of PCE degradation (TCE, DCE, and VC) have not been detected in groundwater samples collected at the site. In addition, the oxidation-reduction potential and dissolved oxygen measured during the sampling events indicate that groundwater at the Site is in an aerobic condition. These observations suggest that reductive dechlorination (*i.e.,* biodegradation) is not an active process at the site. Nevertheless, the concentration of PCE in groundwater appears to be stable (Table 4). These results suggest that the combined natural attenuation processes of advection, dispersion, volatilization, and sorption are sufficient to stabilize the contaminant plume in groundwater.

Based on our interpretation of local hydrogeologic conditions, groundwater discharges to surface water in North Creek approximately one mile south of the site (Figure 11). Given that the contaminant plume appears to be less than about 200 feet long (Figure 7), it is not likely that the plume discharges to surface water. Discharges of contaminated groundwater to excavations in the immediate vicinity of the site are not likely due to the depth to groundwater (greater than approximately 21 feet at the Mill Creek Crossing retail center and greater than approximately 15 feet adjacent to the Bothell-Everett Highway).

Based on our review of driller well logs maintained by the Washington State Department of Ecology and Wellhead Protection area designations as described by the Washington State Department of Health, water supply wells were not identified within the Site.

3.12 Exposure Assessment

A summary of the potential migration pathways and receptors for the Site is presented below.

3.12.1 Direct Contact (Dermal Contact and Ingestion)

Some of the soil immediately beneath the floor slab in the Money Tree and Prime Cleaners contains PCE and TCE in concentrations that exceed MTCA Method A cleanup levels, but even at that location none of

the samples exceed the MTCA Method B cleanup level. There is no identified risk to construction workers by direct contact with soil anywhere on the Site or the Property. No groundwater extraction wells have been identified on the Site. Groundwater lies at a depth of at least 21 feet on the Property and 15 feet on the Site, and therefore there is no risk associated with direct contact by workers with groundwater.

3.12.2 Soil to Groundwater Pathway

Contamination of groundwater via soil leaching appears to have occurred and the soil to groundwater pathway at the Site is complete. However, no water supply wells or groundwater protection areas are identified to lie within the Site. Therefore the potential for adverse impacts to the drinking water supply is low.

3.12.3 Soil and Groundwater to Indoor Air Pathway

Soil gas and indoor air sampling indicate that the soil and groundwater to indoor air pathway is incomplete for PCE. This pathway cannot be unequivocally accessed for TCE with the available information because we have not been able to successfully remove known TCE emitters from the Prime Cleaners tenant space. Given the results for the second indoor air sampling event, during which known TCE emitters were removed for part of the test, it is our opinion that the soil and groundwater to indoor air pathway for TCE is probably incomplete.

3.13 Remedial Investigation Findings

- Soils to depths of over 40 feet at the Site consist of dense to very dense sand, sandy gravel, gravelly sand and occasional cobbles, all with varying amounts of silt. We interpret these soils to consist of upper parts of the Vashon advance outwash.
- The water table lies at a depth of approximately 15 to 26 feet beneath the ground surface, and groundwater flows in a southerly direction. Groundwater is unconfined and appears to be in an aerobic condition.
- The concentrations of PCE (1.3 ug/kg to 560 ug/kg) and TCE (9.2 ug/kg to 38 ug/kg) in soil are relatively low. None of the samples exceed the MTCA Method B cleanup levels. Only nine of the 78 soil samples analyzed for this investigation exceed MTCA Method A soil cleanup levels with respect to PCE (50 ug/kg) or TCE (30 ug/kg). With the exception of DCE at very low concentrations in two samples, DCE and vinyl chloride (VC) were not detected in any of the soil samples.
- The concentration of PCE in groundwater collected from MW-3 (5.6 ug/L to 15 ug/L), MW-4 (44 ug/L to 170 ug/L), and MW-8 (13 ug/L to 36 ug/L) have exceeded the MTCA Method A cleanup level (5 ug/L) for all sampling events. The concentration of PCE in the down gradient well MW-7 (8.0 ug/L) has exceeded the cleanup level in one of three sampling events. PCE was not detected, or was detected in concentrations below MTCA Method A cleanup levels in all of the other wells. TCE and cis-1,2-DCE were detected in MW-1 during the 2010 sampling event, but in concentrations below MTCA cleanup levels. TCE, DCE, and VC have not been detected in the other wells.
- During the most recent sampling event in March of 2014 the PCE plume extended in a southerly to south-southwesterly direction off site to MW-8 and MW-7 for a distance of about 200 feet.
- Based on groundwater samples collected over a period of almost five years, the plume appears to be stable.

- Given the depth to groundwater, lack of groundwater extraction within the Site, and the short plume length, it is our opinion that there is a low risk of direct contact with contaminated groundwater by human and ecological receptors.
- The direct contact pathway for soil is incomplete and there is no risk to construction workers.
- The soil to groundwater pathway is complete, but no water supply wells or ecological resources are identified within the Site.
- The soil and groundwater to indoor air pathway is incomplete for PCE and appears to be incomplete for TCE.

4.0 FEASIBILITY STUDY

The purpose of this Feasibility Study (FS) is to develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the site. In accordance with WAC 173-340-350, this FS includes "cleanup action alternatives that are protective of human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route".

Fifteen remedial action alternatives were evaluated for this FS. Alternatives were initially screened based on an assessment of effectiveness and implementability. Alternatives deemed to be not protective, feasible, or appropriate for the subject site were eliminated from further evaluation, except that certain alternatives were retained as a component of other technologies. Those alternatives that were deemed effective, could be implemented with minimal impacts to the community, workers, and the environment and that had a lower cost were retained for further evaluation. These included Soil Vapor Extraction, Dual Phase Extraction, and Enhanced Anaerobic Biodegradation. Monitored Natural Attenuation was also retained as a baseline for comparison to other technologies.

The recommended remedy utilizes Dual Phase Extraction. This approach optimizes achieving the Remedial Action Objectives at the best overall cost. Risk will be additionally managed by the implementation of a restrictive covenant preventing the extraction of groundwater at the Site and a rigorous Performance Monitoring Plan.

4.1 Remedial Action Objectives

The objectives of this FS were to identify a range of remedial action alternatives that are appropriate for the Site and to document and develop the information necessary to select an appropriate remedial action alternative consistent with WAC 173-340-360. The Remedial Action Objectives (RAOs) are media specific goals for protecting human health and the environment. Groundwater, soil, and soil gas comprise the media of concern at the Site. The Remedial Investigation as described in Section 3 of this report did not identify any ecological risk at the Site. Thus, the RAOs focus on the protection of human health due to potential contact with PCE and TCE. The human health RAOs are as follows:

1. Achieve the MTCA Method A cleanup levels for PCE and TCE in soil and groundwater.

4.2 Screening of Remedial Action Alternatives

An initial screening of remedial action alternatives was completed to reduce the number alternatives retained for detailed analysis. In accordance with WAC 173-360-160, the following elements were qualitatively evaluated for each alternative:

Protectiveness. Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, and improvement of the overall environmental quality.

Permanence. The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated.

Cost. The cost to implement the alternative, including the cost of construction, the net present value of any long-term costs, and agency oversight costs that are cost recoverable. Long term costs include operation and maintenance costs, monitoring costs, equipment replacement costs, and the cost of maintaining institutional controls. Cost estimates for treatment technologies shall describe pretreatment, analytical, labor, and waste management costs. The design life of the cleanup action shall be estimated and the cost of replacement or repair of major elements shall be included in the cost estimate.

Effectiveness. Long term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on site at concentrations that exceed cleanup levels, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components may be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: Reuse or recycling; destruction or detoxification; immobilization or solidification; on-site or off-site disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring.

Risk. The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks.

Implementability. Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction

operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.

Fifteen remedial action alternatives were evaluated for this FS. These are tabulated on Table 11, which summarizes the effectiveness, implementability, implantation risk, and relative cost. Alternatives deemed to be not effective or implementable were eliminated from further evaluation, except that the "Monitored Natural Attenuation" alternative was retained as a baseline and the "Groundwater Monitoring" alternative was retained as a component of other technologies. Dual phase extraction and enhanced reductive dechlorination combined with soil vapor extraction were retained for further evaluation.

Table 11. Remedial Action Alternatives Screening

				Screening Criteria					
Alternative	**Technology**	**Media**	**Description**	**Effectiveness**	**Implementability**	**Implementation Risk**	**Cost**	**Screening Comments**	**Retained?**
No Action	None		No Action	Not effective	Easy	None	None	Does not prevent potential exposures. Does not monitor groundwater quality or plume dynamics.	No
Institutional Controls	Groundwater Monitoring	GW	Groundwater sampling and analysis.	Effective for documenting groundwater quality conditions and plume dynamics.	Easy	Low	Low	Retained to document groundwater quality and effectiveness of other technologies.	**Yes**
	Deed Restrictions	GW/S	Restrict access to soil and groundwater.	Effective at preventing direct contact with soil and groundwater.	Easy to Difficult	Low	Low	If necessary, a deed restriction is practical for that part of the Site lying within the bounds of the Mill Creek Crossing retail center. The State Department of Transportation is not likely to agree to deed restrictions for SR-527.	Yes
Engineering Controls	Low Permeability Barrier	GW	Construct low permeability barrier to contain contaminated groundwater	Can be effective at restricting further migration of contaminated groundwater	Difficult	High	High	Not practical due to the depth of groundwater and proximity of SR-527	No
	Hydraulic Containment	GW	Groundwater extraction wells create hydraulic gradients to prevent off-site migration of contaminants.	Can be effective in preventing off-site migration of contaminants.	Moderate	Moderate	Moderate	Retained as an element of Dual Phase Extraction.	**Yes**
	Surface Capping	S	Asphalt or concrete pavement.	Can be effective in presenting direct contact with soil and restricting surface water infiltration.	Easy	Low	Low	The Site is already nearly 100 percent covered with concrete or asphaltic pavement. Does not satisfy MTCA requirements.	No
In – Situ Treatment	Monitored Natural Attenuation	GW	Passive treatment of groundwater using natural processes.	Historical groundwater quality data suggests that natural attenuation processes may be effectively limiting expansion of the plume.	Easy	Low	Low	Conditions at site do not appear to be favorable for reductive dechlorination to occur without enhancement. However, other elements of natural attenuation (dispersion, adsorption, dilution and volatilization) appear to be preventing expansion of the plume. Retained as a baseline for comparison to other technologies.	**Yes**
	Enhanced Reductive Dechlorination	GW	The practice of adding hydrogen (an electron donor) to groundwater to increase the number and vitality of indigenous microorganisms performing bioremediation (reductive dechlorination).	Can be an effective method of degrading PCE and daughter products in groundwater.	Moderate	Low - Moderate	Moderate	The reliability of the technology is high but may not work if appropriate micro-organisms are not present or the target depths cannot be reached. May require multiple rounds of injections. Dechlorination products (vinyl chloride) have higher toxicity than the parent products, presenting a possible implementation risk. Difficult to apply effectively in the vadose zone.	**Yes**
	Permeable Reactive Barrier	GW	Passively treats contaminated groundwater as it passes through the barrier.	Can be effective for PCE.	Very Difficult	High	High	The reliability is high for chlorinated solvents. However, this technology would be very difficult to implement at the site due to the depth to groundwater and proximity of SR-527.	No
	Chemical Oxidation	GW/S	Chemically oxidizes and destroys the contaminant.	Can be effective for PCE.	Moderate-Difficult	Moderate	Moderate	High reliability for PCE, but the oxidant must come into direct contact with the contaminant. May require multiple rounds of injections. Discussions with vendors indicates that this alternative is not cost effective for low levels of PCE.	No
	Soil Vapor Extraction	S	Apply a vacuum to the vadose zone to extract volatile organic compounds	Can be an effective method of removing PCE from the vadose zone.	Moderate	Low	Moderate	Requires multiple extraction wells with a radius of influence sufficient to reach contaminated soil within the Site. Soil vapor effluent may need to be treated prior to release to the atmosphere.	**Yes**
	In-Situ Air Stripping	GW	Uses a double screened well and injected air to strip volatile components.	Can be an effective method of removing PCE in groundwater.	Moderate	Low	Moderate	Cost is high due to need for multiple treatment wells. Can interfere with anaerobic reductive biodegradation. Exhaust air may require treatment.	No
Ex-Situ Treatment	Dual Phase Extraction	GW	A high vacuum is applied to simultaneously remove contaminated ground water and volatile components from the vadose zone.	Can be effective in treating contaminated groundwater and soil in the vadose zone.	Moderate	Low	Moderate	Can hydraulically contain offsite migration of contaminants. Can mitigate the potential for vapor intrusion. Extracted groundwater and soil gas may need to be treated prior to disposal. Multiple treatment wells needed.	Yes
	Pump & Treat	GW	Pump contaminated groundwater and treat at the surface.	Ineffective for vadose zone soils.	Easy	Low	High	Pump & Treat does not have a history of high reliability. Requires construction of a water treatment system or disposal option.	No
Excavation / Off-Site Disposal Without Treatment	Excavation and Off-Site Disposal	S	Excavate contaminated soil and dispose at licensed landfill.	Highly effective for removal of PCE in the vadose zone.	Easy	Low	High	Not practical at the current time due to the presence of buildings.	No

4.3 Site Specific Remedial Action Alternatives

Based on the preliminary screening of the Remedial Action Alternatives (RAOs), three alternatives were retained for further evaluation. The alternatives retained are:

Alternative A: Monitored Natural Attenuation (MNA)

Alternative B: Enhanced Reduction Dechlorination (Groundwater) / Soil Vapor Extraction (Vadose Zone)

Alternative C: Dual Phase Extraction

The Monitored Natural Attenuation alternative is retained to provide a baseline for costs and risks at the Site. Dual Phase Extraction (DPE) and a combination of Enhanced Reductive Dechlorination (ERD) and Soil Vapor Extraction (SVE) were retained as the primary technologies for further evaluation.

4.3.1 Monitored Natural Attenuation

"Monitored natural attenuation" (MNA) refers to the reliance on natural attenuation processes to achieve the RAOs. Natural attenuation includes a variety of physical, chemical, and biological processes that, under favorable conditions, reduce the mass, toxicity, mobility, volume, and/or concentration of contaminants in soil and/or groundwater. Natural attenuation includes "nondestructive" processes such as dispersion, adsorption, dilution and volatilization, and "destructive" processes such as biodegradation. Biodegradation is the preferred attenuation mechanism, because it results in actual reduction of contaminant mass. However, as described in Section 3 of this report, biodegradation does not appear to be occurring at the Site. Therefore, MNA does not appear to meet the RAOs.

4.3.2 Enhanced Reductive Dechlorination

Enhanced reductive dechlorination (ERD) is the practice of adding hydrogen (an electron donor) to groundwater and/or soil to increase the number and vitality of indigenous microorganisms performing anaerobic bioremediation (reductive dechlorination) on anaerobically biodegradeable compounds. Reductive dechlorination is a term used to describe the biologically mediated process by which chlorinated hydrocarbons (such as PCE and TCE) are degraded under anaerobic conditions. During this naturally occurring process, anaerobic microbes (dehalogenators) substitute hydrogen (H) for chlorine (Cl) on chlorinated contaminant molecules, thus dechlorinating the compound.

When reductive dechlorination occurs naturally, it is considered a component of natural attenuation. However, the conditions at the Site are aerobic, and daughter products that would result from the reductive dechlorination of PCE (trichloroethylene, dichloroethylene, and vinyl chloride) have not been detected in groundwater. The addition of an organic substrate to an aquifer has the potential to further stimulate microbial growth and development, creating an anaerobic environment in which rates of anaerobic biodegradation of PCE and its daughter products may be enhanced. The presence of the substrate expedites the exhaustion of any naturally occurring electron acceptors. As the natural electron acceptors are depleted and a more reducing environment is induced, microorganisms capable of biodegrading PCE gain a selective advantage.

4.3.4 Soil Vapor Extraction

Soil vapor extraction (SVE) utilizes a vacuum applied through wells near the source of contamination in the soil to remove contaminants. Volatile constituents of the contaminant mass "evaporate" and the vapors are drawn toward the extraction wells. Extracted vapor is then treated as necessary (commonly with carbon adsorption) before being released to the atmosphere. The permeability of the soil affects the rate of air and vapor movement through the soil; the higher the permeability of the soil, the faster the movement and (ideally) the greater the amount of vapors that can be extracted.

4.3.5 Dual Phase Extraction

Dual phase extraction (DPE), also known as multi-phase extraction, is a technology that uses a high-vacuum system to remove both contaminated groundwater and soil vapor. High-vacuum extraction wells are installed with the screened section in the zone of contaminated soils and groundwater. Both soil gas and groundwater are extracted, and the water table is depressed. Thus DPE removes contaminants from above and below the water table. Additional unsaturated soil is exposed as the water table around the well is lowered. This area, called the capillary fringe, is often highly contaminated, as it holds undissolved chemicals and vapors that have volatilized from the dissolved phase in groundwater below. Contaminants in the newly exposed zone can be removed by vapor extraction. Once above ground, the extracted vapors and liquid-phase organics and groundwater are separated and treated.

4.4 Evaluation of Remedial Action Alternatives

A detailed analysis of Alternatives A, B and C with respect to the requirements of WAC 173-340-360 (Selection of Cleanup Actions) is presented in Table 12. Results of the pilot tests performed to evaluate the potential effectiveness of alternatives are summarized in section 5.0. Estimated costs to implement the alternatives are presented in Table 13.

Table 12. Selected Alternatives Evaluation

	Protectiveness • Degree to which existing risks are reduced • Time required to reduce the risk and attain cleanup standards • On-site and off-site risks resulting from implementing the alternative • Improvement of the overall environmental quality	**Permanence** • Degree of permanent reduction of contaminant toxicity, mobility, and volume • Adequacy of destruction of hazardous substances • Reduction or elimination of substance release, and source of release • Degree of irreversibility of waste treatment processes • Characteristics and quantity of generated treatment residuals	**Long Term Effectiveness** • Degree of certainty of that the alternative will be successful • Reliability while contaminants remain on-site greater than cleanup levels • Magnitude of residual risk • Effectiveness of controls implemented to manage residual risk	**Management of Short Term Risks** • Risk to human health and the environment associated with the alternative during construction and implementation • The effectiveness of measures taken manage short-term risks	**Technical and Administrative Implementability** • Technical possibility • Availability of off-site facilities, services, and materials • Administrative and regulatory requirements • Schedule, size, and complexity of construction • Monitoring requirements • Site access for construction, operations, and monitoring • Integration with existing site operations or other current and potential future remedial action	**Cost** • Cost of construction • Long-term monitoring, and operations and maintenance costs • Cost to maintain institutional controls • Agency oversight costs
Alternative A **Monitored Natural Attenuation**	This alternative provides some reduction to existing risk in groundwater, given continued advection, dispersion, sorption, and volatilization. The alternative does not address the risk associated with vapor intrusion near the current and former dry cleaners. Time required to reduce risks and attain cleanup standards is not within a reasonable time frame, and may not be achievable (particularly for soil). No on- or off-site risks result from implementing MNA as no actions are required for implementation. On- and off-site risks remain the same as currently exist. MNA provides no improvement in overall environmental quality when implemented as a standalone technology because no actions are conducted as part of implementation. Remedial action objectives are not achieved.	This alternative does not provide a reduction of contaminant toxicity, mobility, or volume. The destruction of contaminants does not appear to be occurring at the Site. Decreasing concentrations appear to be related to advection, dispersion, sorption, and volatilization. This alternative does not reduce, eliminate, or control sources as MNA does not address contaminated soil that appears to be the source of groundwater impacts. Off-site migration of contaminated groundwater remains active. Except for investigation derived waste (IDW) associated with groundwater sampling, no treatment residuals are generated by implementation of an MNA alternative	This alternative provides a low degree of success within a reasonable time frame. It is not expected to achieve cleanup goals for soil. This alternative is not reliable because contaminant destruction does not appear to be occurring. The magnitude of residual risk with this alternative is unchanged from the existing conditions. The controls in place to manage risk include surface capping, which adequately manages direct-contact risk; however, there are no controls to manage ongoing migration of PCE from soil to groundwater.	Except for managing IDW, no short-term risk is associated with construction of this alternative because no construction activities will be conducted. Existing risk remains consistent with the current site risks.	This alternative is technically possible to implement and involves no construction. No facilities, services, or materials are needed for alternative implementation because no construction will be performed. However, this alternative is not administratively implementable because it does not meet the regulatory requirements for a cleanup action. Monitoring requirements are expected to be longer term than for other alternatives because risks will not be reduced with this alternative. There are no concerns with site access because no construction is associated with this alternative. This alternative does not impact existing site operations	This criterion includes construction cost and contingency, and includes estimated long-term maintenance and monitoring. Agency oversight costs are not included and are expected to be consistent for all proposed alternatives. The cost associated with an MNA alternative is expected to be low.

Table 12. Selected Alternatives Evaluation

	Protectiveness • Degree to which existing risks are reduced • Time required to reduce the risk and attain cleanup standards • On-site and off-site risks resulting from implementing the alternative • Improvement of the overall environmental quality	**Permanence** • Degree of permanent reduction of contaminant toxicity, mobility, and volume • Adequacy of destruction of hazardous substances • Reduction or elimination of substance release, and source of release • Degree of irreversibility of waste treatment processes • Characteristics and quantity of generated treatment residuals	**Long Term Effectiveness** • Degree of certainty that the alternative will be successful • Reliability while contaminants remain on-site greater than cleanup levels • Magnitude of residual risk • Effectiveness of controls implemented to manage residual risk	**Management of Short Term Risks** • Risk to human health and the environment associated with the alternative during construction and implementation • The effectiveness of measures taken manage short-term risks	**Technical and Administrative Implementability** • Technical possibility • Availability of off-site facilities, services, and materials • Administrative and regulatory requirements • Schedule, size, and complexity of construction • Monitoring requirements • Site access for construction, operations, and monitoring • Integration with existing site operations or other current and potential future remedial action	**Cost** • Cost of construction • Long-term monitoring, and operations and maintenance costs • Cost to maintain institutional controls • Agency oversight costs
Alternative B Groundwater Remediation by ERD and Vadose Zone Remediation by SVE	This alternative provides a high degree of reduction of existing risk through destruction of contaminant mass in groundwater using ERD and in the vadose zone using SVE. The time required to reduce risk and achieve cleanup levels is less certain but is expected to be complete in 1 to 2 years. It is anticipated that the increased rate of reductive dechlorination in groundwater will in turn reduce soil concentrations through equilibrium diffusion. Vapor extracted from the subsurface during SVE will generate a treatment waste stream that must be managed either on-site or off-site. This alternative provides a moderate degree of improvement in overall environmental quality through mass reduction in the vadose zone, and slow dechlorination of source mass in the saturated zone.	This alternative provides a high degree of permanent contaminant toxicity, mobility, and volume reduction. Destruction of hazardous substances resulting from implementation of SVE and ERD is adequate. The destruction of contaminants resulting from SVE and ERD is permanent and irreversible. Treatment residuals are limited to vapors collected during SVE treatment. Generated waste will require management during implementation over the short term. Soil will be generated as part of the groundwater treatment (injection of amendments) and trenching for the SVE system. These soils will be disposed at a landfill and, depending on concentrations, may be considered hazardous waste.	This alternative provides a moderate to high degree of certainty of success because SVE and ERD have both been implemented successfully at similar sites. ERD technology has been successfully implemented for groundwater remediation at sites with similar conditions. SVE and ERD technologies are both reliable with measurable success. Monitoring can be conducted in the long term to confirm performance. The magnitude of residual risk associated with this alternative is moderate because of the time the contaminant mass will remain on-site.	This alternative will generate a potential direct contact risks to workers during injections, SVE well installation, trenching, and system operation. Site activities will require appropriate PPE, BMPs, and appropriate training requirements for management of risk. These controls are highly effective and anticipated to adequately manage short-term risk.	This alternative is moderately complex to implement but technically possible given site conditions. All necessary off-site facilities, materials, and services are available within the region. This alternative meets administrative and regulatory requirements. This alternative is anticipated to require 3 months for construction, followed by 1 to 2 years of SVE system operation and groundwater monitoring. Long-term monitoring will be required for an extended time frame. Site access for construction is moderately complex because of active site uses, but will not shut down site operations. Access for operations and maintenance during ERD injections and SVE installation will require coordination with facilities operations, but should not be greatly impacted by facility operations. This alternative is somewhat easily integrated with existing site operations and will require trenching for SVE system utilities.	This criterion includes construction cost and contingency, and includes estimated long-term maintenance and monitoring. Agency oversight costs are not included, and are expected to be consistent for all proposed alternatives. The overall cost associated with this alternative is expected to be moderate, as SVE system O&M will be required for a number of years, and an extended period of monitoring, maintenance, and continued ERD treatment

Table 12. Selected Alternatives Evaluation

	Protectiveness • Degree to which existing risks are reduced • Time required to reduce the risk and attain cleanup standards • On-site and off-site risks resulting from implementing the alternative • Improvement of the overall environmental quality	**Permanence** • Degree of permanent reduction of contaminant toxicity, mobility, and volume • Adequacy of destruction of hazardous substances • Reduction or elimination of substance release, and source of release • Degree of irreversibility of waste treatment processes • Characteristics and quantity of generated treatment residuals	**Long Term Effectiveness** • Degree of certainty that the alternative will be successful • Reliability while contaminants remain on-site greater than cleanup levels • Magnitude of residual risk • Effectiveness of controls implemented to manage residual risk	**Management of Short Term Risks** • Risk to human health and the environment associated with the alternative during construction and implementation • The effectiveness of measures taken manage short-term risks	**Technical and Administrative Implementability** • Technical possibility • Availability of off-site facilities, services, and materials • Administrative and regulatory requirements • Schedule, size, and complexity of construction • Monitoring requirements • Site access for construction, operations, and monitoring • Integration with existing site operations or other current and potential future remedial action	**Cost** • Cost of construction • Long-term monitoring, and operations and maintenance costs • Cost to maintain institutional controls • Agency oversight costs
Alternative C **Dual Phase Extraction**	This alternative provides a high degree of reduction of existing risk through the removal and subsequent destruction of contaminant mass in groundwater and soil. This alternative will also draw down the water table resulting in a hydraulic barrier and mitigate the risk of vapor intrusion to onsite structures. The time required to reduce risk and achieve cleanup levels is less certain but is expected to be complete in about 1 year. Groundwater and vapor extracted from the subsurface will generate a treatment waste stream that must be managed. This alternative provides a moderate degree of improvement in overall environmental quality through mass reduction in the vadose zone and groundwater. .	This alternative provides a high degree of permanent contaminant toxicity, mobility, and volume reduction. Destruction of hazardous substances resulting from implementation of DPE is adequate. The destruction of contaminants resulting from DPE is permanent and irreversible. Soil will be generated as part of the system installation (DPE well installation and trenching for pipes). These soils will be disposed at a landfill and, depending on concentrations, may be considered hazardous waste.	This alternative provides a moderate to high degree of certainty of success because DPE has been implemented successfully at similar sites. Monitoring will be conducted in the long term to confirm performance. The magnitude of residual risk associated with this alternative is moderate because of the time the contaminant mass will remain on-site. This alternative is expected to be effective for both the Property and the Site .	This alternative will generate a potential direct contact risk to workers during installation of subsurface piping. Site activities will require appropriate PPE, BMPs, and appropriate training requirements for management of risk. These controls are highly effective and anticipated to adequately manage short-term risk.	This alternative is moderately complex to implement but technically possible given site conditions. All necessary services are available within the Site. This alternative meets administrative and regulatory requirements. This alternative is anticipated to require approximately two months for permit acquisition and construction, followed by about 1 year of operation. Long-term monitoring will be required for an extended time frame. Site access for construction is moderately complex because of active site uses, but will not shut down site operations. Access for operations and maintenance during DPE system installation will require coordination with facilities operations, but should not be greatly impacted by facility operations. This alternative is somewhat easily integrated with existing site operations and will require trenching for DPE system utilities.	This criterion includes construction cost and contingency, and includes estimated long-term maintenance and monitoring. Agency oversight costs are not included, and are expected to be consistent for all proposed alternatives. The overall cost associated with this alternative is expected to be moderate.

Table 13. Remedial Action Alternative Cost Estimates

Alternative A. Monitored Natural Attenuation	Quantity	Units	Unit Costs	Total Cost	Source	Notes
Task 1. Semi-Annual Mobilization	1 Sampling Event	20 Events	$440	$8,800	1	Semi-Annual Groundwater monitoring
Task 2. Semi-Annual Groundwater Sampling						
Field Personnel	1 Sampling Event	20 Events	$2,200	$44,000	1	Conduct sampling event. MW-2, MW-3, MW-4, MW-7, and MW-8 only
Sampling Equipment	1 Sampling Event	20 Events	$300	$6,000	1	Bladder pump, contoller, water level indicator
Disposables	1 Sampling Event	20 Events	$110	$2,200	1	Bladders, tubing, locks
Task 3. Analytical Fees (Semi-Annual Sampling Event)						
VOC	1 Sampling Event	20 Events	$1,035	$20,700	2	Five samples per event
Task 5. Purge Water Disposal						
Disposal	1 Sampling Event	20 Events	$150	$3,000	3	Assumes disposal as non-hazardous waste.
Task 7. Reporting						
Groundwater Monitoring Report	1 Sampling Event	20 Events	$1,100	$22,000	1	Brief document primarily confined to the presentation of new groundwater quality data and a tabulated summary of historical results.
Task 8. Project Management	1 Sampling Event	20 Events	$375	$7,500	1	Project management, report review
Estimated Cost Per Semi-Annual Event			$5,710			
Confirmational Soil Sampling						
Field Personnel	1	Lump Sum	$2,200	$2,200	1	Sample soil beneath the Money Tree and Prime Cleaners tenants spaces to confirm that Method A cleanup levels have been achieved
Direct-Push Subcontractor	1	Lump Sum	$4,025	$4,025	1	Assumes work can be completed in two days
Laboratory Fees	1	Lump Sum	$4,140	$4,140	1	20 soil samples (EPA 8260)
Final Report	1	Lump Sum	$5,640	$5,640	1	Final report documenting all remedial action and petioniong for an NFA
Well Decommissioing	1	Lump Sum	$12,500	$12,500	1,2	Decommission 10 groundwater monitoring wells, 1 DPE pilot study well, and 1 vapor monitoring well
Engineering Contingency (5%)				$7,135		
Estimated Total Project Cost				**$149,840**		MNA for 10 years

Sources:
1 Engineering Estimate
2 ALS Laboratories
3 Waste Express

Table 13. Remedial Action Alternative Cost Estimates (Continued)

Alternative B. ERD/SVE	Quantity	Units	Unit Costs	Total Cost	Source	Notes
Task 1. SVE Well Installation						
Install three SVE wells to 20 feet	1	Lump Sum	$6,900	$6,900	2	Drilling subcontract
Field Engineering	1	Lump Sum	$1,600	$1,600	1	Document well installation
Soil Cutting Disposal	1	Lump Sum	$1,200	$1,200	1,4	Assumes disposal as a non-hazardous waste
Task 2. Implementation (Assumes direct billing by subcontractors)						
SVE System	1	Lump Sum	$24,000	$24,000	1,6	Vavuum extraction pump and associated controls
Granulated Carbon Treatment System	1	Lump Sum	$19,000	$19,000	1,6	Soil gas waste stream treatment
Storage Container Including Shipping and Installation	1	Lump Sum	$11,480	$11,480	1,6	Shipping container to house equipment
Conveyance Piping and Electrical Installation	1	Lump Sum	$38,500	$38,500	1,6	Trench, install piping, backfill, resurface. Assumes excess soil spoils from trenching are not contaminated.
Effluent Sampling at System Startup	1 Sampling Event	5 Events	$440	$2,200	1	Sample waste stream influent and effluent (soil gas) during the first two months of operation
Effluent Sampling Laboratory Fees	1 Sampling Event	5 Events	$500	$2,500	5	Two soil gas analyses (EPA TO-15) per event (includes shipping to Eurofins AirToxics)
SVE O&M	1	Lump Sum	$9,000	$14,000	1,6	O&M for two years
ERD Substrate Costs	1	Lump Sum	$45,200	$45,200	5	Assumes 3D-Microemulsion is the slected substrate
Injection Costs	1	Lump Sum	$28,000	$28,000	1,8	Assumes 54 injection points and that target depths can be reached with direct push equipment. Assumes access to south adjoining property.
Field Engineering	1	Lump Sum	$8,800	$8,800	1	Document ERD injections
SVE O&M	1	Lump Sum	$14,000	$14,000	1,6	O&M for two years
Consulting	1	Lump Sum	$5,000	$5,000	1	Observe and document SVE installation and EAB injections.
Report Preparation	1	Lump Sum	$5,000	$5,000	1	Summary report describing SVE system installation and startup and ERD injections
Task 3. Performance Monitoring						
SVE and Groundwater Sampling						
Field Personnel	1 Sampling Event	8 Events	$2,200	$17,600	1	Quarterly samping events for two years (8 wells and SVE influent and effluent).
Sampling Equipment	1 Sampling Event	8 Events	$300	$2,400	1	Bladder pump and controller, water level indicator
Disposables	1 Sampling Event	8 Events	$110	$880	1	Bladders and tubing.
Analytical Fees						
Groundwater (EPA 8260)	1 Sampling Event	8 Events	$1,660	$13,280		Eight groundwater samples
VOC	1 Sampling Event	8 Events	$500	$4,000	1,3	SVE soil gas influent and effluent (includes shiping to Eurofns AirToxics)
Purge Water Disposal						
Disposal	1 Sampling Event	8 Events	$150	$1,200	4	Assumes disposal as non-hazardous waste.
Reporting	1 Sampling Event	8 Events	$1,500	$12,000	1	Quarterly Performance Monitoring Report
Confirmational Soil Sampling						
Field Personnel	1	Lump Sum	$2,200	$2,200	1	Sample soil beneath the Money Tree and Prime Cleaners tenants spaces to confirm that Method A cleanup levels have been achieved
Direct-Push Subcontractor	1	Lump Sum	$4,025	$4,025	1	Assumes work can be completed in two days
Laboratory Fees	1	Lump Sum	$4,140	$4,140	1	20 soil samples (EPA 8260)
Final Report	1	Lump Sum	$5,640	$5,640	1	Final report documenting all remedial action and petioniong for an NFA
Well Decommissioing	1	Lump Sum	$12,500	$12,500	1,2	Decommission 10 groundwater monitoring wells, 1 DPE pilot study well, and 1 vapor monitoring well
Task 4. Project Management	1	Lump Sum	$10,000	$10,000	1	
Engineering Contingency (15%)				$47,587		
Estimated Total Project Cost				**$364,832**		

Sources:

1 Engineering Estimate
2 Environmental Drilling, Inc.
3 ALS Laboratories
4 Waste Express
5 Regenesis Corporation
6 EPA - Interim Measures Cost Compendium (2004), Global Remediation Solutions
7 Microbial Insights
8 Cascade Drilling

Table 13. Remedial Action Alternative Cost Estimates (Continued)

Alternative C. Dual Phase Extraction	Quantity	Units	Unit Costs	Total Cost	Source	Notes
Task 1. DPE Well Installation						
Install three additional 4-inch DPE wells to 40 feet	1	Lump Sum	$13,800	$13,800	2	Drilling subcontract
Field Engineering	1	Lump Sum	$3,800	$3,800	1	Document well installation
Well Development	1	Lump Sum	$1,800	$1,800	1	Develop three new wells
Soil Cuttings/Well Development Water Disposal	1	Lump Sum	$3,200	$3,200	1,3	Assumes disposal as a non-hazardous waste
Task 2. DPE System Installation and Startup (Assumes direct billing by subcontractors)						
Dual Phase Extraction System	1	Lump Sum	$42,200	$42,200	4	300 CFM vacuum extraction pump, liquid/vapor separator tank, and associated pumps, switches and electrical controls
Condensate Pre-Treatment System	1	Lump Sum	$6,400	$6,400	4	Flow-through condensate pre-treatment system (turbindity mitigation)
Granulated Carbon Treatment Systems	1	Lump Sum	$38,410	$38,410	4	Granulated carbon treatment system (to treat the groundwater and soil gas waste stream)
Storage Container including Shipping and Installation	1	Lump Sum	$11,480	$11,480	4	The equipment will be housed in a shipping container.
Conveyance Piping and Electrical Installation	1	Lump Sum	$38,500	$38,500	4	Trench, install piping, backfill, resurface. Assumes excess soil spoils from trenching are not contaminated.
Effluent Sampling at System Startup	1 Sampling Event	5 Events	$700	$3,500	1	Sample waste stream influent and effluent (soil gas and groundwater) during the first two months of operation
Effluent Sampling Laboratory Fees	1 Sampling Event	5 Events	$915	$4,575	5	Two groundwater (EPA 8260) and two soil gas analyses (EPA TO-15) per event (includes shipping to Eurofins AirToxics)
DPE O&M	1	Lump Sum	$14,000	$14,000	6	O&M for two years
Consulting	1	Lump Sum	$5,000	$5,000	1	Coordinate, observe and document DPE system installation and startup
Reporting	1	Lump Sum	$5,000	$5,000	1	Summary report decribing system installation and startup
Task 3. Performance Monitoring						
DPE System and Groundwater Sampling						
Field Personnel	1 Sampling Event	8 Events	$2,640	$21,120	1	Quarterly sampling events for two years (Assumes 8 groundwater wells are sampled along with DPE groundwater and soil gas influent and effluent).
Sampling Equipment	1 Sampling Event	8 Events	$300	$2,400	1	Bladder pump and controller, water level indicator
Disposables	1 Sampling Event	8 Events	$110	$880	1	Bladders and tubing.
Laboratory Fees						
Groundwater (EPA 8260)	1 Sampling Event	8 Events	$2,070	$16,560	5	Eight groundwater samples, DPE groundwater influent and effluent
Soil Gas (EPA TO-15)	1 Sampling Event	8 Events	$500	$4,000	5	DPE soil gas influent and effluent (includes shipping to Eurofins AirToxics)
Purge Water Disposal						
Disposal	1 Sampling Event	8 Events	$150	$1,200	4	Assumes disposal as non-hazardous waste.
Reporting	1 Sampling Event	8 Events	$1,500	$12,000	1	Quarterly Performance Monitoring Report
Confirmational Soil Sampling						
Field Personnel	1	Lump Sum	$2,200	$2,200	1	Sample soil beneath the Money Tree and Prime Cleaners tenants spaces to confirm that Method A cleanup levels have been achieved
Direct-Push Subcontractor	1	Lump Sum	$4,025	$4,025	1	Assumes work can be completed in two days
Laboratory Fees	1	Lump Sum	$4,140	$4,140	1	20 soil samples (EPA 8260)
Final Report	1	Lump Sum	$5,640	$5,640	1	Final report documenting all remedial action and petioniong for an NFA
Well Decommissioning	1	Lump Sum	$16,500	$16,500	1,2	Decommission 10 groundwater monitorng wells, 4 DPE wells, and 1 vapor monitoring wells.
Task 4. Project Management	1	Lump Sum	$10,000	$10,000	1	
Engineering Contingency (15%)				$43,850		
Estimated Total Project Cost				**$336,180**		

Sources:

1	Engineering Estimate
2	Environmental Drilling, Inc.
3	Waste Express
4	Global Remediation Solutions, LLC
5	ALS Environmental and Eurofins AirToxics

5.0 PILOT STUDIES

Selection of an appropriate remedial alternative at the Site is complicated by an apparently thick layer of contaminated vadose zone soil (the depth to groundwater in the apparent source area ranges up to about 26 feet), the presence of a building overlying the apparent source area, and dense to very dense soils that include gravel and cobbles (potentially limiting the ability of direct-push equipment to inject oxidants or bioremediation formulations). Based on the Feasibility Study described in Section 4, technologies that should be evaluated further are enhanced bioremediation for treating groundwater, soil vapor extraction for treating vadose soil, and dual phase extraction for treating both vadose soil and groundwater at the Site. These technologies were further evaluated by completing pilot tests in the field as described below.

5.1 Soil Vapor Extraction and Dual Phase Extraction Pilot Test

Soil vapor extraction involves extracting soil gas with a vacuum, and dual phase extraction (DPE) involves extracting contaminated groundwater and soil gas simultaneously, from the same extraction well, both using a high-vacuum pumping system. The advantage of DPE is that removal of groundwater depresses the water table and exposes the contaminated soil zone. The DPE process both creates a hydraulic barrier to further migration of the contaminants and enhances the effectiveness of soil vapor extraction. The extracted groundwater is typically treated using an air stripper or activated carbon vessels. The effluent vapor is either directly discharged or treated (dependent on contaminant concentrations) using activated carbon or a thermal oxidizer, and then discharged.

ZGA retained Global Remediation Solutions LLC (GRS) to complete the soil vapor and dual phase extraction pilot study and to interpret the data. GRS supplied a mobile DPE unit equipped with a vapor/water separator and capable of generating a vacuum of 25 inches mercury (25 inches Hg). GRS also supplied an extraction stinger, digital and mechanical magnehelic gauges to measure vacuum, and arranged for the installation of a 4,200 gallon holding tank for the temporary storage of extracted groundwater.

Well DPE-1 (40 feet deep, screened from 5 feet to 40 feet) was used as the extraction well. Well VMW-1 (20 feet deep, screened from 5 feet to 20 feet), located about 20 feet from DPE-1, was used as a vacuum monitoring well. MW-2, MW-3, MW-4 and MW-9 were used to monitor groundwater elevations. MW-2, MW-3, MW-4 were also fitted with magnehelic gauges. A vacuum was periodically measured in these wells even though the water table was never drawn down below the top of the screened interval. These results suggest that the fittings where lengths of PVC pipe of these wells connect are not air tight.

Two separate tests were completed on April 15 and April 16, 2014. The stinger was set at a depth of about 27 feet (about 3.25 feet beneath the water table) and a vacuum of 25 inches of mercury (25 inch Hg) was applied to DPE-1 during both tests. The first test ran for 305 minutes, the second test ran for 440 minutes. Vacuums of up to -0.82 inches of water column (inches WC) were measured in VMW-1. During the second, longer test the water table was measured to be drawn down in MW-2 (0.08 feet), MW-3 (0.16 feet), and MW-4 (0.21 feet).

A total of approximately 1,017 gallons of groundwater was extracted during the study, at an average rate of 1.36 gallons per minute. ZGA collected a sample of water from the Baker Tank on April 16, 2014> The sample was analyzed for VOC using EPA Method 8260. The sample contained 2.0 ug/L PCE and 9.2 ug/L xylene. The concentration of xylene is below the MTCA Method A cleanup Level (1,000 ug/L). No other VOC were detected. A copy of the laboratory report is included in Appendix C. The mass of PCE removed can be estimated using the following formula:

Mass of PCE Removed = (Volume of Water Removed)*(Concentration of PCE)

We estimate that the mass of PCE removed during the 745 minute test is:

Mass of PCE Removed = (1017 gal)*(3.7854 L/gal)*(2.0 ug/L) = 7,700 ug = 0.0077 g

Given that the test ran for a total of 745 minutes, this mass equates to 1.0336E-5 g/minute or 0.0149 g/day.

ZGA also collected two samples of soil vapor effluent using 1-Liter Summa canisters on April 16, 2014. The canisters were connected to a sampling port in the DPE soil vapor effluent piping. For the first test the Summa canister was opened for 30 seconds with no regulator. For the second test the Summa canister was equipped with a 100 ml/minute regulator and filled in about 5 minutes. The analytical results for PCE and TCE are summarized in Table 13. Very low concentrations of acetone, chloroform, xylenes, toluene, and ethylbenzene were also detected but in concentrations below soil gas screening levels defined in *Draft Guidance for Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (2009).

Table 13. Soil Gas Effluent

Analyte (ug/m^3)	**Sample (ug/m^3)**	
	DPE Effluent #1	**DPE Effluent #2**
TCE	ND<3.4	8.3
PCE	380	700

GRS estimated that the mass of PCE removed in soil vapor was 0.001152 g/minute (1.66 g/day). GRS evaluated the entire dataset for the DPE pilot study and concluded that dual phase extraction appears to be an effective technology for the remediation of soil vapors and for depressing the water table to increase the thickness of the unsaturated zone. GRS recommended an effective DPE radius of influence of 40 feet. A copy of the GRS report is included in Appendix D.

5.2 Enhanced Reductive Dechlorination Pilot Test

Enhanced reductive dechlorination (ERD) is the practice of adding hydrogen (an electron donor) to groundwater to increase the number and vitality of indigenous microorganisms capable of performing

anaerobic bioremediation (reductive dechlorination) on anaerobically biodegradeable compounds. ERD promotes biologically mediated processes by which chlorinated hydrocarbons (such as PCE and TCE) are degraded under anaerobic conditions. During this naturally occurring process, anaerobic microbes (dehalogenators) substitute hydrogen (H) for chlorine (Cl) on chlorinated contaminant molecules, thus dechlorinating the compound. ERD is not considered to be effective for vadose zone soils, particularly for soils beneath the building, but could be effective for groundwater remediation.

In order to evaluate the potential effectiveness of ERD, we first engaged a subcontractor to complete a "clean water injection" test in a hole advanced using direct-push equipment. The purpose of the test was to determine if direct-push equipment can reach the target depths (up to about 40 feet below grade) and to estimate the radius of influence for potential future injections. The results of these tests can be used to access the practicality of injecting bioremediation formulations at the Site.

ESN Northwest provided a truck-mounted Geoprobe Model 7800 equipped with 1-inch probes. This is the most powerful direct-push rig in their fleet and is the rig they use for injecting remediation formulations. We initiated the clean water injection test on the southeast part of the Mill Creek Crossing retail center, well away from and cross gradient to the groundwater plume. Two explorations (DPPS-1 and DPPS-2, see Figure 3) were advanced in this area. The target depth was 40 feet beneath the ground surface (bgs), or about 15 feet beneath the top of the water table.

Refusal was met in DPPS-1 at about 16 feet bgs and at about 14 feet bgs DPPS-2, well short of the target depth. Due to the shallow refusal we did not complete the clean water injection in this area. We moved to the southwest part of the Mill Creek Crossing retail center to determine if the target depths could be reached in the area where the injections would actually occur. Water would not be injected even if the target depths could be reached due to the potential effects on the PCE plume in that area.

Two explorations within a few feet of DPPS-3 (Figure 3) met refusal at depths of less than five feet. Refusal in DPPS-3 was met at about 19.5 feet.

Based on these results we conclude that injection of bioremediation formulations at the Site using direct-push equipment is not practical. Other drilling equipment (hollow-stem auger or sonic) could probably reach the target depths. However, an analysis of the plume completed by Regenesis indicated that 54 injection points or wells would be required to remediate the PCE. Completing 54 40-foot deep wells at the Site would be prohibitively expensive.

6.0 RECOMMENDED REMEDIAL ALTERNATIVE

A detailed analysis of estimated costs for Alternatives A, B and C are provided in Table 14. Estimated costs for the primary alternatives, including the MNA alternative are summarized below:

Primary Alternative	Estimated Cost
Alternative A – MNA	$149,840
Alternative B – ERD/SVE	$364,832
Alternative C – DPE	$336,180

Estimated costs should be considered preliminary in nature and may change with time. Actual project costs may be more or less than those described above.

Alternative A is not likely to meet the remedial action objectives and the ERD component of Alternative B is not technically practical. Alternative C is the recommended alternative. This approach optimizes achieving the RAOs and compliance with MTCA at the best overall cost. Key elements of the recommended alternative, including estimated time to complete each element, are described below.

- Install three additional DPE extraction wells. Given the 40-foot radius of influence recommended by GRS, this should be sufficient to reach PCE and TCE contaminated soil and groundwater on that part of the Site that lies within the Mill Creek Crossing retail center. This task can be completed within about one month of notice to proceed. The approximate location of the recommended DPE wells is indicated on Figure 15.
- Install the DPE system and associated underground piping and equipment compound. Including system startup this task can be completed within about three months of notice to proceed.
- Using the estimated mass of PCE in soil and groundwater (Section 3.5.5) and the estimated removal rates based on the results of the Pilot Study (Section 5.2) we estimate that the DPE system would need to operate for about one year to achieve the Remedial Action Objectives and MTCA compliance for soil and groundwater throughout the Property. We further estimate that MTCA compliance for soil and groundwater throughout the Site can also be achieved within about one year.

ZGA intends to complete a Cleanup Action Plan providing additional details regarding system installation, start up and operation under separate cover.

8.0 REFERENCES

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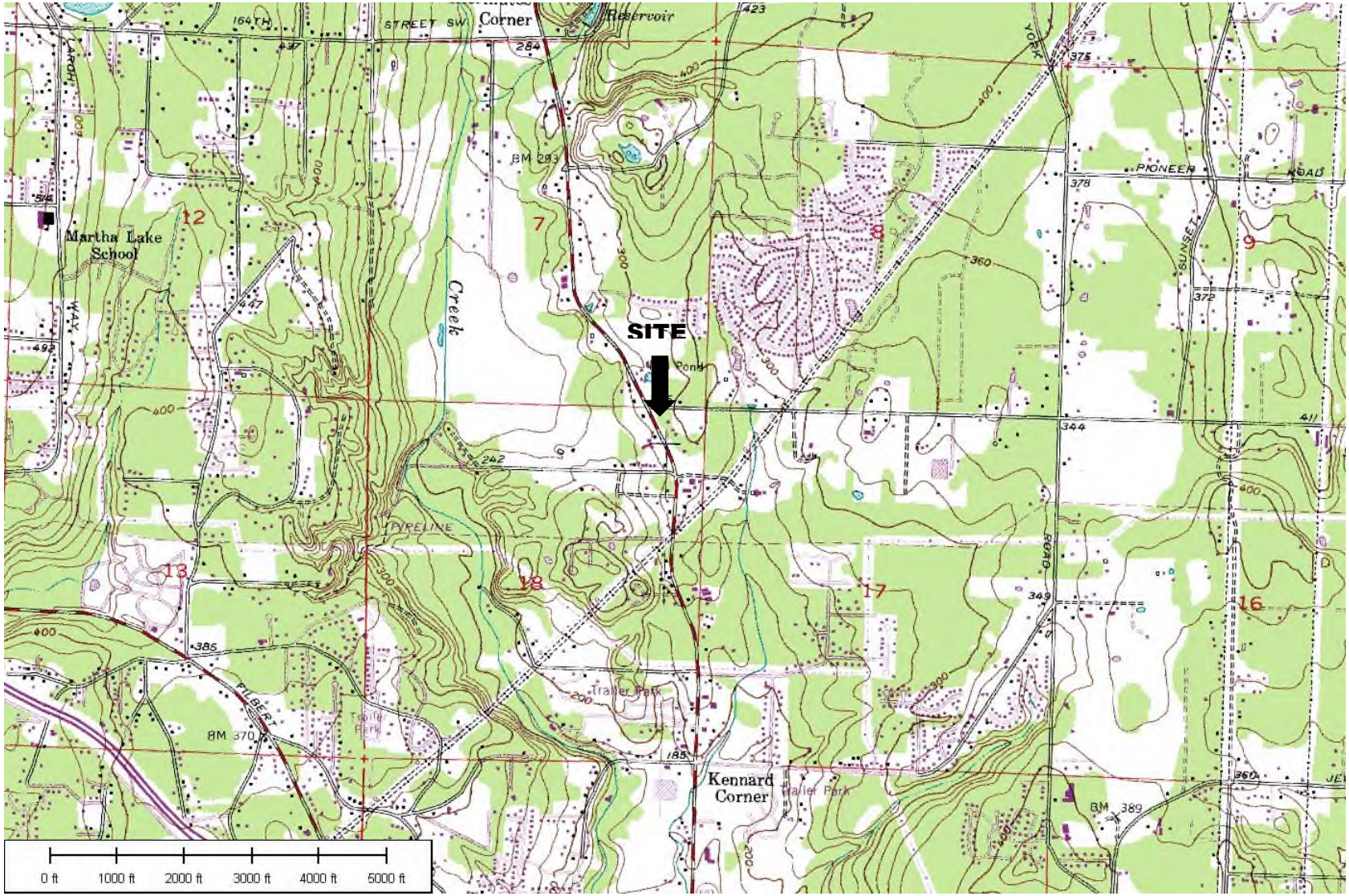
APPENDIX A



Project No.	1001.22	Project Manager: JME	
Drawn By:	JME	Scale: As Shown	
Date:	May, 2014	File Name:	
Client: Mill Creek Crossing LLC			

Zipper Geo Associates, LLC
Geotechnical and Environmental Consulting
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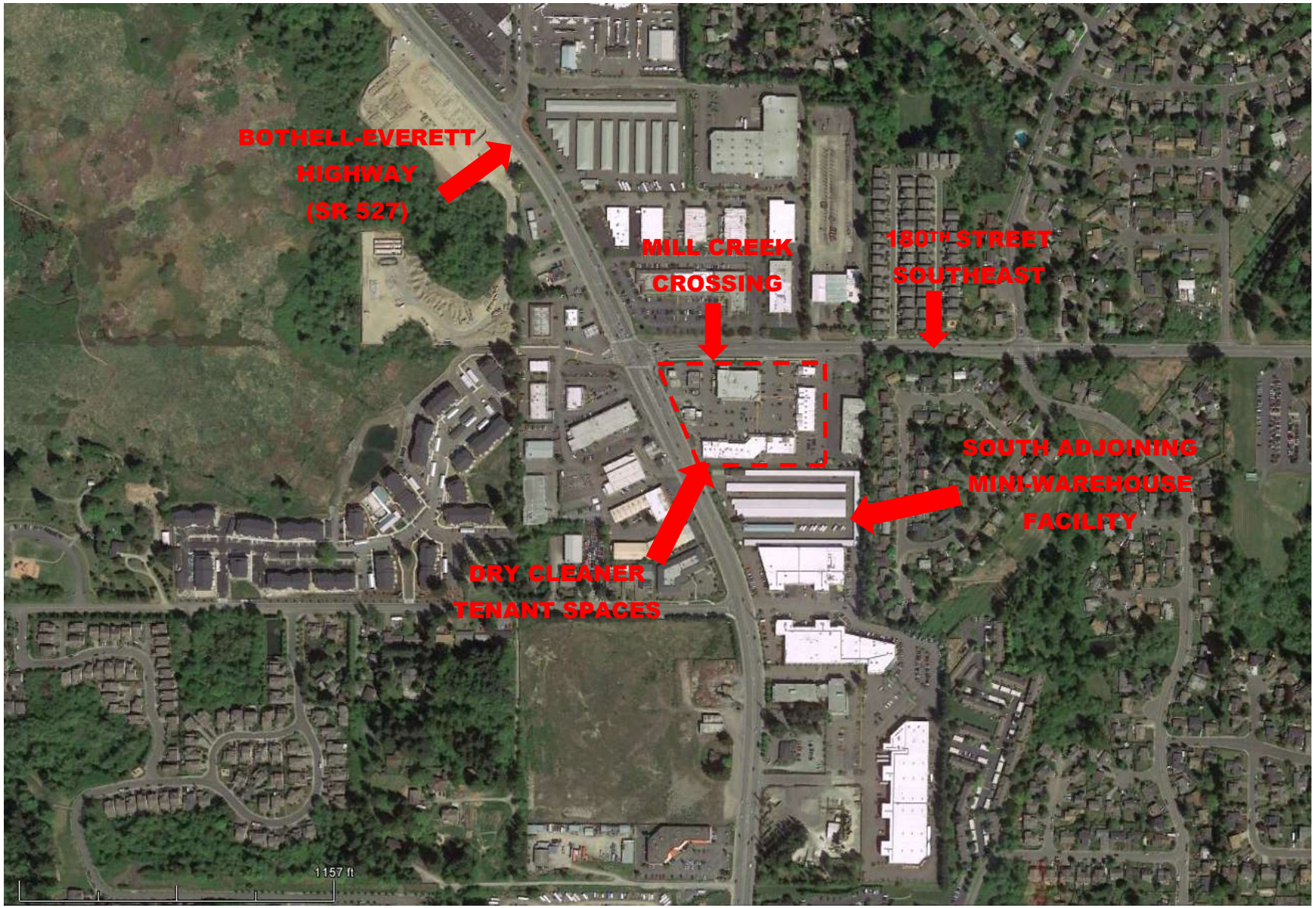
Figure 1

Topographic Map



Project No.	1001.22	Project Manager: JME	
Drawn By:	JME	Scale: As Shown	
Date:	May, 2014	File Name:	
Client: Mill Creek Crossing LLC			

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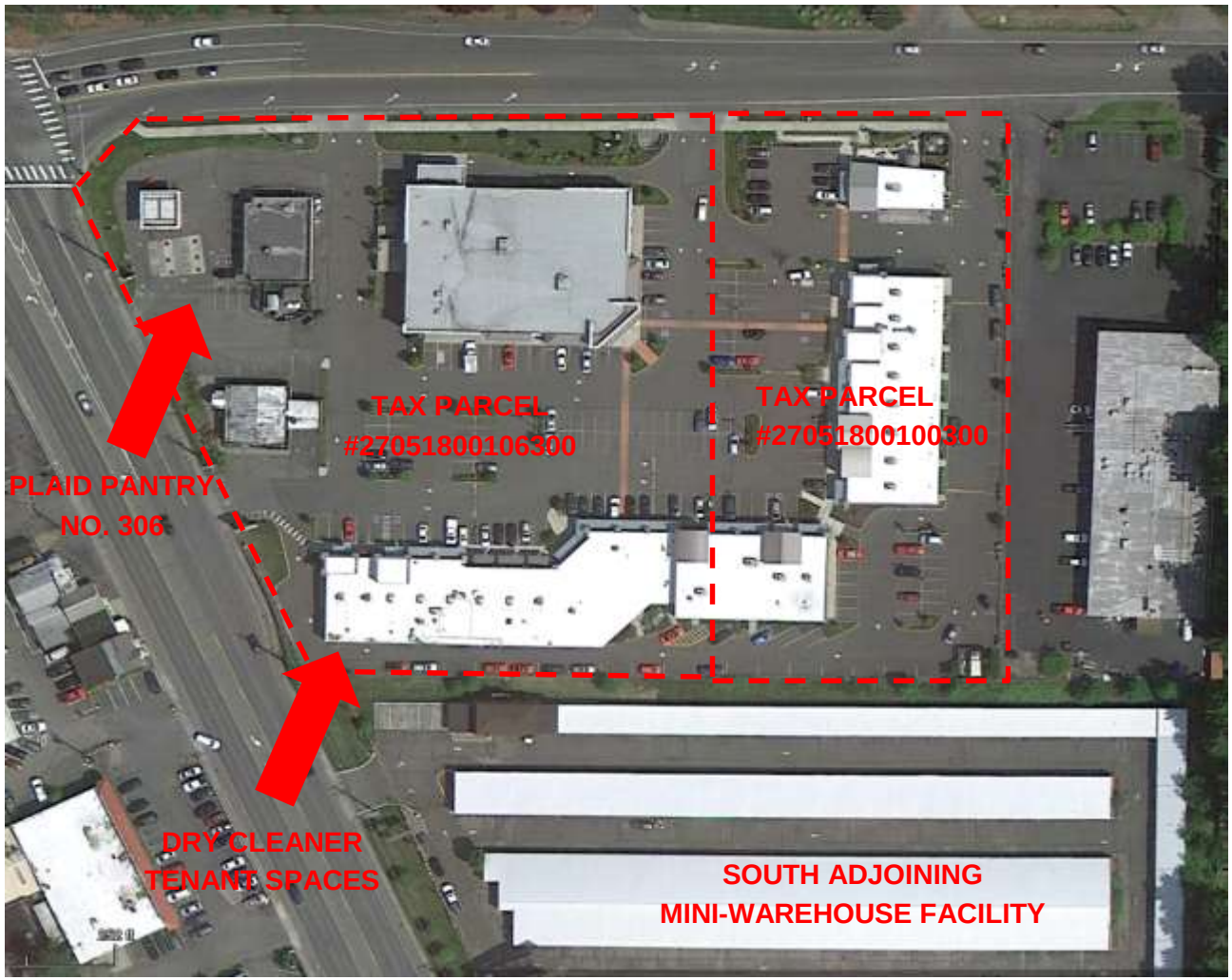
Figure 2A

2013 Aerial Photograph



Project No.	1001.22	Project Manager: JME	
Drawn By:	JME	Scale: As Shown	
Date:	June, 2014	File Name:	
Client: Mill Creek Crossing LLC			

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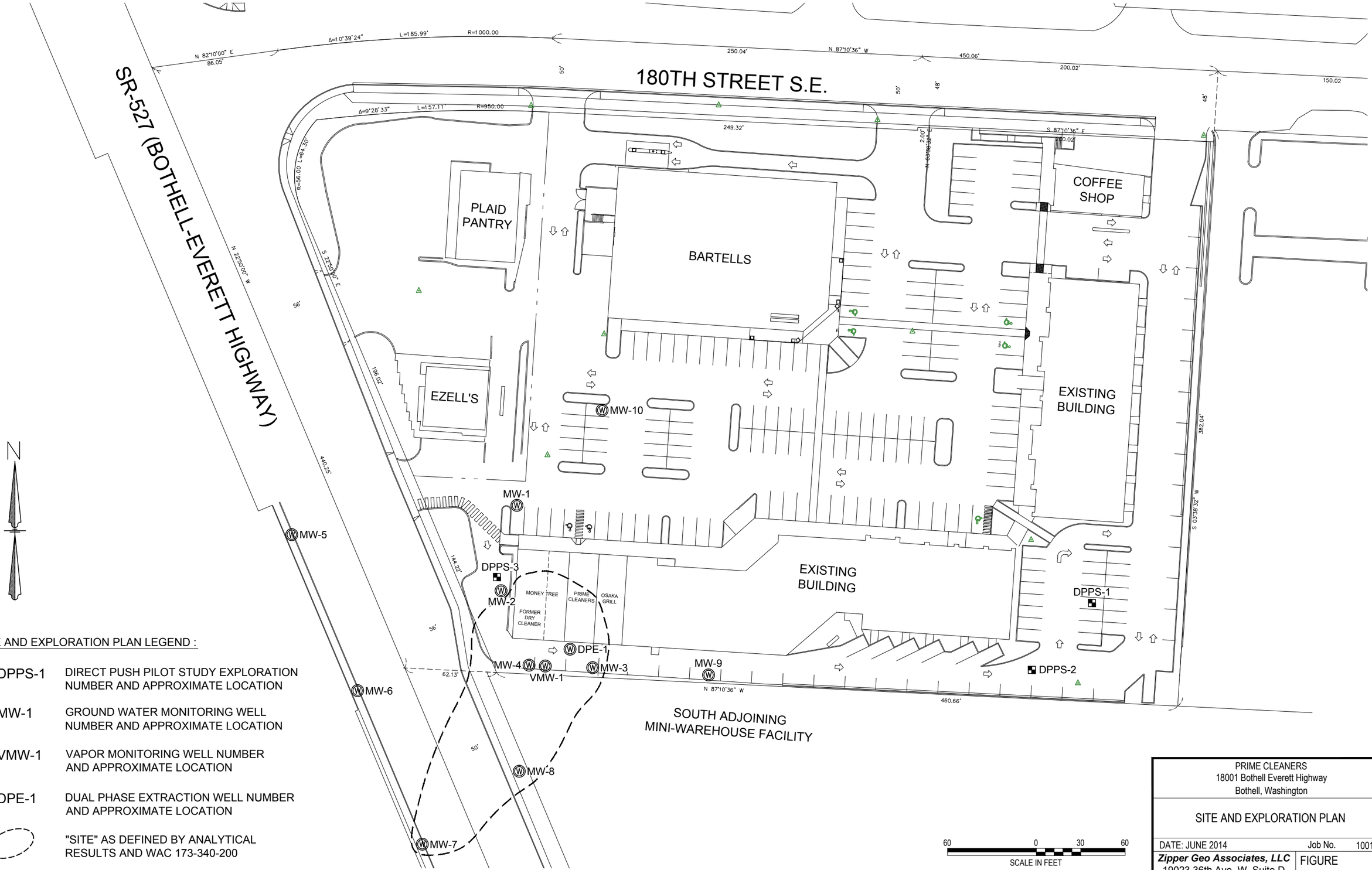
Figure 2B

2013 Aerial Photograph



SITE AND EXPLORATION PLAN LEGEND :

DPPS-1	DIRECT PUSH PILOT STUDY EXPLORATION NUMBER AND APPROXIMATE LOCATION
MW-1	GROUND WATER MONITORING WELL NUMBER AND APPROXIMATE LOCATION
VMW-1	VAPOR MONITORING WELL NUMBER AND APPROXIMATE LOCATION
DPE-1	DUAL PHASE EXTRACTION WELL NUMBER AND APPROXIMATE LOCATION
	"SITE" AS DEFINED BY ANALYTICAL RESULTS AND WAC 173-340-200

PRIME CLEANERS
18001 Bothell Everett Highway
Bothell, Washington

SITE AND EXPLORATION PLAN

DATE: JUNE 2014 Job No. 1001.22

Zipper Geo Associates, LLC
19023 36th Ave. W.,Suite D
Lynnwood, WA

FIGURE 3
SHT.1 of 1

SITE AND EXPLORATION PLAN LEGEND :

B1	DIRECT PUSH SOIL EXPLORATION NUMBER AND APPROXIMATE LOCATION
SP-1	DIRECT PUSH SOIL EXPLORATION NUMBER AND APPROXIMATE LOCATION (ENVIRONMENTAL ASSOCIATES - 1999)
MW-1	GROUND WATER MONITORING WELL NUMBER AND APPROXIMATE LOCATION
MW-4	GROUND WATER MONITORING WELL NUMBER AND APPROXIMATE LOCATION (ADAPT ENGINEERING - 2007)
B-1	BORING NUMBER AND APPROXIMATE LOCATION (ENVIRONMENTAL ASSOCIATES - 1999)
(12') 34 µg/kg	DEPTH OF EXPLORATION SAMPLING, AND MEASURED TCE CONTAMINATION
	APPROXIMATE EXTENT OF TCE ABOVE MTCA METHOD A CLEANUP LEVELS

MW-1
B-2
MONEY TREE
PRIME CLEANERS
OSAKA GRILL
FORMER DRY CLEANER
B13 (3.5') 33 µg/kg
MW-2
FORMER DRY CLEANING MACHINE
B12 (3') 38 µg/kg
B2 (3') 18 µg/kg
FORMER CONTAINMENT PAN
DRY CLEANING MACHINE
B4 (2.5') 29 µg/kg
B3 (2.5') 20 µg/kg
SP-2
B8 (3') 30 µg/kg
B10 (3') 14 µg/kg
B-1
B11
B9 (5') 27 µg/kg
B1 (3') 38 µg/kg
SP-1
FORMER BOILER ROOM
BOILER ROOM
B7 (3') 22 µg/kg
B6 (3') 15 µg/kg
B5 (3') 24 µg/kg
MW-4
MW-3

N

15 0 7.5 15
SCALE IN FEET

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ESTIMATED EXTENT OF TCE CONTAMINATION IN SOIL

DATE: JUNE 2014 Job No. 1001.22

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Lynnwood, WA

FIGURE 4A
SHT.1 of 2

SITE AND EXPLORATION PLAN LEGEND :

B1	DIRECT PUSH SOIL EXPLORATION NUMBER AND APPROXIMATE LOCATION
SP-1	DIRECT PUSH SOIL EXPLORATION NUMBER AND APPROXIMATE LOCATION (ENVIRONMENTAL ASSOCIATES - 1999)
MW-1	GROUND WATER MONITORING WELL NUMBER AND APPROXIMATE LOCATION
MW-4	GROUND WATER MONITORING WELL NUMBER AND APPROXIMATE LOCATION (ADAPT ENGINEERING - 2007)
B-1	BORING NUMBER AND APPROXIMATE LOCATION (ENVIRONMENTAL ASSOCIATES - 1999)
(12') 34 µg/kg	DEPTH OF EXPLORATION SAMPLING, AND MEASURED PCE CONTAMINATION
	APPROXIMATE EXTENT OF PCE ABOVE MTCA METHOD A CLEANUP LEVELS

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Bothell, Washington

ESTIMATED EXTENT OF PCE CONTAMINATION IN SOIL

DATE: JUNE 2014 Job No. 1001.22

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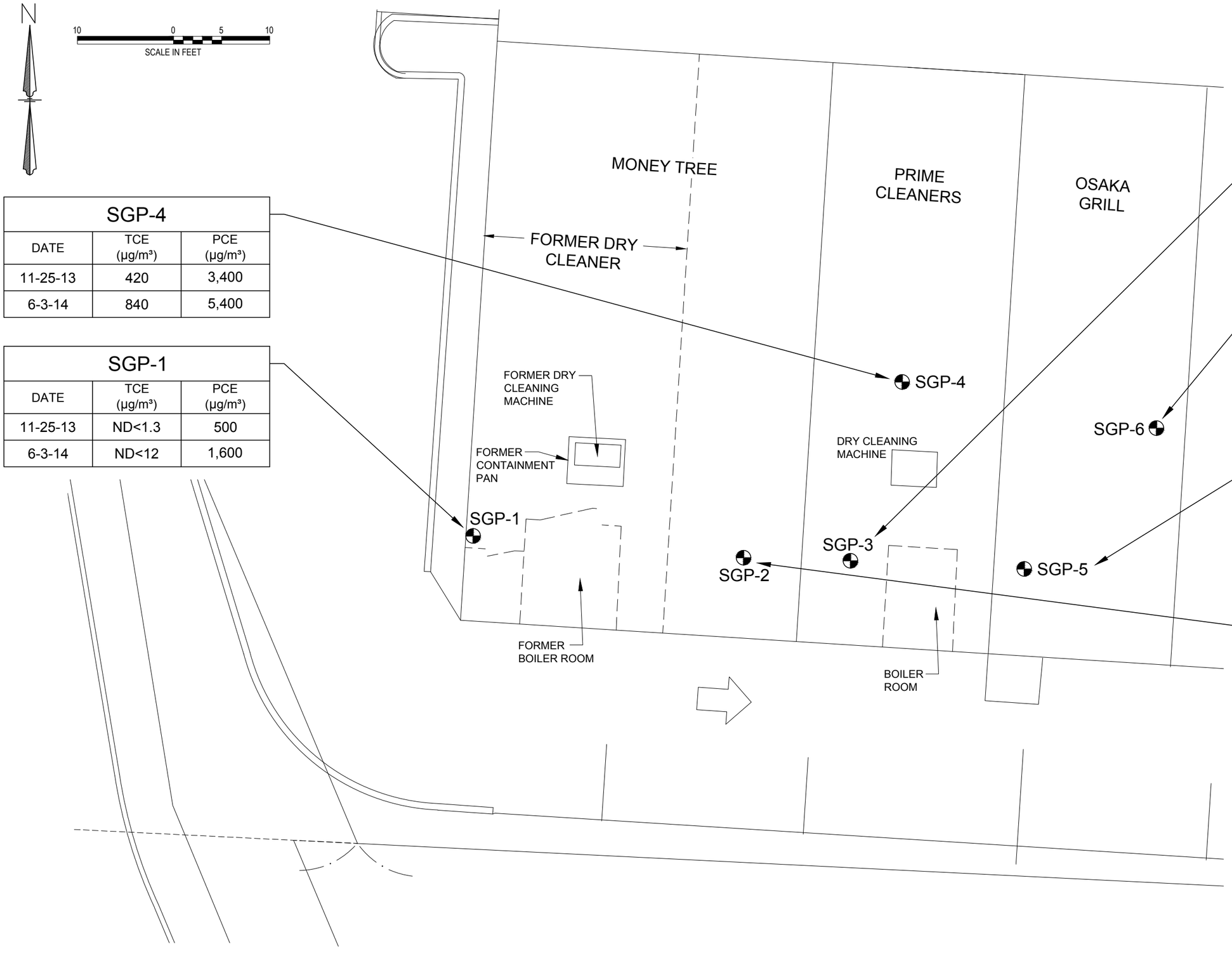
FIGURE 4B
SHT.2of2



SGP-4		
DATE	TCE (µg/m³)	PCE (µg/m³)
11-25-13	420	3,400
6-3-14	840	5,400

SGP-1		
DATE	TCE (µg/m³)	PCE (µg/m³)
11-25-13	ND<1.3	500
6-3-14	ND<12	1,600

SGP-3		
DATE	TCE (µg/m³)	PCE (µg/m³)
11-25-13	68	11,000
6-3-14	160	24,000

SGP-6		
DATE	TCE (µg/m³)	PCE (µg/m³)
11-25-13	ND<630	ND<790
6-3-14	ND<3.2E4	ND<4.0E4

SGP-5		
DATE	TCE (µg/m³)	PCE (µg/m³)
11-25-13	220	5,400
6-3-14	360	8,700

SGP-2		
DATE	TCE (µg/m³)	PCE (µg/m³)
11-25-13	440	7,700
6-3-14	470	9,900

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Bothell, Washington

SOIL GAS - SITE AND EXPLORATION PLAN

DATE: JUNE 2014 Job No. 1001.22

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Lynnwood, WA

FIGURE 5
SHT.1 of 1

MW-1 Terracon (2009)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
7.5	ND<1.1	ND<1.1
17.5	ND<1.1	ND<1.1
25	ND<1.1	2.1
37	ND<1.3	ND<1.3
41	ND<1.2	ND<1.2

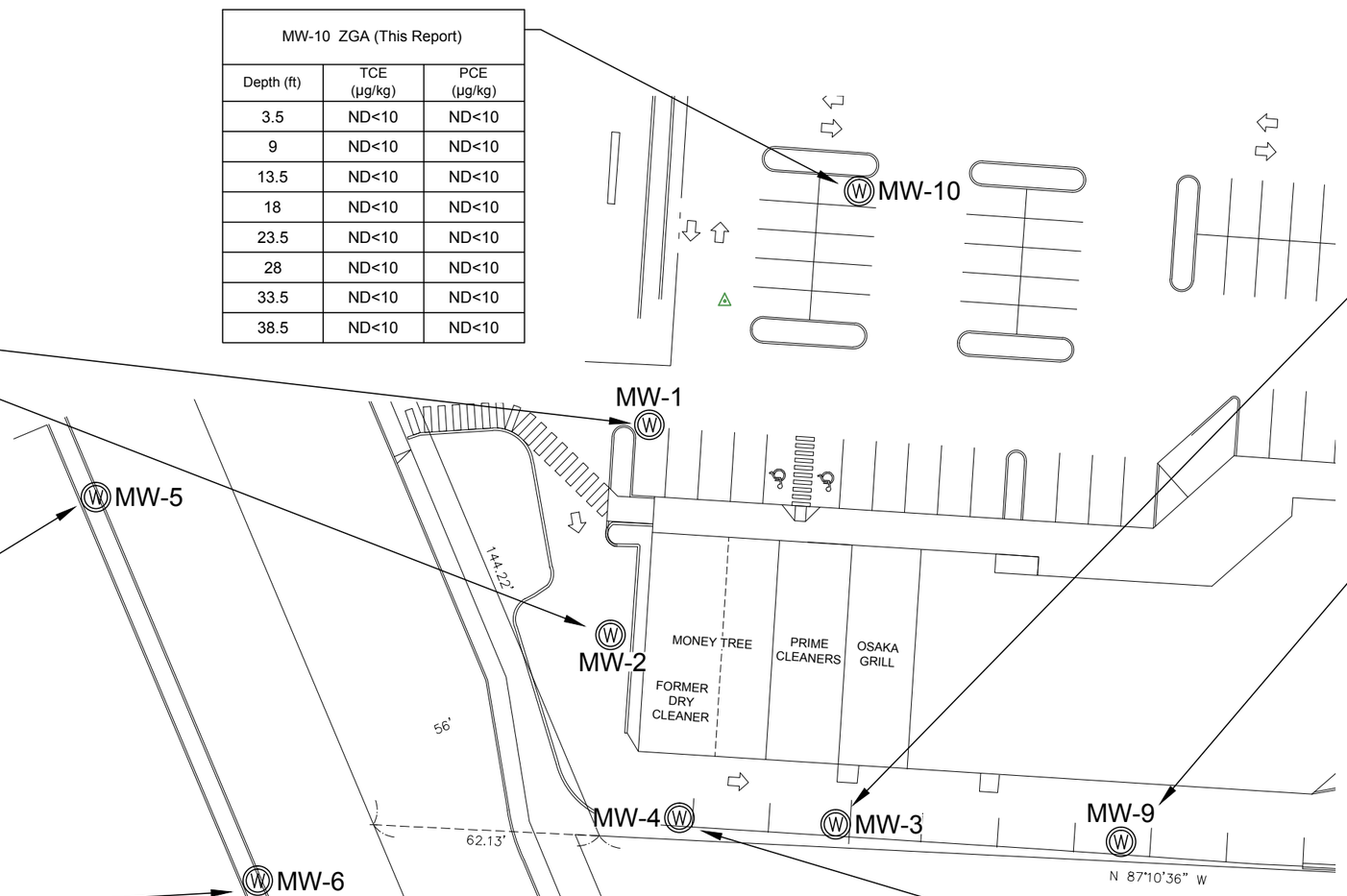
MW-2 Terracon (2009)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
7.5	ND<1.1	ND<1.1
18	ND<1.0	ND<1.0
23	ND<1.1	ND<1.1
33	ND<1.0	ND<1.0
44	ND<1.1	ND<1.1

MW-5 Adapt Engineering (2007)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
12.5	ND<1.2	ND<1.2
20	ND<1.2	ND<1.2
25	ND<1.1	ND<1.1
30	ND<1.2	ND<1.2
35	ND<1.2	ND<1.2

MW-6 Terracon (2011)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
15	ND<1.2	ND<1.2
20	ND<1.0	ND<1.0
26	ND<1.1	ND<1.1
30	ND<1.1	ND<1.1
35	ND<1.1	1.3

MW-7 Terracon (2011)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
16	ND<1.2	ND<1.2
20	ND<1.1	ND<1.1
26	ND<1.1	ND<1.1
32.5	ND<1.1	ND<1.1
40	ND<1.2	13

MW-10 ZGA (This Report)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
3.5	ND<10	ND<10
9	ND<10	ND<10
13.5	ND<10	ND<10
18	ND<10	ND<10
23.5	ND<10	ND<10
28	ND<10	ND<10
33.5	ND<10	ND<10
38.5	ND<10	ND<10



MW-3 Terracon (2009)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
7.5	ND<1.2	4.5
13	ND<1.1	3.9
27.5	ND<1.1	9.3
31	ND<1.1	2.3
37	ND<1.1	ND<1.1

MW-9 ZGA (This Report)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
3	ND<10	ND<10
8	ND<10	ND<10
13	ND<10	ND<10
18	ND<10	ND<10
23	ND<10	ND<10
28.5	ND<10	ND<10
34	ND<10	ND<10
38.5	ND<10	ND<10

MW-4 Adapt Engineering (2007)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
30	ND<30	63

MW-8 Terracon (2011)		
Depth (ft)	TCE (µg/kg)	PCE (µg/kg)
10	ND<1.2	1.8
15	ND<1.0	ND<1.0
20	ND<1.2	8.9
25	ND<1.1	7.3
30	ND<1.2	45
35	ND<1.2	16
40	ND<1.1	25
45	ND<1.1	12
50	ND<1.1	16
55	ND<1.1	ND<1.0
60	ND<1.1	8.7
70	ND<1.2	7

40 0 20 40
SCALE IN FEET

N

PRIME CLEANERS
18001 Bothell Everett Highway
Bothell, Washington

SOIL QUALITY

DATE: JUNE 2014 Job No. 1001.22

Zipper Geo Associates, LLC
19023 36th Ave. W.,Suite D
Lynnwood, WA

FIGURE 6
SHT.1 of 1

N

EZELL'S

MONEY TREE

FORMER DRY CLEANER

PRIME CLEANERS

OSAKA GRILL

440.25'

144.22'

56'

62.13'

50'

N 87°10'36" W

(272.3 ft)

(272.2 ft)

(272.1 ft)

(272.0 ft)

(271.9 ft)

(272.1 ft)

(272.2 ft)

(272.3 ft)

(272.4 ft)

(272.5 ft)

(272.6 ft)

MW-10
(272.30')

MW-1
(272.36')

MW-5
(272.36')

MW-2
(272.19')

MW-4
(272.09')

MW-3
(272.08')

MW-9
(272.68')

MW-6
(272.40')

MW-8
(271.87')

MW-7
(271.87')

MW-5	
TCE (µg/L)	PCE (µg/L)
ND<2	ND<2

MW-2	
TCE (µg/L)	PCE (µg/L)
ND<2	ND<2

MW-4	
TCE (µg/L)	PCE (µg/L)
ND<2	**44**

MW-6	
TCE (µg/L)	PCE (µg/L)
ND<2	**4.7**

MW-7	
TCE (µg/L)	PCE (µg/L)
ND<2	**8.0**

MW-10	
TCE (µg/L)	PCE (µg/L)
ND<2	ND<2

MW-1	
TCE (µg/L)	PCE (µg/L)
ND<2	ND<2

MW-3	
TCE (µg/L)	PCE (µg/L)
ND<2	**5.6**

MW-9	
TCE (µg/L)	PCE (µg/L)
ND<2	ND<2

MW-8	
TCE (µg/L)	PCE (µg/L)
ND<2	13

APPROXIMATE CONTOUR OF 5uG/L PCE CONCENTRATION

GROUNDWATER CONTOUR MAP LEGEND :

MW-1 (272.36') GROUND WATER MONITORING WELL NUMBER, APPROXIMATE LOCATION, AND GROUND WATER ELEVATION (MEASURED JUNE 12, 2014)

35 0 17.5 35
SCALE IN FEET

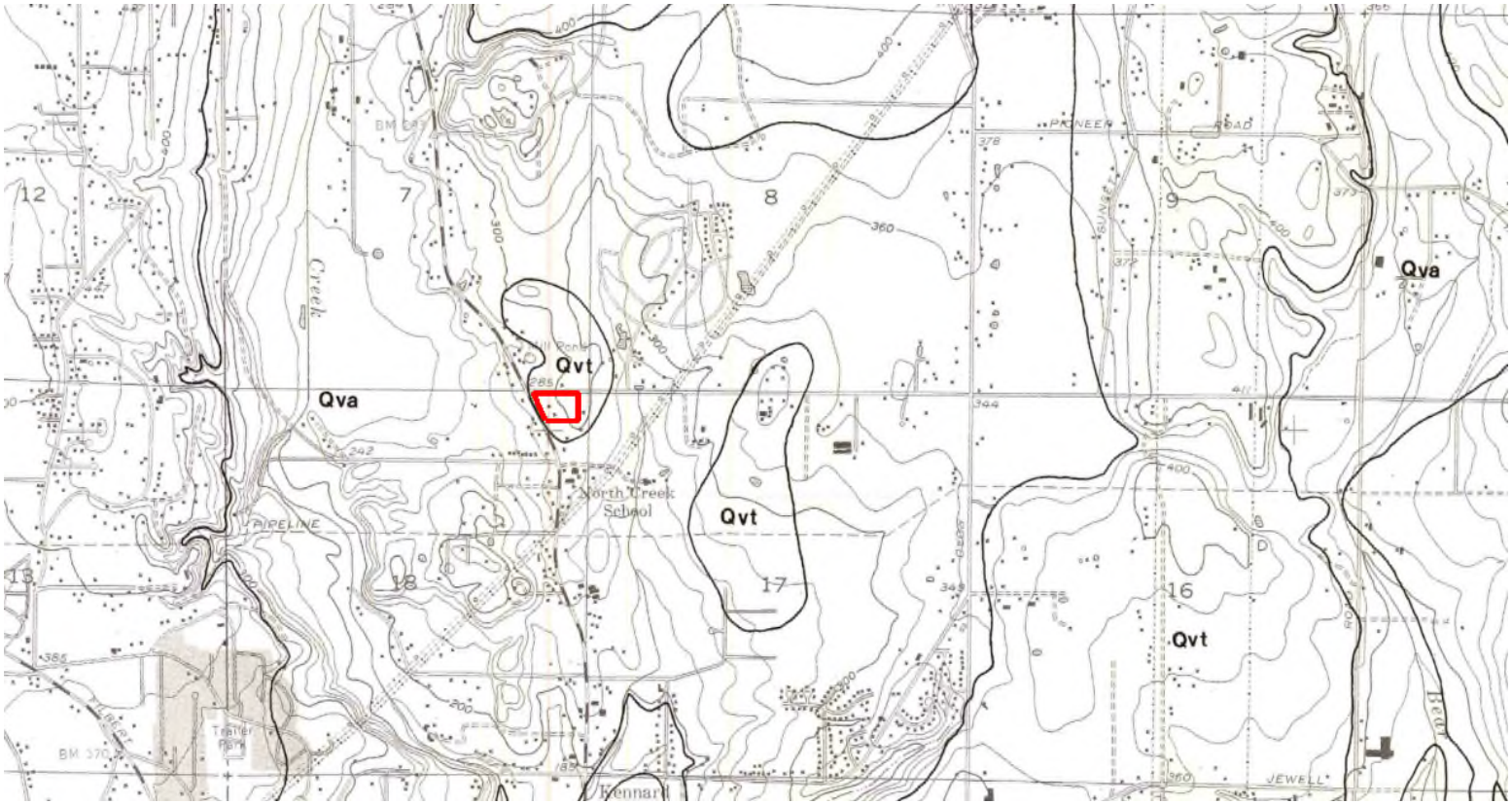
PRIME CLEANERS
18001 Bothell Everett Highway
Bothell, Washington

GROUNDWATER QUALITY

DATE: JUNE 2014 Job No. 1001.22

Zipper Geo Associates, LLC
19023 36th Ave. W.,Suite D
Lynnwood, WA

FIGURE 7
SHT.1 of 1



KEY

Qvt: Vashon glacial till
Qva: Vashon advance outwash
Qtb: Transitional beds

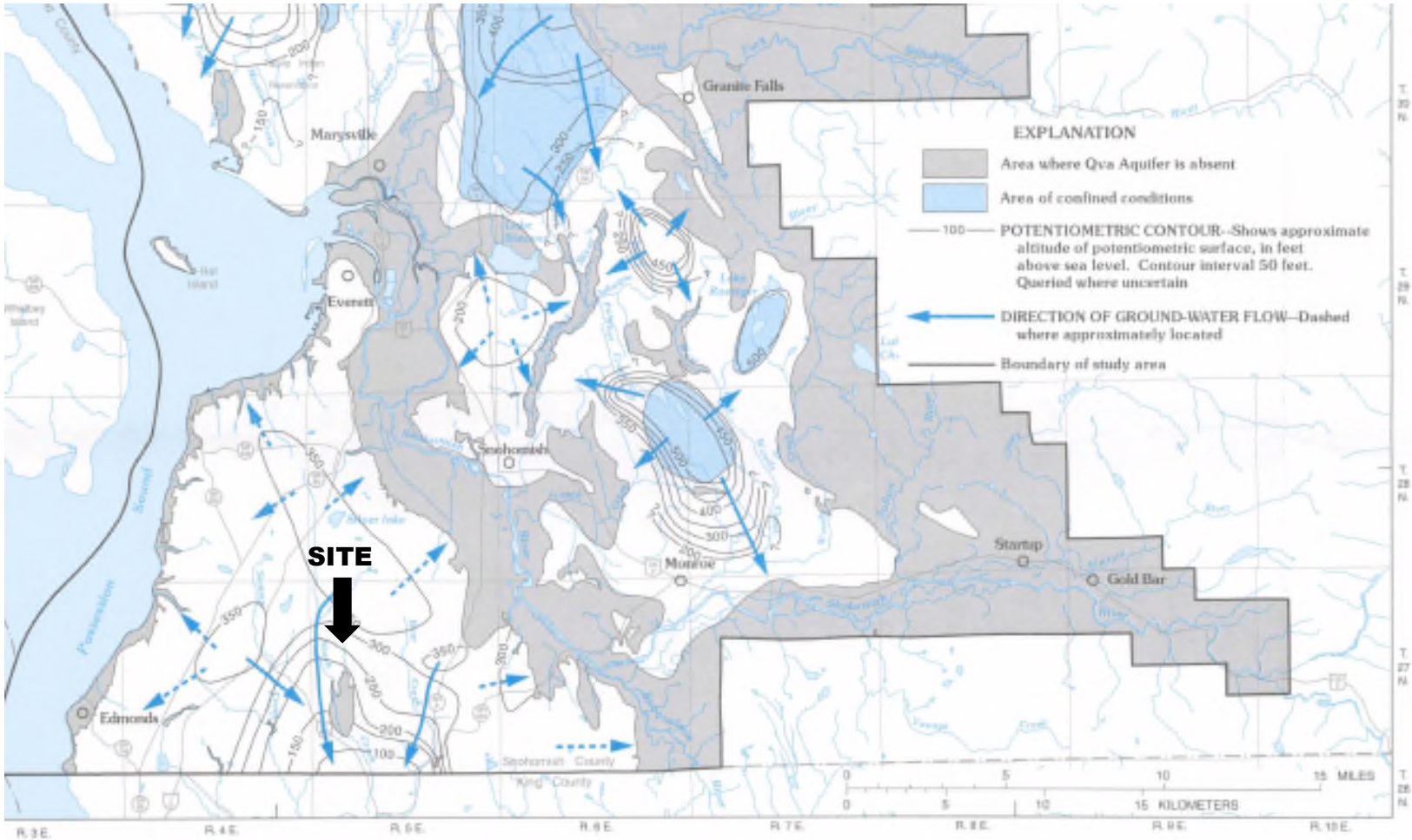
Source: Minard, 1985

Project No.	1001.22	Project Manager: JME	
Drawn By:	JME	Scale: As Shown	
Date:	June, 2014	File Name:	
Client: Mill Creek Crossing LLC			

Zipper Geo Associates, LLC
Geotechnical and Environmental Consulting
19023 36th Avenue West, Suite D
Lynnwood, WA 98036
P 425.582.9928 zippergeo.com

Figure 8

Geologic Map



Source: Thomas, Wilkinson, and Embrey (1997).

Project No.	1001.22	Project Manager: JME	
Drawn By:	JME	Scale: As Shown	
Date:	June, 2014	File Name:	
Client: Mill Creek Crossing LLC			

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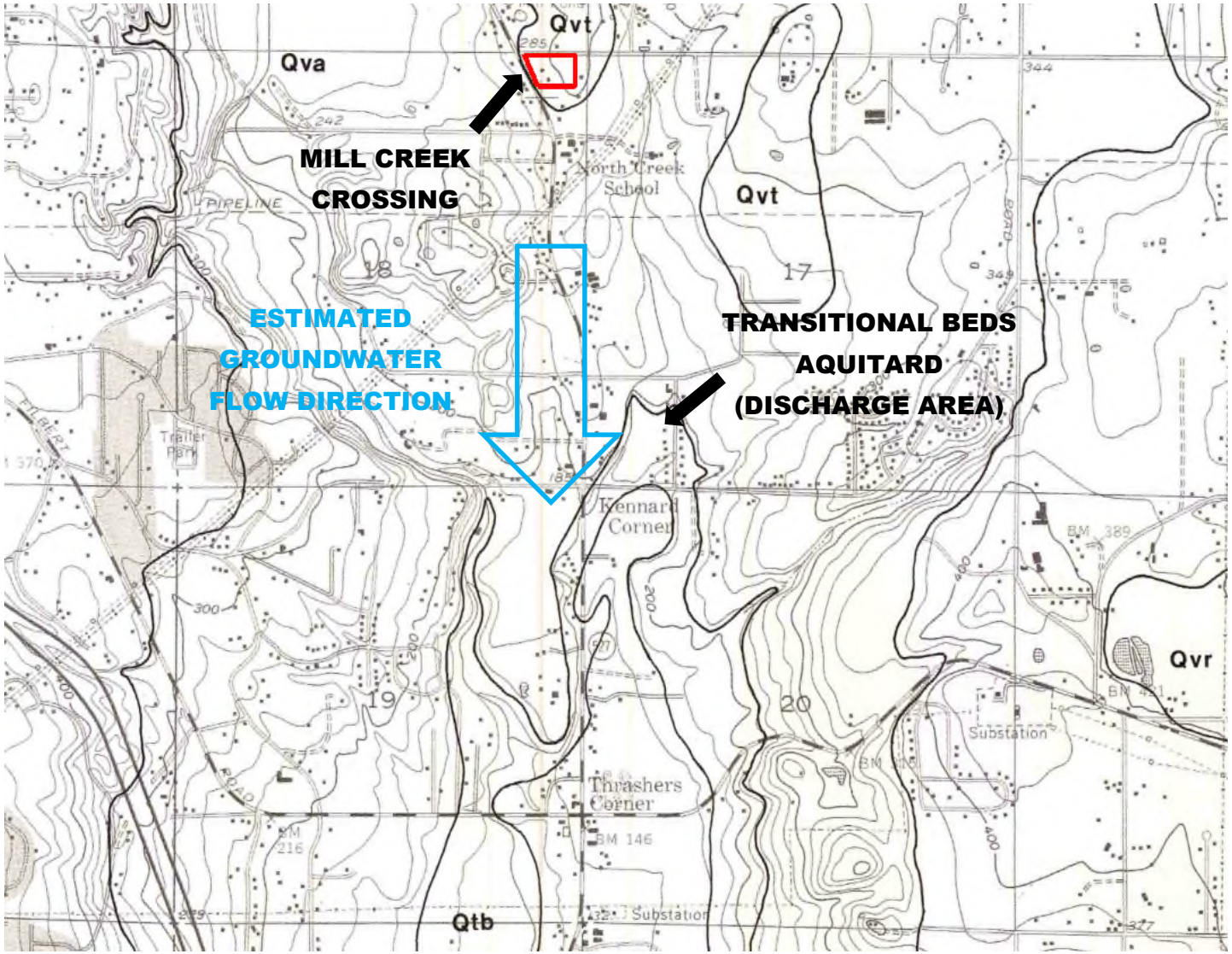
Lynnwood, WA 98036
P 425.582.9928 zippergeo.com

Figure 9

Regional Groundwater Contour Map (Vashon Advance Outwash)



KEY

Qvt: Vashon glacial till
Qva: Vashon advance outwash
Qtb: Transitional beds

Source: Minard, 1985

Project No.	1001.22	Project Manager: JME	
Drawn By:	JME	Scale: As Shown	
Date:	June, 2014	File Name:	
Client: Mill Creek Crossing LLC			

Zipper Geo Associates, LLC
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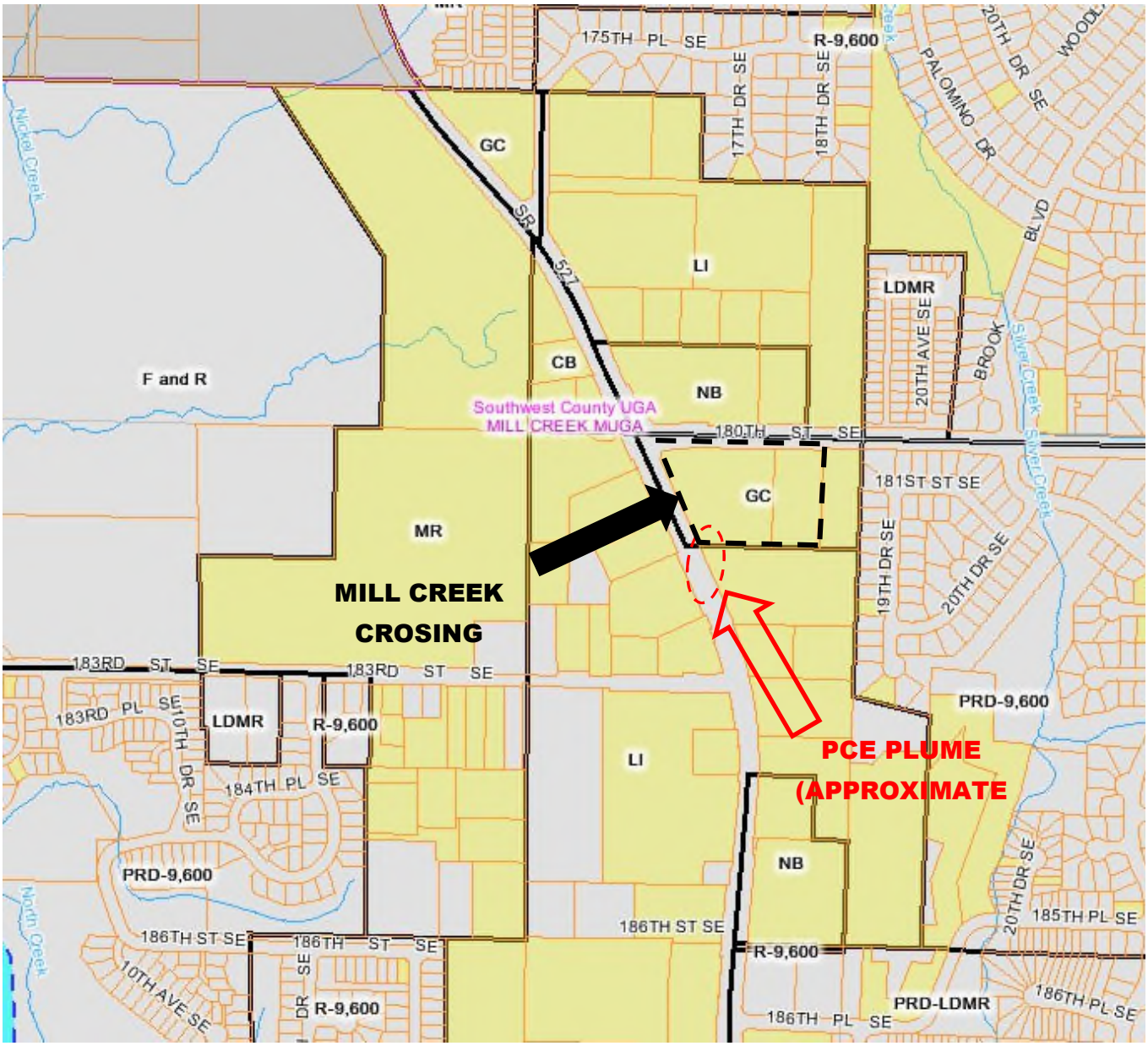
Lynnwood, WA 98036
P 425.582.9928 zippergeo.com

Figure 10

Conceptual Hydrogeologic Map

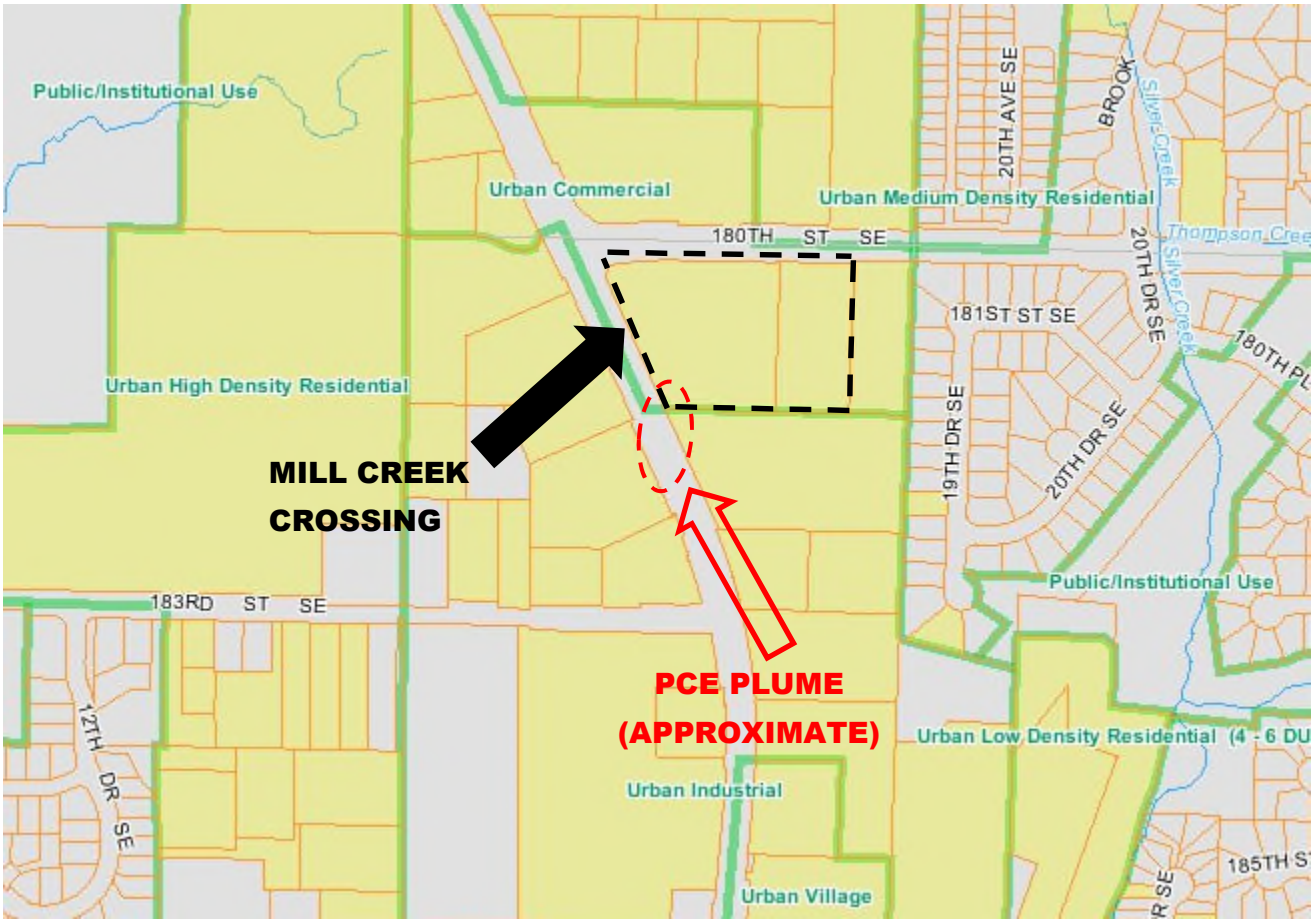


Key

GC: General Commercial
NB: Neighborhood Business
LI: Light Industrial
LDMR: Low Density Multiple Residential
PRD-9,600: Planned Residential Development 9,600 sq. ft.
R-9,600: Residential 9,600 sq. ft.
MR: Multiple Residential
F and R: Forestry and Recreation

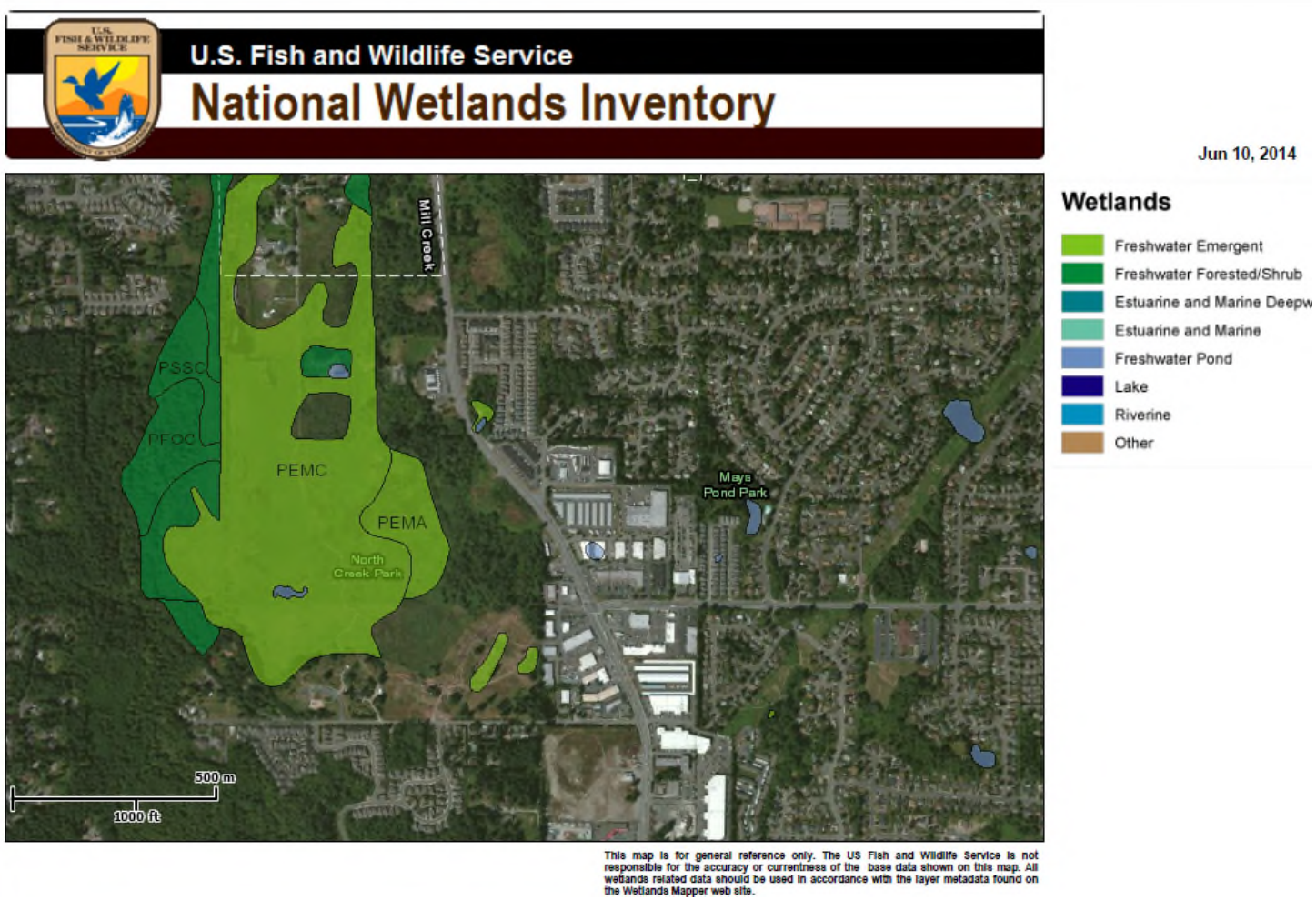
Source: Snohomish County Permit, Planning, and Zoning Map (http://gis.snoco.org/maps/permits/viewer.htm, accessed June, 2014. 2012)

Project No. 1001.24	Project Manager: JME	**Zipper Geo Associates, LLC** **Geotechnical and Environmental Consulting** 19023 36th Avenue West, Suite D Lynnwood, WA 98036 P 425.582.9928 zippergeo.com	**Figure 11** Zoning Map
Drawn By: JME	Scale: As Shown		
Date: May, 2012	File Name:		
Client: Mill Creek Crossing LLC			



Source: Snohomish County Permit, Planning, and Zoning Map (http://gis.snoco.org/maps/permits/viewer.htm, accessed June, 2014)

Project No. 1001.22	Project Manager: JME	**Zipper Geo Associates, LLC** **Geotechnical and Environmental Consulting** 19023 36th Avenue West, Suite D Lynnwood, WA 98036 P 425.582.9928 zippergeo.com	**Figure 12** Comprehensive Plan
Drawn By: JME	Scale: As Shown		
Date: June, 2014,	File Name:		
Client: Mill Creek Crossing LLC			



Source: National Wetlands Inventory (Accessed June 10, 2014)

Project No.	1001.22	Project Manager: JME	
Drawn By:	JME	Scale: As Shown	
Date:	June 2014	File Name:	
Client: Mill Creek Crossing LLC			

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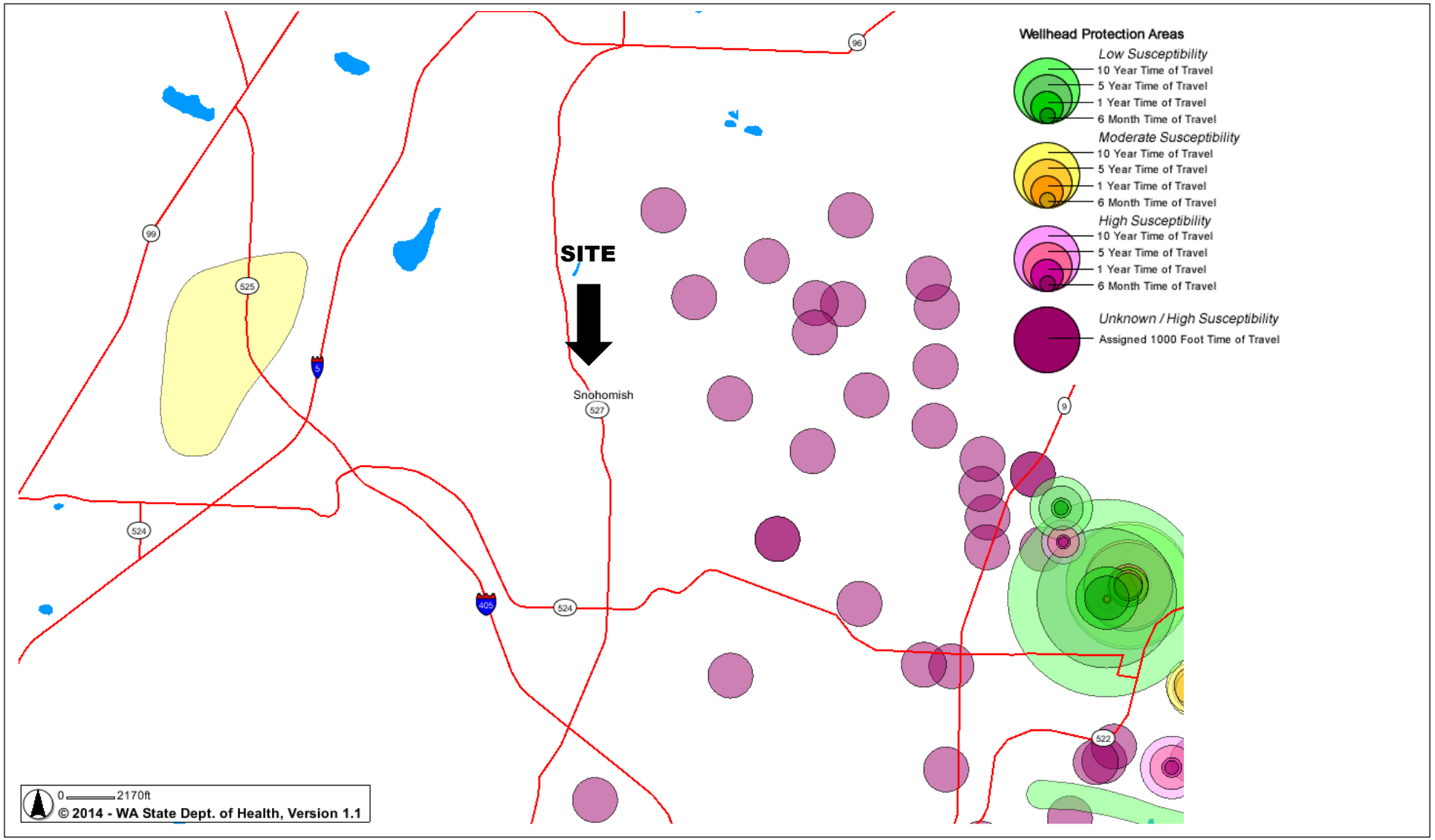
Lynnwood, WA 98036
P 425.582.9928 zippergeo.com

Figure 13
Wetlands Map



Source: Washington State Department of Health, Interactive GIS Mapping Tool (Accessed June, 2014)

Project No.	1001.22	Project Manager: JME	
Drawn By:	JME	Scale: As Shown	
Date:	June, 2014	File Name:	
Client: Mill Creek Crossing LLC			

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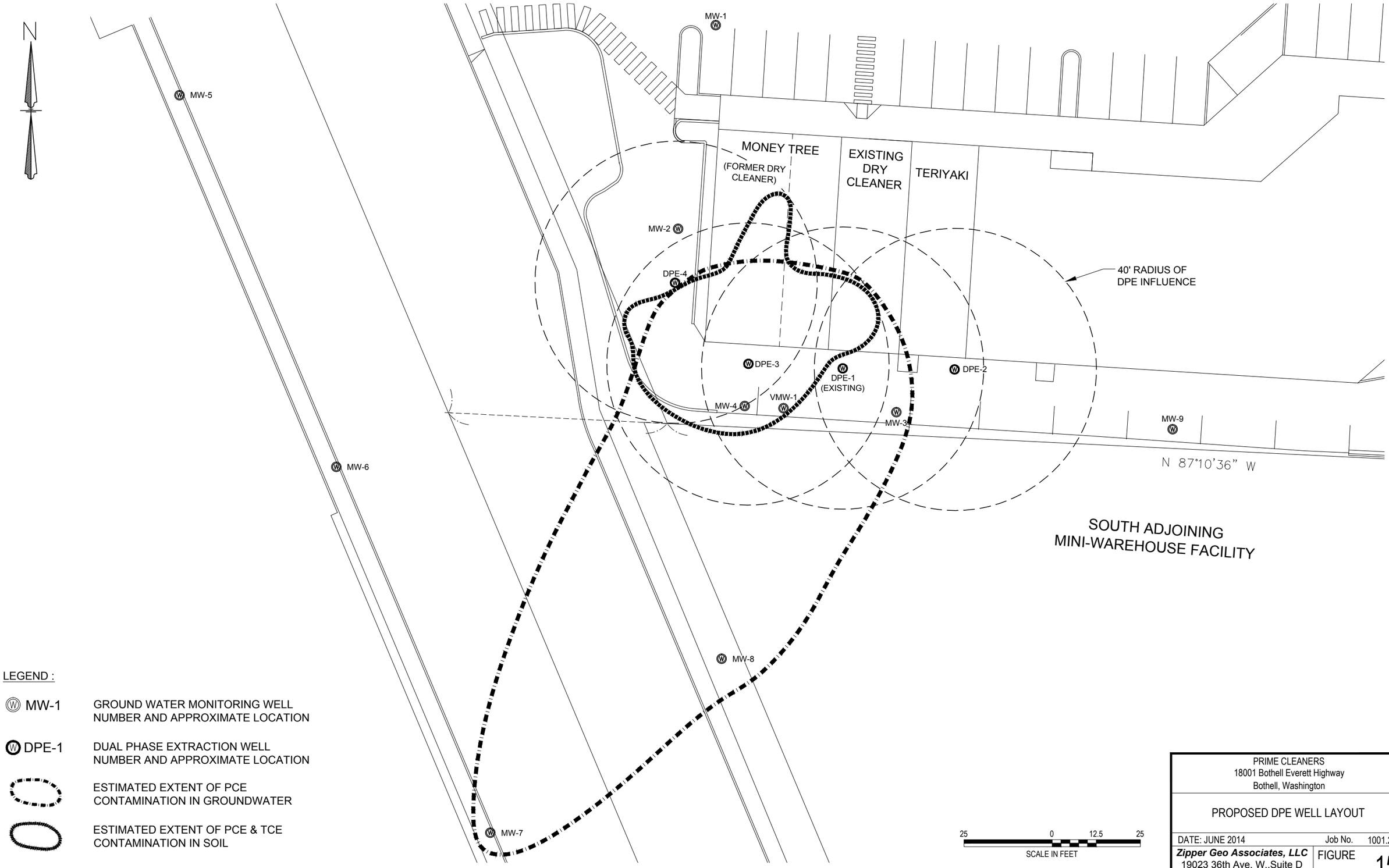
Lynnwood, WA 98036
P 425.582.9928 zippergeo.com

Figure 14
Wellhead Protection Map



PRIME CLEANERS
18001 Bothell Everett Highway
Bothell, Washington

PROPOSED DPE WELL LAYOUT

DATE: JUNE 2014 Job No. 1001.22

Zipper Geo Associates, LLC
19023 36th Ave. W.,Suite D
Lynnwood, WA

FIGURE 15
SHT. 1 of 1

APPENDIX B

LOG OF WELL NO. MW1 (Well Tag #BBK-039)

CLIENT: **The Echelbarger Company**

SITE: **Bothell, Washington**

PROJECT: **Marketplace Retail Center**

BOREHOLE DIA.: **4 in**
WELL DIA.: **2 in**
GROUND SURFACE ELEV.: **220.92'**

DEPTH, ft.	DESCRIPTION	WELL DETAIL	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT BLOWS	TESTS WATER CONTENT, %	TESTS DRY UNIT WT, pcf
0.5	~4 inches asphalt	0							
	SILTY SAND with gravel and cobbles, brown, damp, medium dense to very dense								
			SM	MW1-1	SS	6	33		
11		0							
	SILTY SAND with gravel and cobbles, brown, damp, grading to very dense								
17.5		0							
18	Grading moist	0	SM	MW1-2	SS	6	95		
	SILTY SAND with gravel and cobbles, brown, damp, very dense								
	▽								
24		0							
	SAND WITH SILT and a trace gravel, brown, moist, very dense		SM	MW1-3	SS	6	87		

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 23.0	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West, Suite #100
Mountlake Terrace, WA 98043
V: (425) 771-3304 F: (425) 771-3549

WELL STARTED			5-28-09
WELL COMPLETED			5-28-09
RIG	HS	CO.	Env. Drilling
LOGGED	TAH	JOB #	81097016

LOG OF WELL NO. MW1 (Well Tag #BBK-039)

CLIENT **The Echelbarger Company**

SITE **Bothell, Washington**

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT BLOWS	TESTS WATER CONTENT, %	TESTS DRY UNIT WT, pcf
37	**SAND WITH SILT** and a trace gravel, brown, moist, very dense	0	35							
41	**GRAVELLY SAND**, brown, wet, very dense	0	40	SM	MW1-4	SS	6	38		
				SM	MW1-5	SS	6	105		

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 23.0	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West, Suite #100
Mountlake Terrace, WA 98043
V: (425) 771-3304 F: (425) 771-3549

WELL STARTED			5-28-09
WELL COMPLETED			5-28-09
RIG	HS	CO.	Env. Drilling
LOGGED	TAH	JOB #	81097016

LOG OF WELL NO. MW2 (Well Tag #BBK-040)

CLIENT: **The Echelbarger Company**

SITE: **Bothell, Washington**

PROJECT: **Marketplace Retail Center**

BOREHOLE DIA.: **4 in**
WELL DIA.: **2 in**
GROUND SURFACE ELEV.: **221.05'**

DEPTH, ft.	DESCRIPTION	WELL DETAIL	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT BLOWS	TESTS WATER CONTENT, %	TESTS DRY UNIT WT, pcf
0.5	~4 inches asphalt								
	SILTY SAND with gravel and cobbles, brown, damp, medium dense to very dense		SM	MW2-6	SS	6	35		
11									
12.5	**SILTY SAND** with gravel and cobbles, brown, damp, grading to very dense Grading moist		SM	MW2-7	SS	6	96		
	SILTY SAND with gravel and cobbles, brown, damp, very dense								
22.5	**SAND WITH SILT** and a trace gravel, brown, moist, very dense ▽		SM	MW2-8	SS	6	97		
27.5	**GRAVELLY SAND**, brown, wet, very dense								

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 23.5	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West, Suite #100
Mountlake Terrace, WA 98043
V: (425) 771-3304 F: (425) 771-3549

WELL STARTED			5-28-09
WELL COMPLETED			5-28-09
RIG	HS	CO.	Env. Drilling
LOGGED	TAH	JOB #	81097016

LOG OF WELL NO. MW2 (Well Tag #BBK-040)

CLIENT **The Echelbarger Company**

SITE **Bothell, Washington**

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT BLOWS	TESTS WATER CONTENT, %	TESTS DRY UNIT WT, pcf
	GRAVELLY SAND, brown, wet, very dense			SM	MW2-10	SS	6	91		
			35							
			40							
				SM	MW2-9	SS	6	100 (~3' Hve.)		
	46	0	45							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 23.5	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West, Suite #100
Mountlake Terrace, WA 98043
V: (425) 771-3304 F: (425) 771-3549

WELL STARTED			5-28-09
WELL COMPLETED			5-28-09
RIG	HS	CO.	Env. Drilling
LOGGED	TAH	JOB #	81097016

LOG OF WELL NO. MW3 (Well Tag #BBK-041)

CLIENT: **The Echelbarger Company**

SITE: **Bothell, Washington**

PROJECT: **Marketplace Retail Center**

BOREHOLE DIA.: **4 in**
WELL DIA.: **2 in**
GROUND SURFACE ELEV.: **221.57'**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT BLOWS	TESTS WATER CONTENT, %	TESTS DRY UNIT WT, pcf
	0.5 ~4 inches asphalt	0								
	SILTY SAND with gravel and cobbles, brown, damp, medium dense to very dense		5							
	8	0		SM	MW3-11	SS	6	20		
	8.5 Grading moist	0								
	SILTY SAND with gravel and cobbles, brown, damp, grading to very dense		10	SM	MW3-12	SS	6	36		
			15							
			20							
	▽		25							
	27	0		SM	MW3-13	SS	6	97		
	SAND WITH SILT and a trace gravel, brown, moist, very dense		30	SM	MW3-14	SS	6	61		

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 24.5	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West, Suite #100
Mountlake Terrace, WA 98043
V: (425) 771-3304 F: (425) 771-3549

WELL STARTED			5-28-09
WELL COMPLETED			5-28-09
RIG	HS	CO.	Env. Drilling
LOGGED	TAH	JOB #	81097016

LOG OF WELL NO. MW3 (Well Tag #BBK-041)

CLIENT **The Echelbarger Company**

SITE **Bothell, Washington**

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT BLOWS	TESTS WATER CONTENT, %	TESTS DRY UNIT WT, pcf
	SAND WITH SILT and a trace gravel, brown, moist, very dense		35							
37		0								
38	**GRAVELLY SAND**, brown, wet, very dense	0		SM	MW3-15	SS	6	100 (~2' Hve.)		

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 24.5	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West, Suite #100
Mountlake Terrace, WA 98043
V: (425) 771-3304 F: (425) 771-3549

WELL STARTED			5-28-09
WELL COMPLETED			5-28-09
RIG	HS	CO.	Env. Drilling
LOGGED	TAH	JOB #	81097016

LOG OF BORING NO. MW-5

CLIENT **Mill Creek Crossing, LLC**

SITE **SR-527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf
0.4	5" Concrete									
	SAND, with silt and gravel, brown, medium dense to dense, moist (FILL)									
5			5							
	SILTY FINE SAND, with gravel, gray-brown, very dense, moist									
			10	SM	S-1A	SS	0	50/3"		
				SM	S-1	SS	16	120		
15			15							
	SILTY GRAVELLY SAND, trace cobbles, gray-brown, very dense, moist, slight iron oxide staining			SM	S-2A	SS	0	75/2"		
	grades to wet to saturated at 18 feet ▽			SM	S-2B	SS	3	75/6"		
20			20							

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 18	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	7-12-10		
BORING COMPLETED	7-13-10		
RIG	Mobile B-61	CO.	Env. Drilling
LOGGED	JPG	JOB #	81097016A

LOG OF BORING NO. MW-5

CLIENT **Mill Creek Crossing, LLC**

SITE **SR-527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf
	SILTY GRAVELLY SAND, gray-brown, very dense, wet to saturated, slight iron oxide staining			SM	S-2	SS	9	75/5"		
	23.5									
	GRAVELLY SAND, with silt, trace cobbles, gray, very dense, wet to saturated		25	SP	S-3	SS	5	75/6"		
				SM						
	29									
	SILTY SAND, trace gravel, gray, very dense, wet to saturated		30	SM	S-4	SS	9	63/6"		
			35	SM	S-5	SS	7	78/6"		
	36									
	Groundwater observed at approximately 18 feet while drilling. Approximately 1.5 feet of heave encountered while setting monitoring well. Well Tag # BCB 677									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 18	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	7-12-10		
BORING COMPLETED	7-13-10		
RIG	Mobile B-61	CO.	Env. Drilling
LOGGED	JPG	JOB #	81097016A

LOG OF BORING NO. MW-6

CLIENT **Mill Creek Crossing, LLC**

SITE **SR-527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf
	0.4 5" Concrete **SILTY SAND**, with gravel, brown, medium dense to dense, moist (FILL)		5							
	5 **SANDY GRAVEL**, with silt, gray-brown, very dense, moist		10							
	13 **FINE SANDY SILT**, gray, hard, moist		15	ML	S-1	SS	13	50/5"		
	15.5 **SILTY GRAVELLY SAND**, trace cobbles, gray-brown, very dense, moist, slight iron oxide mottling Cobble/boulder at 18 feet 19.5			SM						
	Continued Next Page		20							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 18	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	7-13-10		
BORING COMPLETED	7-13-10		
RIG	Mobile B-61	CO.	Env. Drilling
LOGGED	JPG	JOB #	81097016A

LOG OF BORING NO. MW-6

CLIENT **Mill Creek Crossing, LLC**

SITE **SR-527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf
	FINE SANDY SILT, gray, hard, wet to saturated			ML	S-2	SS	10	77/6"		
	23									
	SILTY GRAVELLY SAND, with cobbles, gray, very dense, wet to saturated		25	SM	S-3A	SS	0	80/3"		
				SM	S-3	SS	6	77/6"		
			30	SM	S-4	SS	6	80/6"		
	33									
	GRAVELLY SAND, with silt, gray, very dense, wet to saturated									
	35.5		35	SP SM	S-5	SS	6	75/3"		
	Groundwater observed at approximately 18 feet while drilling. Approximately 2.5 feet of heave encountered while setting monitoring well. Well Tag # BCB 678									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 18	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	7-13-10		
BORING COMPLETED	7-13-10		
RIG	Mobile B-61	CO.	Env. Drilling
LOGGED	JPG	JOB #	81097016A

LOG OF BORING NO. MW-7

CLIENT **Mill Creek Crossing, LLC**

SITE **SR-527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf
	0.5 6" Concrete									
	SILTY SAND, with gravel, trace cobbles and asphalt, brown, medium dense to dense, moist (FILL)									
	4.5 **GRAVELLY SAND**, with silt, gray-brown, very dense, moist		5							
			10							
			15	SP SM	S-1A	SS	3	80/6"		
				SP SM SM	S-1	SS	15	92		
	16.5 **SILTY SAND**, gray-brown, very dense, wet to saturated, slight iron oxide staining. ▽									
	19 **SILTY SAND**, with gravel, gray, very dense, wet to saturated		20							

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 17.5	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	7-13-10		
BORING COMPLETED	7-13-10		
RIG	Mobile B-61	CO.	Env. Drilling
LOGGED	JPG	JOB #	81097016A

LOG OF BORING NO. MW-7

CLIENT **Mill Creek Crossing, LLC**

SITE **SR-527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf
	SILTY SAND, with gravel, gray, very dense, wet to saturated			SM	S-2	SS	5	75/5"		
			25	SM	S-3A	SS	2	80/3"		
				SM	S-3	SS	6	85/6"		
	29									
	SANDY GRAVEL, with silt and cobbles, gray, very dense, wet to saturated		30	GP GM	S-4A	SS	0	75/1"		
				GP GM	S-4B	SS	3	70/6"		
				GP GM	S-4	SS	10	100/6"		
			35							
				GP GM	S-5A	SS	2	80/4"		
	39									
	SAND, with silt, gray, very dense, wet to saturated		40							

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 17.5	WD	▼
WL	▼		▼
WL			

Terracon
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Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	7-13-10		
BORING COMPLETED	7-13-10		
RIG	Mobile B-61	CO.	Env. Drilling
LOGGED	JPG	JOB #	81097016A

LOG OF BORING NO. MW-7

CLIENT **Mill Creek Crossing, LLC**

SITE **SR-527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf
	41			SP	S-5	SS	14	50/6"		
	41.5 **SILT**, with sand, gray, hard, wet to saturated			SM ML						
	Groundwater observed at approximately 17.5 feet while drilling. Well Tag # BCB 679									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 17.5	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	7-13-10		
BORING COMPLETED	7-13-10		
RIG	Mobile B-61	CO.	Env. Drilling
LOGGED	JPG	JOB #	81097016A

LOG OF BORING NO. MW-8

CLIENT **Mill Creek Crossing, LLC**

SITE **SR 527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

Borehole Diameter: 9 in
Well Diameter: 2 in

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS UNCONFINED STRENGTH, psf	TESTS FIELD VAPOR TEST (PPM)*	Time Sampled
	Grass over **SILTY GRAVELLY SAND**, trace cobbles, brownish gray, medium dense, moist to wet (Probable Fill)		5									
	7.5 **SILTY SAND**, brownish tan, dense, wet (Glacial Outwash)		10	SM	S1	SS	16	42				0737
			15	SM	S2	SS	6	50/5"				0750
	20 ▽ **Continued Next Page**		20									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 20	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	4-26-11		
BORING COMPLETED	4-26-11		
RIG	Track	CO.	Holocene
LOGGED	CDF	JOB #	81097016A

LOG OF BORING NO. MW-8

CLIENT **Mill Creek Crossing, LLC**

SITE **SR 527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS UNCONFINED STRENGTH, psf	TESTS FIELD VAPOR TEST (PPM)*	Time Sampled
	SILTY SAND, trace gravel, tan, very dense, saturated (Glacial Outwash)			SM	S3	SS	16	59				0757
			25	SM	S4	SS	4	50/3"				0802
	28 **SAND**, with silt and gravel, brown, very dense, saturated (Glacial Outwash)		30	SW	S5	SS	8	50/4"				0815
	Grades to trace silt and dense		35	SW	S6	SS	15	42				0830
	40		40									

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 20	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	4-26-11		
BORING COMPLETED	4-26-11		
RIG	Track	CO.	Holocene
LOGGED	CDF	JOB #	81097016A

LOG OF BORING NO. MW-8

CLIENT **Mill Creek Crossing, LLC**

SITE **SR 527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS UNCONFINED STRENGTH, psf	TESTS FIELD VAPOR TEST (PPM)*	Time Sampled
	SAND, with gravel, trace silt and cobbles, brown, very dense, saturated (Glacial Outwash)			SW	S7	SS	6	50/6"				0843
			45	SW	S8	SS	17	50/5"				0853
	Grades to with silt, trace gravel, brownish tan		50	SW	S9	SS	8	75/6"				0912
	SAND, with silt, trace gravel, **SILT** interbeds, tan, very dense, saturated (Glacial Outwash)		55	SW	S10	SS	9	50/4"				0931
	59											
	Continued Next Page		60									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 20	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	4-26-11		
BORING COMPLETED	4-26-11		
RIG	Track	CO.	Holocene
LOGGED	CDF	JOB #	81097016A

LOG OF BORING NO. MW-8

CLIENT **Mill Creek Crossing, LLC**

SITE **SR 527 & 180th Street SE**
Mill Creek, Washington

PROJECT **Marketplace Retail Center**

GRAPHIC LOG	DESCRIPTION	WELL DETAIL	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT-N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS UNCONFINED STRENGTH, psf	TESTS FIELD VAPOR TEST (PPM)*	Time Sampled
	SILTY SAND, trace gravel, brown to brownish-gray, very dense, saturated (Glacial Outwash)			SM	S11	SS	10	50/4"				0959
			65	SM		SS	4	50/3"				
	70.5		70	SM	S12	SS	6	50/6"				1021
	End of exploration at 70 1/2 feet bgs. Groundwater observed at 20 feet bgs while drilling. Well ID: BHB-770											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 20	WD	▼
WL	▼		▼
WL			

Terracon
21905 64th Avenue West Suite 100
Mountlake Terrace, Washington 98043
T: 425-771-3304 F: 425-771-3549

BORING STARTED	4-26-11		
BORING COMPLETED	4-26-11		
RIG	Track	CO.	Holocene
LOGGED	CDF	JOB #	81097016A

Boring Location: See Figure 3, Site and Exploration Plan		Drilling Company: EDI	Bore Hole Dia.: 6"	**MW-9**
Top Elevation: 299 ft		Drilling Method: HSA	Hammer Type: Auto	
Date Drilled: 9/30/2013		Drill Rig:	Logged by: JME	

Depth (ft)	SOIL DESCRIPTION	Sample Number	SAMPLES Recovery	Ground Water	PENETRATION RESISTANCE (blows/foot)	Blow Counts	Testing
	The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.				▲ Standard Penetration Test △ Hammer Weight and Drop:		
0	Medium dense, damp, brown SAND with trace silt and gravel	MW -9-1	8"		0 20 40 60	14	
5	Medium dense, damp, gray SAND with some gravel and trace silt	MW -9-2	12"			21	
10	Very dense, damp, brown gravelly SAND	MW -9-3	14"			50/6"	
15	Very dense, moist, gray fine SAND with trace silt	MW -9-4	18"			69	
20	Very dense, moist, brown silty SAND/ sandy SILT grading to brown gravelly SAND	MW -9-5	17"			77	
25							

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit ⊣—○—⊢ Liquid Limit

Natural Water Content

Prime Cleaners
18001 Bothell Everett Highway
Bothell, WA

Date: 9/30/2013 Project No.: 1001.22

Zipper Geo Associates
19023 36th Ave. W, Suite D
Lynnwood, WA

BORING LOG: MW-9

Boring Location: See Figure 3, Site and Exploration Plan	Drilling Company: EDI	Bore Hole Dia.: 6"	**MW-9**
Top Elevation: 299 ft	Drilling Method: HSA	Hammer Type: Auto	
Date Drilled: 9/30/2013	Drill Rig:	Logged by: JME	

SOIL DESCRIPTION

The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.

Depth (ft) | Sample Number / SAMPLES / Recovery | Ground Water | **PENETRATION RESISTANCE** (blows/foot) ▲ Standard Penetration Test △ Hammer Weight and Drop: | Blow Counts | Testing

0 20 40 60

25

Very dense, wet, gray gravelly SAND

MW-9-6 — 18" — 50/2"

30

Very dense, saturated, gray gravelly SAND

MW-9-7 — 16" — 50/6"

35

Very dense, saturated, gray sandy GRAVEL grading to gray SAND with trace silt

MW-9-8 — 17" — 59

40

Boring completed at 40 feet on 9/30/13.

45

50

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit — Liquid Limit

Natural Water Content

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

Prime Cleaners
18001 Bothell Everett Highway
Bothell, WA

Date: 9/30/2013 Project No.: 1001.22

Zipper Geo Associates
19023 36th Ave. W, Suite D
Lynnwood, WA

BORING LOG: MW-9

Boring Location: See Figure 3, Site and Exploration Plan	Drilling Company: EDI	Bore Hole Dia.: 6"	**MW-10**
Top Elevation: 297.5 ft	Drilling Method: HSA	Hammer Type: Auto	
Date Drilled: 9/30/2013	Drill Rig:	Logged by: JME	

Depth (ft)	SOIL DESCRIPTION	Sample Number	SAMPLES Recovery	Ground Water	PENETRATION RESISTANCE (blows/foot)	Blow Counts	Testing
	The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.				▲ Standard Penetration Test △ Hammer Weight and Drop: _____ 0 20 40 60		
0	Loose, wet, brown and red mottled SAND with trace silt and gravel	MW-10-1	5"			8	
5	Dense, saturated, brown gravelly SAND, grades to damp, brown SAND with some silt	MW-10-2	18"			42	
10	Very dense, wet, brown gravelly SAND grades to damp, gray, silty SAND and SAND with some gravel	MW-10-3	18"			60	
15	Very dense, damp, gray SAND, trace silt and gravel	MW-10-4	18"			50/5"	
20	Very dense, damp, brown SAND with some silt and trace gravel, grades to brown SAND with trace silt	MW-10-5	18"			60	
25							

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- ▼ 11/2/12 Groundwater level at time of drilling (ATD) or on date of measurement.

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit ⊢—○—⊣ Liquid Limit

Natural Water Content

Prime Cleaners
18001 Bothell Everett Highway
Bothell, WA

Date: 9/30/2013 Project No.: 1001.22

Zipper Geo Associates
19023 36th Ave. W, Suite D
Lynnwood, WA

BORING LOG: MW-10

Boring Location: See Figure 3, Site and Exploration Plan	Drilling Company: EDI	Bore Hole Dia.: 6"	**MW-10**
Top Elevation: 297.5 ft	Drilling Method: HSA	Hammer Type: Auto	
Date Drilled: 9/30/2013	Drill Rig:	Logged by: JME	

Depth (ft)	SOIL DESCRIPTION	Sample Number	SAMPLES Recovery	Ground Water	PENETRATION RESISTANCE (blows/foot)	Blow Counts	Testing
	The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.				▲ Standard Penetration Test △ Hammer Weight and Drop:		
25	Very dense, saturated, gray sandy GRAVEL with trace silt, grades to gray fine SAND with trace silt	MW-10-6	18"		0 20 40 60	50/3"	
30	Very dense, saturated, brown silty SAND, grades to brown sandy GRAVEL	MW-10-7	12"			50/6"	
35	Very dense, damp, gray SAND with some silt and gravel, grades to gray silty SAND	MW-10-8	14"			50/5"	
40	Boring completed at 40 feet on 9/30/13.						
45							
50							

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- ▼ 11/2/12 Groundwater level at time of drilling (ATD) or on date of measurement.

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit ⊢—○—⊣ Liquid Limit

Natural Water Content

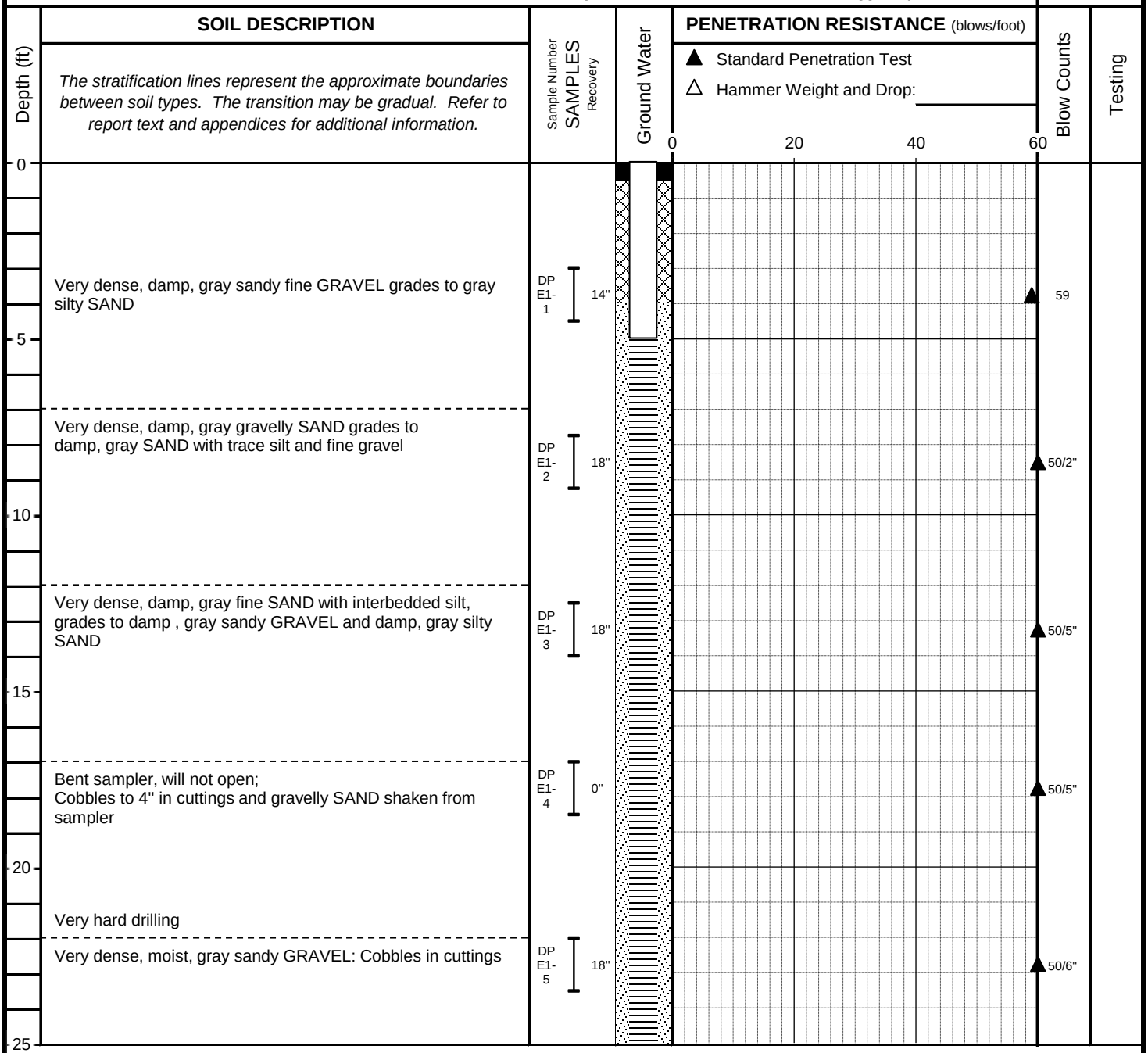
Prime Cleaners
18001 Bothell Everett Highway
Bothell, WA

Date: 9/30/2013 Project No.: 1001.22

Zipper Geo Associates
19023 36th Ave. W, Suite D
Lynnwood, WA

BORING LOG: MW-10

Boring Location: See Figure 3, Site and Exploration Plan		Drilling Company: EDI	Bore Hole Dia.: 12"	**DPE-1**
Top Elevation: 297 ft		Drilling Method: HSA	Hammer Type: Auto	
Date Drilled: 10/1/2013		Drill Rig:	Logged by: JME	



SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit — Liquid Limit

Natural Water Content

Prime Cleaners
1801 Bothell Everett Highway
Bothell, WA

Date: 10/1/2013 Project No.: 1001.22

Zipper Geo Associates
19023 36th Ave. W, Suite D
Lynnwood, WA

BORING LOG: DPE-1

Boring Location: See Figure 3, Site and Exploration Plan	Drilling Company: EDI	Bore Hole Dia.: 12"	**DPE-1**
Top Elevation: 297 ft	Drilling Method: HSA	Hammer Type: Auto	
Date Drilled: 10/1/2013	Drill Rig:	Logged by: JME	

Depth (ft)	SOIL DESCRIPTION	Sample Number / SAMPLES / Recovery	Ground Water	PENETRATION RESISTANCE (blows/foot) ▲ Standard Penetration Test △ Hammer Weight and Drop:	Blow Counts	Testing
	The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.			0 20 40 60		
25	Very dense, saturated, gray gravelly SAND grades to gray SAND with trace silt and gravel	DPE 1-6 18"			50/5"	
30	Saturated, gray gravelly SAND grades to gray SAND with trace silt and gravel	DPE 1-7 18"			0	
35	Very dense, saturated, gray sandy GRAVEL grades to gray fine SAND with trace silt	DPE 1-8 18"			50/6"	
40	Boing completed at 39 feet on 10/1/13.					
45						
50						

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit ⊣—○—⊢ Liquid Limit

Natural Water Content

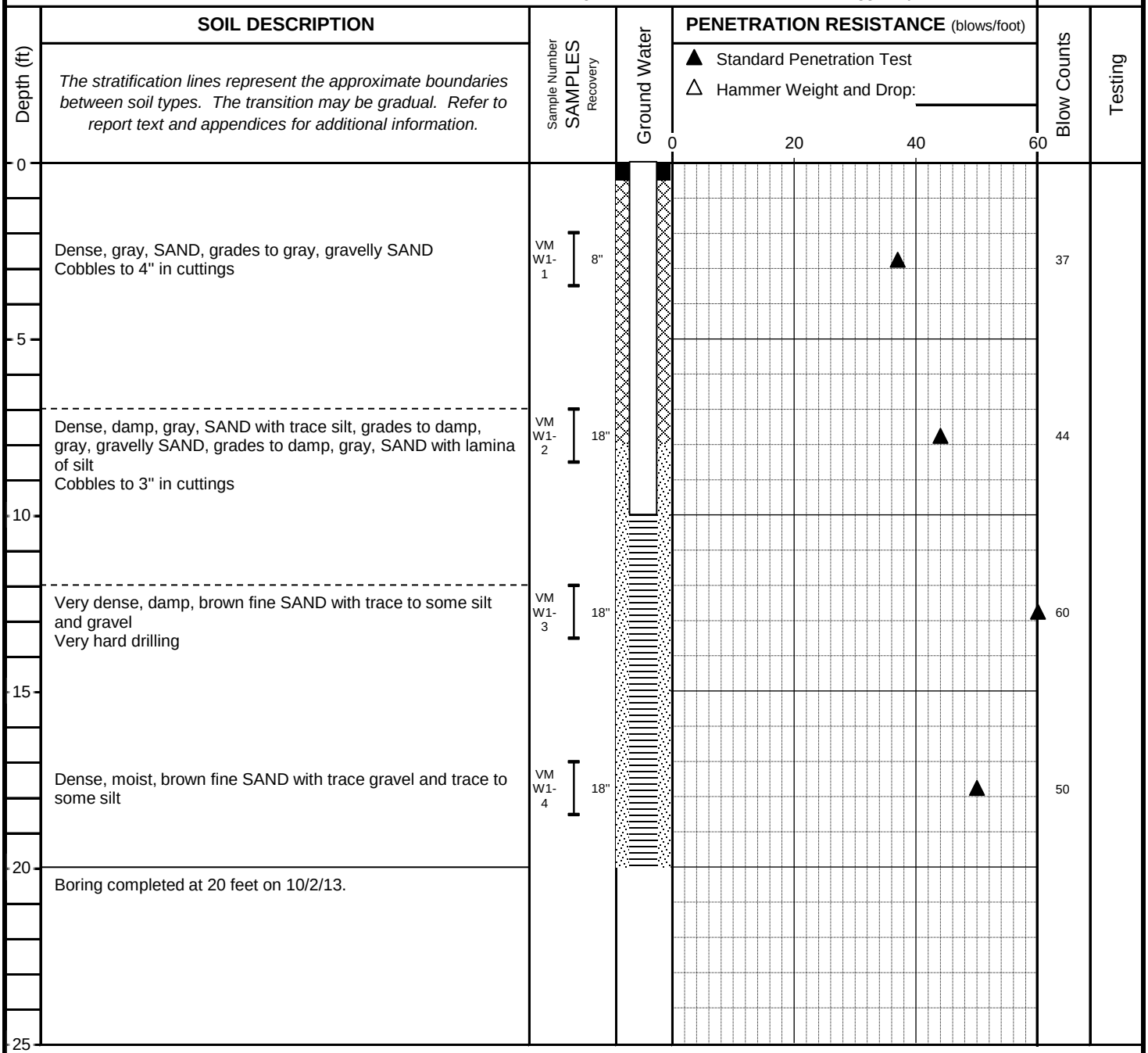
Prime Cleaners
1801 Bothell Everett Highway
Bothell, WA

Date: 10/1/2013 Project No.: 1001.22

Zipper Geo Associates
19023 36th Ave. W, Suite D
Lynnwood, WA

BORING LOG: DPE-1

Boring Location: See Figure 3, Site and Exploration Plan	Drilling Company: EDI	Bore Hole Dia.: 6"	**VMW-1**
Top Elevation: 297 ft	Drilling Method: HSA	Hammer Type: Auto	
Date Drilled: 10/2/2013	Drill Rig:	Logged by: JME	



SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit — Liquid Limit

Natural Water Content

Prime Cleaners
18001 Bothell Everett Highway
Bothell, WA

Date: 10/2/2013 Project No.: 1001.22

Zipper Geo Associates
19023 36th Ave. W, Suite D
Lynnwood, WA

BORING LOG: VMW-1

APPENDIX C

SOIL ANALYTICAL RESULTS

October 9, 2013

Mr. Jon Einarsen
Zipper Geo Associates
19023 - 36th Ave W., Suite D
Lynnwood, WA 98036-

Dear Mr. Einarsen,

On October 1st, 16 samples were received by our laboratory and assigned our laboratory project number EV13100008. The project was identified as your 1001.22. The sample identification and requested analyses are outlined on the attached chain of custody record.

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

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

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-01
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 1:10:00 PM
CLIENT SAMPLE ID	MW 9-1	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-01
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 1:10:00 PM
CLIENT SAMPLE ID	MW 9-1	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**114**	10/07/2013	GAP
Toluene-d8	EPA-8260	**88.6**	10/07/2013	GAP
4-Bromofluorobenzene	EPA-8260	**78.6**	10/07/2013	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-02
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 1:20:00 PM
CLIENT SAMPLE ID	MW 9-2	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-02
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 1:20:00 PM
CLIENT SAMPLE ID	MW 9-2	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**82.5**	10/07/2013	GAP
Toluene-d8	EPA-8260	**86.6**	10/07/2013	GAP
4-Bromofluorobenzene	EPA-8260	**78.1**	10/07/2013	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-03
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 1:35:00 PM
CLIENT SAMPLE ID	MW 9-3	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-03
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 1:35:00 PM
CLIENT SAMPLE ID	MW 9-3	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**147 GS1**	10/07/2013	GAP
Toluene-d8	EPA-8260	**78.7**	10/07/2013	GAP
4-Bromofluorobenzene	EPA-8260	**94.9**	10/07/2013	GAP

GS1 - Surrogate outside of control limits due to matrix effect.
U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-04
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 1:45:00 PM
CLIENT SAMPLE ID	MW 9-4	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-04
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 1:45:00 PM
CLIENT SAMPLE ID	MW 9-4	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**146 GS1**	10/07/2013	GAP
Toluene-d8	EPA-8260	**82.6**	10/07/2013	GAP
4-Bromofluorobenzene	EPA-8260	**95.2**	10/07/2013	GAP

GS1 - Surrogate outside of control limits due to matrix effect.
U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-05
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 2:00:00 PM
CLIENT SAMPLE ID	MW 9-5	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-05
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 2:00:00 PM
CLIENT SAMPLE ID	MW 9-5	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**156 GS1**	10/07/2013	GAP
Toluene-d8	EPA-8260	**81.8**	10/07/2013	GAP
4-Bromofluorobenzene	EPA-8260	**104**	10/07/2013	GAP

GS1 - Surrogate outside of control limits due to matrix effect.
U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-06
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 2:20:00 PM
CLIENT SAMPLE ID	MW 9-6	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-06
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 2:20:00 PM
CLIENT SAMPLE ID	MW 9-6	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**132**	10/07/2013	GAP
Toluene-d8	EPA-8260	**87.0**	10/07/2013	GAP
4-Bromofluorobenzene	EPA-8260	**82.1**	10/07/2013	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-07
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 2:35:00 PM
CLIENT SAMPLE ID	MW 9-7	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-07
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 2:35:00 PM
CLIENT SAMPLE ID	MW 9-7	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**137**	10/07/2013	GAP
Toluene-d8	EPA-8260	**86.7**	10/07/2013	GAP
4-Bromofluorobenzene	EPA-8260	**88.0**	10/07/2013	GAP

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

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-08
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 2:55:00 PM
CLIENT SAMPLE ID	MW 9-8	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-08
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 2:55:00 PM
CLIENT SAMPLE ID	MW 9-8	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**140 GS1**	10/07/2013	GAP
Toluene-d8	EPA-8260	**84.6**	10/07/2013	GAP
4-Bromofluorobenzene	EPA-8260	**88.9**	10/07/2013	GAP

U - Analyte analyzed for but not detected at level above reporting limit.
GS1 - Surrogate outside of control limits due to matrix effect.

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-09
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 8:45:00 AM
CLIENT SAMPLE ID	MW 10-1	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP

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CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-09
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 8:45:00 AM
CLIENT SAMPLE ID	MW 10-1	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**129**	10/08/2013	GAP
Toluene-d8	EPA-8260	**89.5**	10/08/2013	GAP
4-Bromofluorobenzene	EPA-8260	**102**	10/08/2013	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-10
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 9:00:00 AM
CLIENT SAMPLE ID	MW 10-2	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-10
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 9:00:00 AM
CLIENT SAMPLE ID	MW 10-2	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**148 GS1**	10/08/2013	GAP
Toluene-d8	EPA-8260	**84.2**	10/08/2013	GAP
4-Bromofluorobenzene	EPA-8260	**101**	10/08/2013	GAP

GS1 - Surrogate outside of control limits due to matrix effect.
U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-11
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 9:20:00 AM
CLIENT SAMPLE ID	MW 10-3	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-11
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 9:20:00 AM
CLIENT SAMPLE ID	MW 10-3	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**157 GS1**	10/08/2013	GAP
Toluene-d8	EPA-8260	**84.0**	10/08/2013	GAP
4-Bromofluorobenzene	EPA-8260	**102**	10/08/2013	GAP

GS1 - Surrogate outside of control limits due to matrix effect.
U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-12
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 9:40:00 AM
CLIENT SAMPLE ID	MW 10-4	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-12
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 9:40:00 AM
CLIENT SAMPLE ID	MW 10-4	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**140 GS1**	10/08/2013	GAP
Toluene-d8	EPA-8260	**85.9**	10/08/2013	GAP
4-Bromofluorobenzene	EPA-8260	**107**	10/08/2013	GAP

GS1 - Surrogate outside of control limits due to matrix effect.
U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-13
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 10:05:00 AM
CLIENT SAMPLE ID	MW 10-5	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-13
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 10:05:00 AM
CLIENT SAMPLE ID	MW 10-5	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**133**	10/08/2013	GAP
Toluene-d8	EPA-8260	**86.7**	10/08/2013	GAP
4-Bromofluorobenzene	EPA-8260	**111**	10/08/2013	GAP

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

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-14
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 10:30:00 AM
CLIENT SAMPLE ID	MW 10-6	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-14
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 10:30:00 AM
CLIENT SAMPLE ID	MW 10-6	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**145 GS1**	10/08/2013	GAP
Toluene-d8	EPA-8260	**86.0**	10/08/2013	GAP
4-Bromofluorobenzene	EPA-8260	**88.5**	10/08/2013	GAP

GS1 - Surrogate outside of control limits due to matrix effect.
U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-15
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 10:50:00 AM
CLIENT SAMPLE ID	MW 10-7	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-15
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 10:50:00 AM
CLIENT SAMPLE ID	MW 10-7	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**136**	10/08/2013	GAP
Toluene-d8	EPA-8260	**88.0**	10/08/2013	GAP
4-Bromofluorobenzene	EPA-8260	**108**	10/08/2013	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-16
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 11:15:00 AM
CLIENT SAMPLE ID	MW 10-8	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/08/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS JOB#:	EV13100008
		ALS SAMPLE#:	-16
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	10/1/2013
CLIENT PROJECT:	1001.22	COLLECTION DATE:	9/30/2013 11:15:00 AM
CLIENT SAMPLE ID	MW 10-8	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/08/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/08/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/08/2013	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**114**	10/08/2013	GAP
Toluene-d8	EPA-8260	**87.1**	10/08/2013	GAP
4-Bromofluorobenzene	EPA-8260	**120**	10/08/2013	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT: Zipper Geo Associates
19023 - 36th Ave W., Suite D
Lynnwood, WA 98036-

CLIENT CONTACT: Jon Einarsen
CLIENT PROJECT: 1001.22

DATE: 10/9/2013
ALS SDG#: EV13100008
WDOE ACCREDITATION: C601

LABORATORY BLANK RESULTS

MB-100713S - Batch 7245 - Soil by EPA-8260

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Vinyl Chloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Tetrachloride	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trichlorofluoromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Carbon Disulfide	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Acetone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Methylene Chloride	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Acrylonitrile	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Methyl T-Butyl Ether	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Butanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Chloroform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Benzene	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP
Trichloroethene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromomethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromodichloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Methyl-2-Pentanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
Toluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2-Trichloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Hexanone	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,3-Dichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Tetrachloroethylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Dibromochloromethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromoethane	EPA-8260	U	5.0	1	UG/KG	10/07/2013	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS SDG#:	EV13100008
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY BLANK RESULTS

MB-100713S - Batch 7245 - Soil by EPA-8260

Chlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/07/2013	GAP
Styrene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
o-Xylene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromoform	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Isopropylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichloropropane	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Bromobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Propyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
2-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
4-Chlorotoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
T-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
S-Butyl Benzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
P-Isopropyltoluene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,3 Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,4-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
N-Butylbenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	50	1	UG/KG	10/07/2013	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Hexachlorobutadiene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
Naphthalene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	10	1	UG/KG	10/07/2013	GAP

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CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	10/9/2013
		ALS SDG#:	EV13100008
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 7245 - Soil by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	EPA-8260	**106**			10/07/2013	GAP
1,1-Dichloroethene - BSD	EPA-8260	**94.4**	**12**		10/08/2013	GAP
Benzene - BS	EPA-8260	**102**			10/07/2013	GAP
Benzene - BSD	EPA-8260	**105**	**4**		10/08/2013	GAP
Trichloroethene - BS	EPA-8260	**107**			10/07/2013	GAP
Trichloroethene - BSD	EPA-8260	**103**	**4**		10/08/2013	GAP
Toluene - BS	EPA-8260	**95.8**			10/07/2013	GAP
Toluene - BSD	EPA-8260	**90.1**	**6**		10/08/2013	GAP
Chlorobenzene - BS	EPA-8260	**91.6**			10/07/2013	GAP
Chlorobenzene - BSD	EPA-8260	**87.8**	**4**		10/08/2013	GAP

APPROVED BY

Laboratory Director

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
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http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV13100008

Date 10/1/13 Page 1 Of 2

PROJECT ID: 1001.22
REPORT TO COMPANY: ZGA
PROJECT MANAGER: Jon Emarsen
ADDRESS:
PHONE: FAX:
P.O. #: 1001.22 E-MAIL: jemarsen@zappergeo
INVOICE TO COMPANY: ZGA
ATTENTION: Emarsen
ADDRESS:

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. MW 9-1	9/30/13	~~0~~ 1310	~~H2O~~ soil	1							X										4	
2. 9-2		1320		2																		
3. 9-3		1335		3																		
4. 9-4		1345		4																		
5. 9-5		1400		5																		
6. 9-6		1420		6																		
7. 9-7		1435		7																		
8. 9-8		1455		8																		
9.																						
10.																						

LABORATORY COPY

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: ZGA / 10/1/13 / 1240
   Received By: Walt Kurt, ALS, 10/1/13, 1240
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

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

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER: Specify:

* Turnaround request less than standard may incur Rush Charges

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

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EJ13100008

Date 10/1/13 Page 2 Of 2

PROJECT ID: 1001.22
REPORT TO COMPANY: ZGA
PROJECT MANAGER: Jon Emanuelsen
ADDRESS:
PHONE: FAX:
P.O. #: 1001.22 E-MAIL: jemanuelsen@zgpnw.com
INVOICE TO COMPANY: ZGA
ATTENTION: Emanuelsen
ADDRESS:

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. MW 10-1	9/30/13	0845	~~H2O~~ SOIL	9							X									4	
2. -2		0900		10																	
3. -3		0920		11																	
4. -4		0940		12																	
5. -5		1005		13																	
6. -6		1030		14																	
7. -7		1050		15																	
8. -8		1115		16																	
9.																					
10.																					

LABORATORY COPY

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: ZGA / 10-1-13 / 1240
   Received By: Hallie Kuntz, ALS, 10/1/13, 1240
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

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

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER: Specify:

* Turnaround request less than standard may incur Rush Charges

GROUNDWATER ANALYTICAL RESULTS

March 18, 2014

Mr. Jon Einarsen
Zipper Geo Associates
19023 - 36th Ave W., Suite D
Lynnwood, WA 98036-

Dear Mr. Einarsen,

On March 7th, 10 samples were received by our laboratory and assigned our laboratory project number EV14030061. The project was identified as your 1001.22. The sample identification and requested analyses are outlined on the attached chain of custody record.

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

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

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-01
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/5/2014 3:45:00 PM
CLIENT SAMPLE ID	MW-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Tetrachloroethylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-01
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/5/2014 3:45:00 PM
CLIENT SAMPLE ID	MW-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**97.8**	03/17/2014	GAP
Toluene-d8	EPA-8260	**96.6**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**107**	03/17/2014	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-02
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/5/2014 2:05:00 PM
CLIENT SAMPLE ID	MW-2	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY	
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP	
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP	
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Tetrachloroethylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP	

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-02
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/5/2014 2:05:00 PM
CLIENT SAMPLE ID	MW-2	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**99.9**	03/17/2014	GAP
Toluene-d8	EPA-8260	**95.7**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**105**	03/17/2014	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-03
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/7/2014 9:40:00 AM
CLIENT SAMPLE ID	MW-3	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY	
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP	
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP	
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Tetrachloroethylene	EPA-8260	**5.6**	2.0	1	UG/L	03/17/2014	GAP	
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP	

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CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-03
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/7/2014 9:40:00 AM
CLIENT SAMPLE ID	MW-3	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**102**	03/17/2014	GAP
Toluene-d8	EPA-8260	**96.2**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**103**	03/17/2014	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-04
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/7/2014 1:10:00 PM
CLIENT SAMPLE ID	MW-4	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY	
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP	
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP	
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Tetrachloroethylene	EPA-8260	**44**	8.0	4	UG/L	03/18/2014	GAP	
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP	

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-04
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/7/2014 1:10:00 PM
CLIENT SAMPLE ID	MW-4	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**102**	03/17/2014	GAP
1,2-Dichloroethane-d4 4X Dilution	EPA-8260	**97.0**	03/18/2014	GAP
Toluene-d8	EPA-8260	**95.5**	03/17/2014	GAP
Toluene-d8 4X Dilution	EPA-8260	**95.1**	03/18/2014	GAP
4-Bromofluorobenzene	EPA-8260	**104**	03/17/2014	GAP
4-Bromofluorobenzene 4X Dilution	EPA-8260	**109**	03/18/2014	GAP

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

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-05
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/6/2014 12:30:00 PM
CLIENT SAMPLE ID	MW-5	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Tetrachloroethylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-05
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/6/2014 12:30:00 PM
CLIENT SAMPLE ID	MW-5	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**101**	03/17/2014	GAP
Toluene-d8	EPA-8260	**95.4**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**105**	03/17/2014	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-06
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/6/2014 3:30:00 PM
CLIENT SAMPLE ID	MW-6	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY	
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP	
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP	
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Tetrachloroethylene	EPA-8260	**4.7**	2.0	1	UG/L	03/17/2014	GAP	
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP	

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CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-06
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/6/2014 3:30:00 PM
CLIENT SAMPLE ID	MW-6	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**104**	03/17/2014	GAP
Toluene-d8	EPA-8260	**94.7**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**103**	03/17/2014	GAP

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

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-07
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/6/2014 4:20:00 PM
CLIENT SAMPLE ID	MW-7	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY	
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP	
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP	
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroform	EPA-8260	**3.1**	2.0	1	UG/L	03/17/2014	GAP	
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Tetrachloroethylene	EPA-8260	**8.0**	2.0	1	UG/L	03/17/2014	GAP	
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP	

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CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-07
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/6/2014 4:20:00 PM
CLIENT SAMPLE ID	MW-7	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**105**	03/17/2014	GAP
Toluene-d8	EPA-8260	**95.5**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**106**	03/17/2014	GAP

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

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-08
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/7/2014 11:45:00 AM
CLIENT SAMPLE ID	MW-8	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY	
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP	
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP	
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Tetrachloroethylene	EPA-8260	**13**	2.0	1	UG/L	03/17/2014	GAP	
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP	

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
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CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-08
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/7/2014 11:45:00 AM
CLIENT SAMPLE ID	MW-8	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**105**	03/17/2014	GAP
Toluene-d8	EPA-8260	**94.5**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**103**	03/17/2014	GAP

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

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-09
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/5/2014 5:35:00 PM
CLIENT SAMPLE ID	MW-9	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY	
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP	
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP	
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP	
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Tetrachloroethylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP	
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP	

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-09
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/5/2014 5:35:00 PM
CLIENT SAMPLE ID	MW-9	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**106**	03/17/2014	GAP
Toluene-d8	EPA-8260	**95.0**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**100**	03/17/2014	GAP

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

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-10
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/6/2014 10:50:00 AM
CLIENT SAMPLE ID	MW-10	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Tetrachloroethylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS JOB#:	EV14030061
		ALS SAMPLE#:	EV14030061-10
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	03/07/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	3/6/2014 10:50:00 AM
CLIENT SAMPLE ID	MW-10	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**106**	03/17/2014	GAP
Toluene-d8	EPA-8260	**94.6**	03/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**103**	03/17/2014	GAP

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

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS SDG#:	EV14030061
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY BLANK RESULTS

MB-031714W - Batch 7714 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	03/17/2014	GAP
Bromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Acetone	EPA-8260	U	25	1	UG/L	03/17/2014	GAP
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	03/17/2014	GAP
Acrylonitrile	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Butanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Chloroform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trichloroethene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Dibromomethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
Toluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Hexanone	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Tetrachloroethylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	03/17/2014	GAP

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS SDG#:	EV14030061
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY BLANK RESULTS

MB-031714W - Batch 7714 - Water by EPA-8260

Chlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	03/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	03/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	03/17/2014	GAP

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

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	3/18/2014
		ALS SDG#:	EV14030061
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 7714 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	EPA-8260	**106**			03/17/2014	GAP
1,1-Dichloroethene - BSD	EPA-8260	**110**	**3**		03/17/2014	GAP
Benzene - BS	EPA-8260	**97.0**			03/17/2014	GAP
Benzene - BSD	EPA-8260	**98.4**	**1**		03/17/2014	GAP
Trichloroethene - BS	EPA-8260	**104**			03/17/2014	GAP
Trichloroethene - BSD	EPA-8260	**107**	**3**		03/17/2014	GAP
Toluene - BS	EPA-8260	**103**			03/17/2014	GAP
Toluene - BSD	EPA-8260	**106**	**3**		03/17/2014	GAP
Chlorobenzene - BS	EPA-8260	**105**			03/17/2014	GAP
Chlorobenzene - BSD	EPA-8260	**107**	**2**		03/17/2014	GAP

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

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

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV1403006

Date 3/7/14 Page 1 Of 1

PROJECT ID: 1001.22
REPORT TO COMPANY: ZGA
PROJECT MANAGER: Jon Emanuelsen
ADDRESS:
PHONE: FAX:
P.O. #: 1001.22 E-MAIL: jemanuelsen@zippergeo.com
INVOICE TO COMPANY: ZGA
ATTENTION: Jon Emanuelsen
ADDRESS:

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. MW-1	3/5	15:45	H_2O	1							X										3	
2. MW-2	3/5	14:05		2																		
3. MW-3	3/7	09:40		3																		
4. MW-4	3/7	13:10		4																		
5. MW-5	3/6	12:30		5																		
6. MW-6	3/6	15:30		6																		
7. MW-7	3/6	16:20		7																		
8. MW-8	3/7	11:45		8																		
9. MW-9	3/5	17:35		9																		
10. MW-10	3/6	10:50		10																		

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Jon Emanuelsen / ZGA / 3-7-14 / 1532
   Received By: ALS 3/7/14 15:32
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

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

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER: Specify:

* Turnaround request less than standard may incur Rush Charges

INDOOR AIR AND SOIL GAS ANALYTICAL RESULTS

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Jon Einarsen

Collected by: (Print and Sign) Jon Einarsen

Company Zipper GEO Email jeinarsen@zippergeo.com

Address 19023 36th Ave W City Lynnwood State WA Zip 98036

Phone Suite D 425-582-9928 Fax

Project Info:
P.O. # 1001.22
Project # 1001.22
Project Name Mill Creek Crossing

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	PRIME CLEANERS IA	35988	11/21/13	0908-1708	TO-15 SIM	-30+	-5.25		
02A	OSAKA IA	24487	↓	0919-1710	↓	-30+	-4.0		
03A	MONEY TREE IA	35987		0926-1712		-30+	-3.25		
04A	AMBIENT	33588		0938-1720		-30+	-8.0		

Relinquished by: (signature) Date/Time 11/22/13 1145
Received by: (signature) Date/Time 11/26/13 1015

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Notes:

Lab Use Only

Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
UPS		N/A	Good	Yes No None	1311500

Form 1293 rev.11

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12/12/2013
Mr. Jon Einarsen
Zipper Geo Associates, LLC
19023 36th Avenue West
Suite D
Lynwood WA 98036

Project Name: Mill Creek Crossing
Project #: 1001.22
Workorder #: 1311500

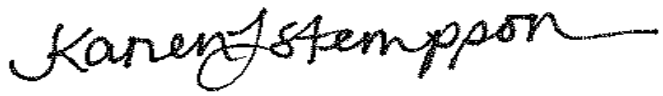
Dear Mr. Jon Einarsen

The following report includes the data for the above referenced project for sample(s) received on 11/26/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Karen Stempson

Project Manager

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WORK ORDER #: 1311500

Work Order Summary

CLIENT:	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036	**BILL TO:**	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036
PHONE:	425-582-9928	**P.O. #**	1001.22
FAX:		**PROJECT #**	1001.22 Mill Creek Crossing
DATE RECEIVED:	11/26/2013	**CONTACT:**	Karen Stempson
DATE COMPLETED:	12/12/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	PRIME CLEANERS IA	Modified TO-15 SIM	3.1 "Hg	4.8 psi
02A	OSAKA IA	Modified TO-15 SIM	2 "Hg	4.6 psi
03A	MONEY TREE IA	Modified TO-15 SIM	2.6 "Hg	5.3 psi
04A	AMBIENT	Modified TO-15 SIM	4.5 "Hg	4.9 psi
05A	Lab Blank	Modified TO-15 SIM	NA	NA
06A	CCV	Modified TO-15 SIM	NA	NA
07A	LCS	Modified TO-15 SIM	NA	NA
07AA	LCSD	Modified TO-15 SIM	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 12/12/13

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15 SIM
Zipper Geo Associates, LLC
Workorder# 1311500

Four 6 Liter Summa Canister (SIM Certified) samples were received on November 26, 2013. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on samples PRIME CLEANERS IA and OSAKA IA due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: PRIME CLEANERS IA

Lab ID#: 1311500-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.25	0.30	0.79	0.96
Trichloroethene	0.099	52	0.53	280
Toluene	0.099	1.5	0.37	5.5
Tetrachloroethene	0.099	0.16	0.67	1.1
Ethyl Benzene	0.099	0.097 J	0.43	0.42 J
m,p-Xylene	0.20	0.33	0.86	1.4
o-Xylene	0.099	0.13	0.43	0.57

Client Sample ID: OSAKA IA

Lab ID#: 1311500-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.18	0.36	0.56	1.1
Trichloroethene	0.071	40	0.38	210
Toluene	0.071	1.2	0.27	4.4
Tetrachloroethene	0.071	0.53	0.48	3.6
Ethyl Benzene	0.071	0.19	0.31	0.83
m,p-Xylene	0.14	0.71	0.61	3.1
o-Xylene	0.071	0.27	0.31	1.2

Client Sample ID: MONEY TREE IA

Lab ID#: 1311500-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.074	0.31	0.24	1.0
Trichloroethene	0.030	0.25	0.16	1.3
Toluene	0.030	1.3	0.11	4.8
Ethyl Benzene	0.030	0.11	0.13	0.49
m,p-Xylene	0.060	0.38	0.26	1.7
o-Xylene	0.030	0.13	0.13	0.58

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: AMBIENT

Lab ID#: 1311500-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.078	0.21	0.25	0.66
Toluene	0.031	0.64	0.12	2.4
Ethyl Benzene	0.031	0.074	0.14	0.32
m,p-Xylene	0.063	0.23	0.27	1.0
o-Xylene	0.031	0.086	0.14	0.37

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Client Sample ID: PRIME CLEANERS IA

Lab ID#: 1311500-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**c121010sim**	**Date of Collection:**	**11/21/13 5:08:00 PM**
Dil. Factor:	**4.93**	**Date of Analysis:**	**12/10/13 02:09 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.049	Not Detected	0.13	Not Detected
1,1-Dichloroethene	0.049	Not Detected	0.20	Not Detected
1,1-Dichloroethane	0.099	Not Detected	0.40	Not Detected
cis-1,2-Dichloroethene	0.099	Not Detected	0.39	Not Detected
1,1,1-Trichloroethane	0.099	Not Detected	0.54	Not Detected
Benzene	0.25	0.30	0.79	0.96
1,2-Dichloroethane	0.099	Not Detected	0.40	Not Detected
Trichloroethene	0.099	52	0.53	280
Toluene	0.099	1.5	0.37	5.5
1,1,2-Trichloroethane	0.099	Not Detected	0.54	Not Detected
Tetrachloroethene	0.099	0.16	0.67	1.1
Ethyl Benzene	0.099	0.097 J	0.43	0.42 J
m,p-Xylene	0.20	0.33	0.86	1.4
o-Xylene	0.099	0.13	0.43	0.57
1,1,2,2-Tetrachloroethane	0.099	Not Detected	0.68	Not Detected
trans-1,2-Dichloroethene	0.49	Not Detected	2.0	Not Detected
Methyl tert-butyl ether	0.49	Not Detected	1.8	Not Detected

J = Estimated value.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: OSAKA IA

Lab ID#: 1311500-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**c121011sim**	**Date of Collection: 11/21/13 5:10:00 PM**	
Dil. Factor:	**3.53**	**Date of Analysis: 12/10/13 02:50 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.035	Not Detected	0.090	Not Detected
1,1-Dichloroethene	0.035	Not Detected	0.14	Not Detected
1,1-Dichloroethane	0.071	Not Detected	0.28	Not Detected
cis-1,2-Dichloroethene	0.071	Not Detected	0.28	Not Detected
1,1,1-Trichloroethane	0.071	Not Detected	0.38	Not Detected
Benzene	0.18	0.36	0.56	1.1
1,2-Dichloroethane	0.071	Not Detected	0.28	Not Detected
Trichloroethene	0.071	40	0.38	210
Toluene	0.071	1.2	0.27	4.4
1,1,2-Trichloroethane	0.071	Not Detected	0.38	Not Detected
Tetrachloroethene	0.071	0.53	0.48	3.6
Ethyl Benzene	0.071	0.19	0.31	0.83
m,p-Xylene	0.14	0.71	0.61	3.1
o-Xylene	0.071	0.27	0.31	1.2
1,1,2,2-Tetrachloroethane	0.071	Not Detected	0.48	Not Detected
trans-1,2-Dichloroethene	0.35	Not Detected	1.4	Not Detected
Methyl tert-butyl ether	0.35	Not Detected	1.3	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	93	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: MONEY TREE IA

Lab ID#: 1311500-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**c121012sim**	**Date of Collection: 11/21/13 5:12:00 PM**	
Dil. Factor:	**1.49**	**Date of Analysis: 12/10/13 03:39 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.038	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.059	Not Detected
1,1-Dichloroethane	0.030	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
1,1,1-Trichloroethane	0.030	Not Detected	0.16	Not Detected
Benzene	0.074	0.31	0.24	1.0
1,2-Dichloroethane	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	0.25	0.16	1.3
Toluene	0.030	1.3	0.11	4.8
1,1,2-Trichloroethane	0.030	Not Detected	0.16	Not Detected
Tetrachloroethene	0.030	Not Detected	0.20	Not Detected
Ethyl Benzene	0.030	0.11	0.13	0.49
m,p-Xylene	0.060	0.38	0.26	1.7
o-Xylene	0.030	0.13	0.13	0.58
1,1,2,2-Tetrachloroethane	0.030	Not Detected	0.20	Not Detected
trans-1,2-Dichloroethene	0.15	Not Detected	0.59	Not Detected
Methyl tert-butyl ether	0.15	Not Detected	0.54	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: AMBIENT

Lab ID#: 1311500-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**c121013sim**	**Date of Collection: 11/21/13 5:20:00 PM**	
Dil. Factor:	**1.57**	**Date of Analysis: 12/10/13 04:28 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
1,1-Dichloroethene	0.016	Not Detected	0.062	Not Detected
1,1-Dichloroethane	0.031	Not Detected	0.13	Not Detected
cis-1,2-Dichloroethene	0.031	Not Detected	0.12	Not Detected
1,1,1-Trichloroethane	0.031	Not Detected	0.17	Not Detected
Benzene	0.078	0.21	0.25	0.66
1,2-Dichloroethane	0.031	Not Detected	0.13	Not Detected
Trichloroethene	0.031	Not Detected	0.17	Not Detected
Toluene	0.031	0.64	0.12	2.4
1,1,2-Trichloroethane	0.031	Not Detected	0.17	Not Detected
Tetrachloroethene	0.031	Not Detected	0.21	Not Detected
Ethyl Benzene	0.031	0.074	0.14	0.32
m,p-Xylene	0.063	0.23	0.27	1.0
o-Xylene	0.031	0.086	0.14	0.37
1,1,2,2-Tetrachloroethane	0.031	Not Detected	0.22	Not Detected
trans-1,2-Dichloroethene	0.16	Not Detected	0.62	Not Detected
Methyl tert-butyl ether	0.16	Not Detected	0.57	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1311500-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**c121008sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/10/13 12:31 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
1,2-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
1,1,2-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
1,1,2,2-Tetrachloroethane	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: CCV

Lab ID#: 1311500-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**c121004sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/10/13 09:41 AM**	

Compound	%Recovery
Vinyl Chloride	88
1,1-Dichloroethene	97
1,1-Dichloroethane	96
cis-1,2-Dichloroethene	101
1,1,1-Trichloroethane	94
Benzene	89
1,2-Dichloroethane	89
Trichloroethene	86
Toluene	96
1,1,2-Trichloroethane	96
Tetrachloroethene	99
Ethyl Benzene	106
m,p-Xylene	109
o-Xylene	107
1,1,2,2-Tetrachloroethane	89
trans-1,2-Dichloroethene	100
Methyl tert-butyl ether	107

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1311500-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**c121005sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/10/13 10:23 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	92	70-130
1,1-Dichloroethene	114	70-130
1,1-Dichloroethane	102	70-130
cis-1,2-Dichloroethene	119	70-130
1,1,1-Trichloroethane	99	70-130
Benzene	94	70-130
1,2-Dichloroethane	92	70-130
Trichloroethene	89	70-130
Toluene	99	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	102	70-130
Ethyl Benzene	107	70-130
m,p-Xylene	110	70-130
o-Xylene	105	70-130
1,1,2,2-Tetrachloroethane	92	70-130
trans-1,2-Dichloroethene	90	60-140
Methyl tert-butyl ether	109	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCSD

Lab ID#: 1311500-07AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**c121006sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/10/13 11:03 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	92	70-130
1,1-Dichloroethene	114	70-130
1,1-Dichloroethane	102	70-130
cis-1,2-Dichloroethene	119	70-130
1,1,1-Trichloroethane	99	70-130
Benzene	94	70-130
1,2-Dichloroethane	92	70-130
Trichloroethene	90	70-130
Toluene	100	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	102	70-130
Ethyl Benzene	107	70-130
m,p-Xylene	110	70-130
o-Xylene	105	70-130
1,1,2,2-Tetrachloroethane	91	70-130
trans-1,2-Dichloroethene	90	60-140
Methyl tert-butyl ether	109	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	100	70-130

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Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager: Jon Einarsen
Collected by: (Print and Sign) [signature]
Company: Zipper GEO Email: jeinarsen@zippergeo.com
Address: 19023 36th Ave W City: Lynnwood State: WA Zip: 98036
Phone: 425-582-9928 Fax:

Project info:
P.O. #: 1001.22
Project #: 1001.22
Project Name: Mill Creek Crossing

Turn Around Time: ☒ Normal ☐ Rush (specify)

Lab Use Only: Pressurized by: / Date: / Pressurization Gas: N₂ He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SGP-1	11926	11/25/13	1159		-30+			
02A	SGP-2	33397	11/25/13	1232		-30+			
	~~SGP-3~~	~~34017~~				~~-30+~~			
	~~SGP-4~~	~~1737~~				~~-30+~~			
03A	SGP-5	35689	11/25/13	1324		-29.5			
		~~37760~~				-27			
04A	SGP-6	33716	11/25/13	1347		-30+			

Relinquished by: (signature) [signature] Date/Time 11/26/13 1:05
Received by: (signature) [signature] ATL Date/Time 12/2/13 1200
Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time
Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Notes: Used 2-propanol for leak detection.

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	UPS		N/A	Good	Yes No (None)	1312016

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12/19/2013
Mr. Jon Einarsen
Zipper Geo Associates, LLC
19023 36th Avenue West
Suite D
Lynwood WA 98036

Project Name: Mill Creek Crossing
Project #: 1001.22
Workorder #: 1312016

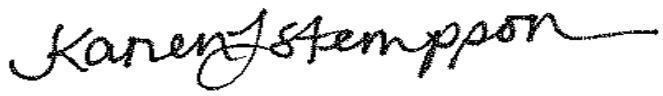
Dear Mr. Jon Einarsen

The following report includes the data for the above referenced project for sample(s) received on 12/2/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Karen Stempson

Project Manager

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WORK ORDER #: 1312016

Work Order Summary

CLIENT:	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036	**BILL TO:**	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036
PHONE:	425-582-9928	**P.O. #**	1001.22
FAX:		**PROJECT #**	1001.22 Mill Creek Crossing
DATE RECEIVED:	12/02/2013	**CONTACT:**	Karen Stempson
DATE COMPLETED:	12/19/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SGP-1	Modified TO-15	4.5 "Hg	15 psi
02A	SGP-2	Modified TO-15	5.0 "Hg	15 psi
03A	SGP-5	Modified TO-15	5.0 "Hg	15 psi
04A	SGP-6	Modified TO-15	4.0 "Hg	15 psi
05A	Lab Blank	Modified TO-15	NA	NA
05B	Lab Blank	Modified TO-15	NA	NA
05C	Lab Blank	Modified TO-15	NA	NA
06A	CCV	Modified TO-15	NA	NA
06B	CCV	Modified TO-15	NA	NA
06C	CCV	Modified TO-15	NA	NA
07A	LCS	Modified TO-15	NA	NA
07AA	LCSD	Modified TO-15	NA	NA
07B	LCS	Modified TO-15	NA	NA
07BB	LCSD	Modified TO-15	NA	NA
07C	LCS	Modified TO-15	NA	NA
07CC	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Mayes DATE: 12/19/13

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 956
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
Zipper Geo Associates, LLC
Workorder# 1312016

Four 1 Liter Summa Canister (100% Certified) samples were received on December 02, 2013. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Samples SGP-2, SGP-5 and SGP-6 were transferred from Low Level analysis to full scan TO-15 due to high levels of target compounds.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Dilution was performed on samples SGP-2, SGP-5 and SGP-6 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data

page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SGP-1

Lab ID#: 1312016-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.24	0.38	1.2	1.9
Ethanol	1.2	8.8	2.2	16
Acetone	1.2	3.6	2.8	8.7
2-Propanol	1.2	40	2.9	99
Toluene	0.24	0.29	0.90	1.1
Tetrachloroethene	0.24	74	1.6	500
Chlorobenzene	0.24	0.29	1.1	1.3

Client Sample ID: SGP-2

Lab ID#: 1312016-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	19	64	48	160
cis-1,2-Dichloroethene	4.8	5.6	19	22
Chloroform	4.8	33	24	160
Trichloroethene	4.8	81	26	440
Tetrachloroethene	4.8	1100	33	7700

Client Sample ID: SGP-5

Lab ID#: 1312016-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	13	13	24	25
2-Propanol	13	180	32	450
Chloroform	3.2	10	16	50
Trichloroethene	3.2	40	17	220
Tetrachloroethene	3.2	800	22	5400

Client Sample ID: SGP-6

Lab ID#: 1312016-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SGP-6

Lab ID#: 1312016-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	470	82000 E	1100	200000 E
Toluene	120	220	440	840

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Client Sample ID: SGP-1

Lab ID#: 1312016-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121607**	**Date of Collection: 11/25/13 11:59:00 AM**	
Dil. Factor:	**2.38**	**Date of Analysis: 12/16/13 12:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.24	0.38	1.2	1.9
Freon 114	0.24	Not Detected	1.7	Not Detected
Chloromethane	1.2	Not Detected	2.4	Not Detected
Vinyl Chloride	0.24	Not Detected	0.61	Not Detected
1,3-Butadiene	0.24	Not Detected	0.53	Not Detected
Bromomethane	1.2	Not Detected	4.6	Not Detected
Chloroethane	1.2	Not Detected	3.1	Not Detected
Freon 11	0.24	Not Detected	1.3	Not Detected
Ethanol	1.2	8.8	2.2	16
Freon 113	0.24	Not Detected	1.8	Not Detected
1,1-Dichloroethene	0.24	Not Detected	0.94	Not Detected
Acetone	1.2	3.6	2.8	8.7
2-Propanol	1.2	40	2.9	99
Carbon Disulfide	1.2	Not Detected	3.7	Not Detected
3-Chloropropene	1.2	Not Detected	3.7	Not Detected
Methylene Chloride	0.48	Not Detected	1.6	Not Detected
Methyl tert-butyl ether	0.24	Not Detected	0.86	Not Detected
trans-1,2-Dichloroethene	0.24	Not Detected	0.94	Not Detected
Hexane	0.24	Not Detected	0.84	Not Detected
1,1-Dichloroethane	0.24	Not Detected	0.96	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1.2	Not Detected	3.5	Not Detected
cis-1,2-Dichloroethene	0.24	Not Detected	0.94	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.5	Not Detected
Chloroform	0.24	Not Detected	1.2	Not Detected
1,1,1-Trichloroethane	0.24	Not Detected	1.3	Not Detected
Cyclohexane	0.24	Not Detected	0.82	Not Detected
Carbon Tetrachloride	0.24	Not Detected	1.5	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.6	Not Detected
Benzene	0.24	Not Detected	0.76	Not Detected
1,2-Dichloroethane	0.24	Not Detected	0.96	Not Detected
Heptane	0.24	Not Detected	0.98	Not Detected
Trichloroethene	0.24	Not Detected	1.3	Not Detected
1,2-Dichloropropane	0.24	Not Detected	1.1	Not Detected
1,4-Dioxane	0.24	Not Detected	0.86	Not Detected
Bromodichloromethane	0.24	Not Detected	1.6	Not Detected
cis-1,3-Dichloropropene	0.24	Not Detected	1.1	Not Detected
4-Methyl-2-pentanone	0.24	Not Detected	0.97	Not Detected
Toluene	0.24	0.29	0.90	1.1
trans-1,3-Dichloropropene	0.24	Not Detected	1.1	Not Detected
1,1,2-Trichloroethane	0.24	Not Detected	1.3	Not Detected
Tetrachloroethene	0.24	74	1.6	500
2-Hexanone	1.2	Not Detected	4.9	Not Detected

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Client Sample ID: SGP-1

Lab ID#: 1312016-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121607**	**Date of Collection: 11/25/13 11:59:00 AM**	
Dil. Factor:	**2.38**	**Date of Analysis: 12/16/13 12:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.24	Not Detected	2.0	Not Detected
1,2-Dibromoethane (EDB)	0.24	Not Detected	1.8	Not Detected
Chlorobenzene	0.24	0.29	1.1	1.3
Ethyl Benzene	0.24	Not Detected	1.0	Not Detected
m,p-Xylene	0.24	Not Detected	1.0	Not Detected
o-Xylene	0.24	Not Detected	1.0	Not Detected
Styrene	0.24	Not Detected	1.0	Not Detected
Bromoform	0.24	Not Detected	2.5	Not Detected
Cumene	0.24	Not Detected	1.2	Not Detected
1,1,2,2-Tetrachloroethane	0.24	Not Detected	1.6	Not Detected
Propylbenzene	0.24	Not Detected	1.2	Not Detected
4-Ethyltoluene	0.24	Not Detected	1.2	Not Detected
1,3,5-Trimethylbenzene	0.24	Not Detected	1.2	Not Detected
1,2,4-Trimethylbenzene	0.24	Not Detected	1.2	Not Detected
1,3-Dichlorobenzene	0.24	Not Detected	1.4	Not Detected
1,4-Dichlorobenzene	0.24	Not Detected	1.4	Not Detected
alpha-Chlorotoluene	0.24	Not Detected	1.2	Not Detected
1,2-Dichlorobenzene	0.24	Not Detected	1.4	Not Detected
1,2,4-Trichlorobenzene	1.2	Not Detected UJ	8.8	Not Detected UJ
Hexachlorobutadiene	1.2	Not Detected	13	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	83	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: SGP-2

Lab ID#: 1312016-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121713**	**Date of Collection: 11/25/13 12:32:00 PM**	
Dil. Factor:	**9.68**	**Date of Analysis: 12/17/13 05:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	4.8	Not Detected	24	Not Detected
Freon 114	4.8	Not Detected	34	Not Detected
Chloromethane	48	Not Detected	100	Not Detected
Vinyl Chloride	4.8	Not Detected	12	Not Detected
1,3-Butadiene	4.8	Not Detected	11	Not Detected
Bromomethane	48	Not Detected	190	Not Detected
Chloroethane	19	Not Detected	51	Not Detected
Freon 11	4.8	Not Detected	27	Not Detected
Ethanol	19	Not Detected	36	Not Detected
Freon 113	4.8	Not Detected	37	Not Detected
1,1-Dichloroethene	4.8	Not Detected	19	Not Detected
Acetone	48	Not Detected	110	Not Detected
2-Propanol	19	64	48	160
Carbon Disulfide	19	Not Detected	60	Not Detected
3-Chloropropene	19	Not Detected	60	Not Detected
Methylene Chloride	48	Not Detected	170	Not Detected
Methyl tert-butyl ether	4.8	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	4.8	Not Detected	19	Not Detected
Hexane	4.8	Not Detected	17	Not Detected
1,1-Dichloroethane	4.8	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	19	Not Detected	57	Not Detected
cis-1,2-Dichloroethene	4.8	5.6	19	22
Tetrahydrofuran	4.8	Not Detected	14	Not Detected
Chloroform	4.8	33	24	160
1,1,1-Trichloroethane	4.8	Not Detected	26	Not Detected
Cyclohexane	4.8	Not Detected	17	Not Detected
Carbon Tetrachloride	4.8	Not Detected	30	Not Detected
2,2,4-Trimethylpentane	4.8	Not Detected	23	Not Detected
Benzene	4.8	Not Detected	15	Not Detected
1,2-Dichloroethane	4.8	Not Detected	20	Not Detected
Heptane	4.8	Not Detected	20	Not Detected
Trichloroethene	4.8	81	26	440
1,2-Dichloropropane	4.8	Not Detected	22	Not Detected
1,4-Dioxane	19	Not Detected	70	Not Detected
Bromodichloromethane	4.8	Not Detected	32	Not Detected
cis-1,3-Dichloropropene	4.8	Not Detected	22	Not Detected
4-Methyl-2-pentanone	4.8	Not Detected	20	Not Detected
Toluene	4.8	Not Detected	18	Not Detected
trans-1,3-Dichloropropene	4.8	Not Detected	22	Not Detected
1,1,2-Trichloroethane	4.8	Not Detected	26	Not Detected
Tetrachloroethene	4.8	1100	33	7700
2-Hexanone	19	Not Detected	79	Not Detected

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Client Sample ID: SGP-2

Lab ID#: 1312016-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121713**	**Date of Collection: 11/25/13 12:32:00 PM**	
Dil. Factor:	**9.68**	**Date of Analysis: 12/17/13 05:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	4.8	Not Detected	41	Not Detected
1,2-Dibromoethane (EDB)	4.8	Not Detected	37	Not Detected
Chlorobenzene	4.8	Not Detected	22	Not Detected
Ethyl Benzene	4.8	Not Detected	21	Not Detected
m,p-Xylene	4.8	Not Detected	21	Not Detected
o-Xylene	4.8	Not Detected	21	Not Detected
Styrene	4.8	Not Detected	21	Not Detected
Bromoform	4.8	Not Detected	50	Not Detected
Cumene	4.8	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	4.8	Not Detected	33	Not Detected
Propylbenzene	4.8	Not Detected	24	Not Detected
4-Ethyltoluene	4.8	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	4.8	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	4.8	Not Detected	24	Not Detected
1,3-Dichlorobenzene	4.8	Not Detected	29	Not Detected
1,4-Dichlorobenzene	4.8	Not Detected	29	Not Detected
alpha-Chlorotoluene	4.8	Not Detected	25	Not Detected
1,2-Dichlorobenzene	4.8	Not Detected	29	Not Detected
1,2,4-Trichlorobenzene	19	Not Detected	140	Not Detected
Hexachlorobutadiene	19	Not Detected	210	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: SGP-5

Lab ID#: 1312016-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121714**	**Date of Collection: 11/25/13 1:24:00 PM**	
Dil. Factor:	**6.45**	**Date of Analysis: 12/17/13 06:05 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.2	Not Detected	16	Not Detected
Freon 114	3.2	Not Detected	22	Not Detected
Chloromethane	32	Not Detected	66	Not Detected
Vinyl Chloride	3.2	Not Detected	8.2	Not Detected
1,3-Butadiene	3.2	Not Detected	7.1	Not Detected
Bromomethane	32	Not Detected	120	Not Detected
Chloroethane	13	Not Detected	34	Not Detected
Freon 11	3.2	Not Detected	18	Not Detected
Ethanol	13	13	24	25
Freon 113	3.2	Not Detected	25	Not Detected
1,1-Dichloroethene	3.2	Not Detected	13	Not Detected
Acetone	32	Not Detected	77	Not Detected
2-Propanol	13	180	32	450
Carbon Disulfide	13	Not Detected	40	Not Detected
3-Chloropropene	13	Not Detected	40	Not Detected
Methylene Chloride	32	Not Detected	110	Not Detected
Methyl tert-butyl ether	3.2	Not Detected	12	Not Detected
trans-1,2-Dichloroethene	3.2	Not Detected	13	Not Detected
Hexane	3.2	Not Detected	11	Not Detected
1,1-Dichloroethane	3.2	Not Detected	13	Not Detected
2-Butanone (Methyl Ethyl Ketone)	13	Not Detected	38	Not Detected
cis-1,2-Dichloroethene	3.2	Not Detected	13	Not Detected
Tetrahydrofuran	3.2	Not Detected	9.5	Not Detected
Chloroform	3.2	10	16	50
1,1,1-Trichloroethane	3.2	Not Detected	18	Not Detected
Cyclohexane	3.2	Not Detected	11	Not Detected
Carbon Tetrachloride	3.2	Not Detected	20	Not Detected
2,2,4-Trimethylpentane	3.2	Not Detected	15	Not Detected
Benzene	3.2	Not Detected	10	Not Detected
1,2-Dichloroethane	3.2	Not Detected	13	Not Detected
Heptane	3.2	Not Detected	13	Not Detected
Trichloroethene	3.2	40	17	220
1,2-Dichloropropane	3.2	Not Detected	15	Not Detected
1,4-Dioxane	13	Not Detected	46	Not Detected
Bromodichloromethane	3.2	Not Detected	22	Not Detected
cis-1,3-Dichloropropene	3.2	Not Detected	15	Not Detected
4-Methyl-2-pentanone	3.2	Not Detected	13	Not Detected
Toluene	3.2	Not Detected	12	Not Detected
trans-1,3-Dichloropropene	3.2	Not Detected	15	Not Detected
1,1,2-Trichloroethane	3.2	Not Detected	18	Not Detected
Tetrachloroethene	3.2	800	22	5400
2-Hexanone	13	Not Detected	53	Not Detected

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Client Sample ID: SGP-5

Lab ID#: 1312016-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121714**	**Date of Collection: 11/25/13 1:24:00 PM**	
Dil. Factor:	**6.45**	**Date of Analysis: 12/17/13 06:05 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	3.2	Not Detected	27	Not Detected
1,2-Dibromoethane (EDB)	3.2	Not Detected	25	Not Detected
Chlorobenzene	3.2	Not Detected	15	Not Detected
Ethyl Benzene	3.2	Not Detected	14	Not Detected
m,p-Xylene	3.2	Not Detected	14	Not Detected
o-Xylene	3.2	Not Detected	14	Not Detected
Styrene	3.2	Not Detected	14	Not Detected
Bromoform	3.2	Not Detected	33	Not Detected
Cumene	3.2	Not Detected	16	Not Detected
1,1,2,2-Tetrachloroethane	3.2	Not Detected	22	Not Detected
Propylbenzene	3.2	Not Detected	16	Not Detected
4-Ethyltoluene	3.2	Not Detected	16	Not Detected
1,3,5-Trimethylbenzene	3.2	Not Detected	16	Not Detected
1,2,4-Trimethylbenzene	3.2	Not Detected	16	Not Detected
1,3-Dichlorobenzene	3.2	Not Detected	19	Not Detected
1,4-Dichlorobenzene	3.2	Not Detected	19	Not Detected
alpha-Chlorotoluene	3.2	Not Detected	17	Not Detected
1,2-Dichlorobenzene	3.2	Not Detected	19	Not Detected
1,2,4-Trichlorobenzene	13	Not Detected	96	Not Detected
Hexachlorobutadiene	13	Not Detected	140	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: SGP-6

Lab ID#: 1312016-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121816**	**Date of Collection: 11/25/13 1:47:00 PM**	
Dil. Factor:	**233**	**Date of Analysis: 12/18/13 06:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	120	Not Detected	580	Not Detected
Freon 114	120	Not Detected	810	Not Detected
Chloromethane	1200	Not Detected	2400	Not Detected
Vinyl Chloride	120	Not Detected	300	Not Detected
1,3-Butadiene	120	Not Detected	260	Not Detected
Bromomethane	1200	Not Detected	4500	Not Detected
Chloroethane	470	Not Detected	1200	Not Detected
Freon 11	120	Not Detected	650	Not Detected
Ethanol	470	Not Detected UJ	880	Not Detected UJ
Freon 113	120	Not Detected	890	Not Detected
1,1-Dichloroethene	120	Not Detected	460	Not Detected
Acetone	1200	Not Detected	2800	Not Detected
2-Propanol	470	82000 E	1100	200000 E
Carbon Disulfide	470	Not Detected	1400	Not Detected
3-Chloropropene	470	Not Detected	1400	Not Detected
Methylene Chloride	1200	Not Detected	4000	Not Detected
Methyl tert-butyl ether	120	Not Detected	420	Not Detected
trans-1,2-Dichloroethene	120	Not Detected	460	Not Detected
Hexane	120	Not Detected	410	Not Detected
1,1-Dichloroethane	120	Not Detected	470	Not Detected
2-Butanone (Methyl Ethyl Ketone)	470	Not Detected	1400	Not Detected
cis-1,2-Dichloroethene	120	Not Detected	460	Not Detected
Tetrahydrofuran	120	Not Detected	340	Not Detected
Chloroform	120	Not Detected	570	Not Detected
1,1,1-Trichloroethane	120	Not Detected	640	Not Detected
Cyclohexane	120	Not Detected	400	Not Detected
Carbon Tetrachloride	120	Not Detected	730	Not Detected
2,2,4-Trimethylpentane	120	Not Detected	540	Not Detected
Benzene	120	Not Detected	370	Not Detected
1,2-Dichloroethane	120	Not Detected	470	Not Detected
Heptane	120	Not Detected	480	Not Detected
Trichloroethene	120	Not Detected	630	Not Detected
1,2-Dichloropropane	120	Not Detected	540	Not Detected
1,4-Dioxane	470	Not Detected	1700	Not Detected
Bromodichloromethane	120	Not Detected	780	Not Detected
cis-1,3-Dichloropropene	120	Not Detected	530	Not Detected
4-Methyl-2-pentanone	120	Not Detected	480	Not Detected
Toluene	120	220	440	840
trans-1,3-Dichloropropene	120	Not Detected	530	Not Detected
1,1,2-Trichloroethane	120	Not Detected	640	Not Detected
Tetrachloroethene	120	Not Detected	790	Not Detected
2-Hexanone	470	Not Detected	1900	Not Detected

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Client Sample ID: SGP-6

Lab ID#: 1312016-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121816**	**Date of Collection: 11/25/13 1:47:00 PM**	
Dil. Factor:	**233**	**Date of Analysis: 12/18/13 06:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	120	Not Detected	990	Not Detected
1,2-Dibromoethane (EDB)	120	Not Detected	900	Not Detected
Chlorobenzene	120	Not Detected	540	Not Detected
Ethyl Benzene	120	Not Detected	500	Not Detected
m,p-Xylene	120	Not Detected	500	Not Detected
o-Xylene	120	Not Detected	500	Not Detected
Styrene	120	Not Detected	500	Not Detected
Bromoform	120	Not Detected	1200	Not Detected
Cumene	120	Not Detected	570	Not Detected
1,1,2,2-Tetrachloroethane	120	Not Detected	800	Not Detected
Propylbenzene	120	Not Detected	570	Not Detected
4-Ethyltoluene	120	Not Detected	570	Not Detected
1,3,5-Trimethylbenzene	120	Not Detected	570	Not Detected
1,2,4-Trimethylbenzene	120	Not Detected	570	Not Detected
1,3-Dichlorobenzene	120	Not Detected	700	Not Detected
1,4-Dichlorobenzene	120	Not Detected	700	Not Detected
alpha-Chlorotoluene	120	Not Detected	600	Not Detected
1,2-Dichlorobenzene	120	Not Detected	700	Not Detected
1,2,4-Trichlorobenzene	470	Not Detected	3400	Not Detected
Hexachlorobutadiene	470	Not Detected	5000	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.
E = Exceeds instrument calibration range.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	112	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1312016-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121606**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/16/13 11:28 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.10	Not Detected	0.49	Not Detected
Freon 114	0.10	Not Detected	0.70	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.10	Not Detected	0.26	Not Detected
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
3-Chloropropene	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
Carbon Tetrachloride	0.10	Not Detected	0.63	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
1,2-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,2-Dichloropropane	0.10	Not Detected	0.46	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
Bromodichloromethane	0.10	Not Detected	0.67	Not Detected
cis-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
trans-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
1,1,2-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
2-Hexanone	0.50	Not Detected	2.0	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1312016-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121606**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/16/13 11:28 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.10	Not Detected	0.85	Not Detected
1,2-Dibromoethane (EDB)	0.10	Not Detected	0.77	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
Bromoform	0.10	Not Detected	1.0	Not Detected
Cumene	0.10	Not Detected	0.49	Not Detected
1,1,2,2-Tetrachloroethane	0.10	Not Detected	0.69	Not Detected
Propylbenzene	0.10	Not Detected	0.49	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
alpha-Chlorotoluene	0.10	Not Detected	0.52	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected UJ	3.7	Not Detected UJ
Hexachlorobutadiene	0.50	Not Detected	5.3	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	82	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1312016-05B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121707**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/17/13 01:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1312016-05B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121707**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/17/13 01:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1312016-05C

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121809**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 01:41 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected UJ	3.8	Not Detected UJ
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1312016-05C

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121809**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 01:41 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	114	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: CCV

Lab ID#: 1312016-06A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121602**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/16/13 08:54 AM**

Compound	%Recovery
Freon 12	96
Freon 114	105
Chloromethane	98
Vinyl Chloride	109
1,3-Butadiene	106
Bromomethane	106
Chloroethane	87
Freon 11	81
Ethanol	81
Freon 113	97
1,1-Dichloroethene	98
Acetone	71
2-Propanol	88
Carbon Disulfide	95
3-Chloropropene	94
Methylene Chloride	95
Methyl tert-butyl ether	89
trans-1,2-Dichloroethene	95
Hexane	86
1,1-Dichloroethane	82
2-Butanone (Methyl Ethyl Ketone)	92
cis-1,2-Dichloroethene	95
Tetrahydrofuran	86
Chloroform	88
1,1,1-Trichloroethane	85
Cyclohexane	94
Carbon Tetrachloride	94
2,2,4-Trimethylpentane	84
Benzene	90
1,2-Dichloroethane	83
Heptane	88
Trichloroethene	102
1,2-Dichloropropane	86
1,4-Dioxane	102
Bromodichloromethane	92
cis-1,3-Dichloropropene	99
4-Methyl-2-pentanone	89
Toluene	93
trans-1,3-Dichloropropene	97
1,1,2-Trichloroethane	102
Tetrachloroethene	101
2-Hexanone	94

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Client Sample ID: CCV

Lab ID#: 1312016-06A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121602**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/16/13 08:54 AM**

Compound	%Recovery
Dibromochloromethane	102
1,2-Dibromoethane (EDB)	98
Chlorobenzene	95
Ethyl Benzene	95
m,p-Xylene	96
o-Xylene	91
Styrene	92
Bromoform	105
Cumene	89
1,1,2,2-Tetrachloroethane	90
Propylbenzene	82
4-Ethyltoluene	86
1,3,5-Trimethylbenzene	82
1,2,4-Trimethylbenzene	81
1,3-Dichlorobenzene	82
1,4-Dichlorobenzene	78
alpha-Chlorotoluene	81
1,2-Dichlorobenzene	80
1,2,4-Trichlorobenzene	63 Q
Hexachlorobutadiene	71

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: CCV

Lab ID#: 1312016-06B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/17/13 09:22 AM**	

Compound	%Recovery
Freon 12	97
Freon 114	93
Chloromethane	103
Vinyl Chloride	89
1,3-Butadiene	84
Bromomethane	84
Chloroethane	89
Freon 11	100
Ethanol	72
Freon 113	84
1,1-Dichloroethene	92
Acetone	78
2-Propanol	88
Carbon Disulfide	89
3-Chloropropene	89
Methylene Chloride	87
Methyl tert-butyl ether	89
trans-1,2-Dichloroethene	90
Hexane	84
1,1-Dichloroethane	93
2-Butanone (Methyl Ethyl Ketone)	92
cis-1,2-Dichloroethene	88
Tetrahydrofuran	80
Chloroform	96
1,1,1-Trichloroethane	95
Cyclohexane	87
Carbon Tetrachloride	96
2,2,4-Trimethylpentane	86
Benzene	96
1,2-Dichloroethane	101
Heptane	95
Trichloroethene	93
1,2-Dichloropropane	97
1,4-Dioxane	90
Bromodichloromethane	100
cis-1,3-Dichloropropene	94
4-Methyl-2-pentanone	91
Toluene	99
trans-1,3-Dichloropropene	93
1,1,2-Trichloroethane	96
Tetrachloroethene	86
2-Hexanone	91

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Client Sample ID: CCV

Lab ID#: 1312016-06B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/17/13 09:22 AM**	

Compound	%Recovery
Dibromochloromethane	94
1,2-Dibromoethane (EDB)	98
Chlorobenzene	84
Ethyl Benzene	97
m,p-Xylene	98
o-Xylene	99
Styrene	97
Bromoform	97
Cumene	95
1,1,2,2-Tetrachloroethane	96
Propylbenzene	93
4-Ethyltoluene	91
1,3,5-Trimethylbenzene	97
1,2,4-Trimethylbenzene	91
1,3-Dichlorobenzene	98
1,4-Dichlorobenzene	100
alpha-Chlorotoluene	95
1,2-Dichlorobenzene	98
1,2,4-Trichlorobenzene	112
Hexachlorobutadiene	113

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: CCV

Lab ID#: 1312016-06C

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:22 AM**	

Compound	%Recovery
Freon 12	100
Freon 114	92
Chloromethane	104
Vinyl Chloride	89
1,3-Butadiene	81
Bromomethane	86
Chloroethane	87
Freon 11	104
Ethanol	69 Q
Freon 113	86
1,1-Dichloroethene	87
Acetone	74
2-Propanol	93
Carbon Disulfide	87
3-Chloropropene	89
Methylene Chloride	88
Methyl tert-butyl ether	89
trans-1,2-Dichloroethene	93
Hexane	82
1,1-Dichloroethane	94
2-Butanone (Methyl Ethyl Ketone)	92
cis-1,2-Dichloroethene	89
Tetrahydrofuran	80
Chloroform	97
1,1,1-Trichloroethane	98
Cyclohexane	88
Carbon Tetrachloride	101
2,2,4-Trimethylpentane	89
Benzene	95
1,2-Dichloroethane	105
Heptane	93
Trichloroethene	95
1,2-Dichloropropane	97
1,4-Dioxane	91
Bromodichloromethane	102
cis-1,3-Dichloropropene	93
4-Methyl-2-pentanone	92
Toluene	101
trans-1,3-Dichloropropene	93
1,1,2-Trichloroethane	96
Tetrachloroethene	88
2-Hexanone	91

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Client Sample ID: CCV

Lab ID#: 1312016-06C

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:22 AM**	

Compound	%Recovery
Dibromochloromethane	95
1,2-Dibromoethane (EDB)	100
Chlorobenzene	84
Ethyl Benzene	99
m,p-Xylene	100
o-Xylene	100
Styrene	96
Bromoform	98
Cumene	96
1,1,2,2-Tetrachloroethane	98
Propylbenzene	94
4-Ethyltoluene	93
1,3,5-Trimethylbenzene	99
1,2,4-Trimethylbenzene	93
1,3-Dichlorobenzene	99
1,4-Dichlorobenzene	101
alpha-Chlorotoluene	96
1,2-Dichlorobenzene	100
1,2,4-Trichlorobenzene	114
Hexachlorobutadiene	116

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: LCS

Lab ID#: 1312016-07A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/16/13 09:36 AM**	

Compound	%Recovery	Method Limits
Freon 12	97	70-130
Freon 114	109	70-130
Chloromethane	97	70-130
Vinyl Chloride	111	70-130
1,3-Butadiene	106	70-130
Bromomethane	115	70-130
Chloroethane	98	70-130
Freon 11	83	70-130
Ethanol	89	70-130
Freon 113	115	70-130
1,1-Dichloroethene	122	70-130
Acetone	79	70-130
2-Propanol	93	70-130
Carbon Disulfide	96	70-130
3-Chloropropene	100	70-130
Methylene Chloride	115	70-130
Methyl tert-butyl ether	95	70-130
trans-1,2-Dichloroethene	91	70-130
Hexane	96	70-130
1,1-Dichloroethane	95	70-130
2-Butanone (Methyl Ethyl Ketone)	97	70-130
cis-1,2-Dichloroethene	117	70-130
Tetrahydrofuran	92	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	91	70-130
Cyclohexane	102	70-130
Carbon Tetrachloride	100	70-130
2,2,4-Trimethylpentane	91	70-130
Benzene	94	70-130
1,2-Dichloroethane	85	70-130
Heptane	95	70-130
Trichloroethene	106	70-130
1,2-Dichloropropane	90	70-130
1,4-Dioxane	103	70-130
Bromodichloromethane	97	70-130
cis-1,3-Dichloropropene	105	70-130
4-Methyl-2-pentanone	89	70-130
Toluene	93	70-130
trans-1,3-Dichloropropene	96	70-130
1,1,2-Trichloroethane	106	70-130
Tetrachloroethene	104	70-130
2-Hexanone	99	70-130

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Client Sample ID: LCS

Lab ID#: 1312016-07A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/16/13 09:36 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	113	70-130
1,2-Dibromoethane (EDB)	104	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	99	70-130
o-Xylene	96	70-130
Styrene	96	70-130
Bromoform	117	70-130
Cumene	95	70-130
1,1,2,2-Tetrachloroethane	94	70-130
Propylbenzene	89	70-130
4-Ethyltoluene	91	70-130
1,3,5-Trimethylbenzene	84	70-130
1,2,4-Trimethylbenzene	84	70-130
1,3-Dichlorobenzene	87	70-130
1,4-Dichlorobenzene	80	70-130
alpha-Chlorotoluene	89	70-130
1,2-Dichlorobenzene	82	70-130
1,2,4-Trichlorobenzene	76	70-130
Hexachlorobutadiene	82	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	81	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: LCSD

Lab ID#: 1312016-07AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/16/13 10:17 AM**	

Compound	%Recovery	Method Limits
Freon 12	99	70-130
Freon 114	110	70-130
Chloromethane	98	70-130
Vinyl Chloride	112	70-130
1,3-Butadiene	107	70-130
Bromomethane	114	70-130
Chloroethane	98	70-130
Freon 11	88	70-130
Ethanol	85	70-130
Freon 113	118	70-130
1,1-Dichloroethene	126	70-130
Acetone	79	70-130
2-Propanol	95	70-130
Carbon Disulfide	96	70-130
3-Chloropropene	102	70-130
Methylene Chloride	115	70-130
Methyl tert-butyl ether	96	70-130
trans-1,2-Dichloroethene	90	70-130
Hexane	94	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	103	70-130
cis-1,2-Dichloroethene	118	70-130
Tetrahydrofuran	93	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	93	70-130
Cyclohexane	103	70-130
Carbon Tetrachloride	100	70-130
2,2,4-Trimethylpentane	92	70-130
Benzene	98	70-130
1,2-Dichloroethane	88	70-130
Heptane	96	70-130
Trichloroethene	108	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	112	70-130
Bromodichloromethane	101	70-130
cis-1,3-Dichloropropene	108	70-130
4-Methyl-2-pentanone	92	70-130
Toluene	96	70-130
trans-1,3-Dichloropropene	89	70-130
1,1,2-Trichloroethane	101	70-130
Tetrachloroethene	101	70-130
2-Hexanone	95	70-130

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Client Sample ID: LCSD

Lab ID#: 1312016-07AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/16/13 10:17 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	108	70-130
1,2-Dibromoethane (EDB)	100	70-130
Chlorobenzene	96	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	98	70-130
o-Xylene	90	70-130
Styrene	92	70-130
Bromoform	111	70-130
Cumene	92	70-130
1,1,2,2-Tetrachloroethane	89	70-130
Propylbenzene	84	70-130
4-Ethyltoluene	84	70-130
1,3,5-Trimethylbenzene	80	70-130
1,2,4-Trimethylbenzene	77	70-130
1,3-Dichlorobenzene	81	70-130
1,4-Dichlorobenzene	76	70-130
alpha-Chlorotoluene	86	70-130
1,2-Dichlorobenzene	80	70-130
1,2,4-Trichlorobenzene	67 Q	70-130
Hexachlorobutadiene	78	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	82	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: LCS

Lab ID#: 1312016-07B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/17/13 09:56 AM**	

Compound	%Recovery	Method Limits
Freon 12	98	70-130
Freon 114	93	70-130
Chloromethane	109	70-130
Vinyl Chloride	92	70-130
1,3-Butadiene	88	70-130
Bromomethane	86	70-130
Chloroethane	89	70-130
Freon 11	101	70-130
Ethanol	76	70-130
Freon 113	98	70-130
1,1-Dichloroethene	102	70-130
Acetone	82	70-130
2-Propanol	90	70-130
Carbon Disulfide	83	70-130
3-Chloropropene	93	70-130
Methylene Chloride	97	70-130
Methyl tert-butyl ether	91	70-130
trans-1,2-Dichloroethene	81	70-130
Hexane	89	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	92	70-130
cis-1,2-Dichloroethene	100	70-130
Tetrahydrofuran	82	70-130
Chloroform	98	70-130
1,1,1-Trichloroethane	96	70-130
Cyclohexane	93	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	90	70-130
Benzene	96	70-130
1,2-Dichloroethane	100	70-130
Heptane	93	70-130
Trichloroethene	94	70-130
1,2-Dichloropropane	96	70-130
1,4-Dioxane	95	70-130
Bromodichloromethane	102	70-130
cis-1,3-Dichloropropene	96	70-130
4-Methyl-2-pentanone	93	70-130
Toluene	96	70-130
trans-1,3-Dichloropropene	86	70-130
1,1,2-Trichloroethane	92	70-130
Tetrachloroethene	84	70-130
2-Hexanone	90	70-130

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Client Sample ID: LCS

Lab ID#: 1312016-07B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/17/13 09:56 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	95	70-130
1,2-Dibromoethane (EDB)	95	70-130
Chlorobenzene	80	70-130
Ethyl Benzene	94	70-130
m,p-Xylene	95	70-130
o-Xylene	94	70-130
Styrene	94	70-130
Bromoform	98	70-130
Cumene	94	70-130
1,1,2,2-Tetrachloroethane	93	70-130
Propylbenzene	93	70-130
4-Ethyltoluene	92	70-130
1,3,5-Trimethylbenzene	94	70-130
1,2,4-Trimethylbenzene	87	70-130
1,3-Dichlorobenzene	94	70-130
1,4-Dichlorobenzene	96	70-130
alpha-Chlorotoluene	100	70-130
1,2-Dichlorobenzene	95	70-130
1,2,4-Trichlorobenzene	114	70-130
Hexachlorobutadiene	114	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	109	70-130

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Client Sample ID: LCSD

Lab ID#: 1312016-07BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/17/13 11:04 AM**	

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Freon 114	97	70-130
Chloromethane	114	70-130
Vinyl Chloride	96	70-130
1,3-Butadiene	88	70-130
Bromomethane	90	70-130
Chloroethane	94	70-130
Freon 11	103	70-130
Ethanol	78	70-130
Freon 113	100	70-130
1,1-Dichloroethene	104	70-130
Acetone	82	70-130
2-Propanol	91	70-130
Carbon Disulfide	84	70-130
3-Chloropropene	93	70-130
Methylene Chloride	100	70-130
Methyl tert-butyl ether	92	70-130
trans-1,2-Dichloroethene	84	70-130
Hexane	91	70-130
1,1-Dichloroethane	100	70-130
2-Butanone (Methyl Ethyl Ketone)	93	70-130
cis-1,2-Dichloroethene	102	70-130
Tetrahydrofuran	84	70-130
Chloroform	99	70-130
1,1,1-Trichloroethane	98	70-130
Cyclohexane	94	70-130
Carbon Tetrachloride	100	70-130
2,2,4-Trimethylpentane	92	70-130
Benzene	95	70-130
1,2-Dichloroethane	100	70-130
Heptane	94	70-130
Trichloroethene	93	70-130
1,2-Dichloropropane	93	70-130
1,4-Dioxane	95	70-130
Bromodichloromethane	101	70-130
cis-1,3-Dichloropropene	96	70-130
4-Methyl-2-pentanone	91	70-130
Toluene	95	70-130
trans-1,3-Dichloropropene	87	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	85	70-130
2-Hexanone	92	70-130

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Client Sample ID: LCSD

Lab ID#: 1312016-07BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/17/13 11:04 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	97	70-130
1,2-Dibromoethane (EDB)	97	70-130
Chlorobenzene	80	70-130
Ethyl Benzene	96	70-130
m,p-Xylene	95	70-130
o-Xylene	95	70-130
Styrene	96	70-130
Bromoform	99	70-130
Cumene	96	70-130
1,1,2,2-Tetrachloroethane	94	70-130
Propylbenzene	94	70-130
4-Ethyltoluene	92	70-130
1,3,5-Trimethylbenzene	95	70-130
1,2,4-Trimethylbenzene	88	70-130
1,3-Dichlorobenzene	95	70-130
1,4-Dichlorobenzene	98	70-130
alpha-Chlorotoluene	101	70-130
1,2-Dichlorobenzene	96	70-130
1,2,4-Trichlorobenzene	115	70-130
Hexachlorobutadiene	115	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: LCS

Lab ID#: 1312016-07C

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:59 AM**	

Compound	%Recovery	Method Limits
Freon 12	98	70-130
Freon 114	92	70-130
Chloromethane	106	70-130
Vinyl Chloride	89	70-130
1,3-Butadiene	81	70-130
Bromomethane	85	70-130
Chloroethane	87	70-130
Freon 11	102	70-130
Ethanol	69 Q	70-130
Freon 113	97	70-130
1,1-Dichloroethene	100	70-130
Acetone	78	70-130
2-Propanol	90	70-130
Carbon Disulfide	80	70-130
3-Chloropropene	88	70-130
Methylene Chloride	93	70-130
Methyl tert-butyl ether	87	70-130
trans-1,2-Dichloroethene	79	70-130
Hexane	84	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	91	70-130
cis-1,2-Dichloroethene	96	70-130
Tetrahydrofuran	80	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	96	70-130
Cyclohexane	90	70-130
Carbon Tetrachloride	100	70-130
2,2,4-Trimethylpentane	88	70-130
Benzene	96	70-130
1,2-Dichloroethane	106	70-130
Heptane	93	70-130
Trichloroethene	96	70-130
1,2-Dichloropropane	98	70-130
1,4-Dioxane	96	70-130
Bromodichloromethane	106	70-130
cis-1,3-Dichloropropene	97	70-130
4-Methyl-2-pentanone	93	70-130
Toluene	99	70-130
trans-1,3-Dichloropropene	84	70-130
1,1,2-Trichloroethane	91	70-130
Tetrachloroethene	84	70-130
2-Hexanone	89	70-130

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Client Sample ID: LCS

Lab ID#: 1312016-07C

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:59 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	96	70-130
1,2-Dibromoethane (EDB)	95	70-130
Chlorobenzene	79	70-130
Ethyl Benzene	93	70-130
m,p-Xylene	94	70-130
o-Xylene	92	70-130
Styrene	93	70-130
Bromoform	97	70-130
Cumene	94	70-130
1,1,2,2-Tetrachloroethane	93	70-130
Propylbenzene	92	70-130
4-Ethyltoluene	90	70-130
1,3,5-Trimethylbenzene	95	70-130
1,2,4-Trimethylbenzene	86	70-130
1,3-Dichlorobenzene	96	70-130
1,4-Dichlorobenzene	95	70-130
alpha-Chlorotoluene	98	70-130
1,2-Dichlorobenzene	94	70-130
1,2,4-Trichlorobenzene	115	70-130
Hexachlorobutadiene	111	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	107	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	107	70-130

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Client Sample ID: LCSD

Lab ID#: 1312016-07CC

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 10:36 AM**	

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Freon 114	96	70-130
Chloromethane	110	70-130
Vinyl Chloride	92	70-130
1,3-Butadiene	85	70-130
Bromomethane	87	70-130
Chloroethane	89	70-130
Freon 11	106	70-130
Ethanol	74	70-130
Freon 113	98	70-130
1,1-Dichloroethene	103	70-130
Acetone	80	70-130
2-Propanol	95	70-130
Carbon Disulfide	83	70-130
3-Chloropropene	90	70-130
Methylene Chloride	98	70-130
Methyl tert-butyl ether	92	70-130
trans-1,2-Dichloroethene	80	70-130
Hexane	88	70-130
1,1-Dichloroethane	100	70-130
2-Butanone (Methyl Ethyl Ketone)	94	70-130
cis-1,2-Dichloroethene	101	70-130
Tetrahydrofuran	84	70-130
Chloroform	102	70-130
1,1,1-Trichloroethane	99	70-130
Cyclohexane	94	70-130
Carbon Tetrachloride	103	70-130
2,2,4-Trimethylpentane	91	70-130
Benzene	95	70-130
1,2-Dichloroethane	103	70-130
Heptane	92	70-130
Trichloroethene	93	70-130
1,2-Dichloropropane	95	70-130
1,4-Dioxane	94	70-130
Bromodichloromethane	104	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	91	70-130
Toluene	96	70-130
trans-1,3-Dichloropropene	87	70-130
1,1,2-Trichloroethane	92	70-130
Tetrachloroethene	86	70-130
2-Hexanone	91	70-130

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Client Sample ID: LCSD

Lab ID#: 1312016-07CC

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j121804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 10:36 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	96	70-130
1,2-Dibromoethane (EDB)	96	70-130
Chlorobenzene	80	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	96	70-130
o-Xylene	94	70-130
Styrene	94	70-130
Bromoform	99	70-130
Cumene	95	70-130
1,1,2,2-Tetrachloroethane	94	70-130
Propylbenzene	93	70-130
4-Ethyltoluene	93	70-130
1,3,5-Trimethylbenzene	96	70-130
1,2,4-Trimethylbenzene	89	70-130
1,3-Dichlorobenzene	97	70-130
1,4-Dichlorobenzene	98	70-130
alpha-Chlorotoluene	100	70-130
1,2-Dichlorobenzene	97	70-130
1,2,4-Trichlorobenzene	118	70-130
Hexachlorobutadiene	118	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	110	70-130

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Jon Einarsen

Collected by: (Print and Sign) Jon Einarsen

Company Zipper Geo Assoc. Email jeinarsen@zippergeo.com

Address 19023 36th Ave W City Lynnwood State WA Zip 98036

Phone 425.582.9928 Fax

Project Info:
P.O. # 1001.22
Project # 1001.22
Project Name

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SGP-3	37310	12/6/13	111	TO-15 LL	-30+	-5		
02A	SGP-4	1737	12/6/13	1113	TO-15 LL	-30+	-5		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
	12/6/13 1530		12.12.13 0945
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	UPS		4	Good	Yes No (None)	1312183

Form 1293 rev.11

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12/26/2013
Mr. Jon Einarsen
Zipper Geo Associates, LLC
19023 36th Avenue West
Suite D
Lynwood WA 98036

Project Name:
Project #: 1001.22
Workorder #: 1312183

Dear Mr. Jon Einarsen

The following report includes the data for the above referenced project for sample(s) received on 12/12/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Karen Stempson

Project Manager

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WORK ORDER #: 1312183

Work Order Summary

CLIENT:	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036	**BILL TO:**	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036
PHONE:	425-582-9928	**P.O. #**	1001.22
FAX:		**PROJECT #**	1001.22
DATE RECEIVED:	12/12/2013	**CONTACT:**	Karen Stempson
DATE COMPLETED:	12/26/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SGP-3	Modified TO-15	2.8 "Hg	15 psi
02A	SGP-4	Modified TO-15	2.8 "Hg	15 psi
03A	Lab Blank	Modified TO-15	NA	NA
03B	Lab Blank	Modified TO-15	NA	NA
04A	CCV	Modified TO-15	NA	NA
04B	CCV	Modified TO-15	NA	NA
05A	LCS	Modified TO-15	NA	NA
05AA	LCSD	Modified TO-15	NA	NA
05B	LCS	Modified TO-15	NA	NA
05BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 12/26/13

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
Zipper Geo Associates, LLC
Workorder# 1312183

Two 1 Liter Summa Canister (100% Certified) samples were received on December 12, 2013. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

Sample collection time was incorrect on the Chain of Custody (COC) for sample SGP-4. The sampling time was taken from the tag.

Analytical Notes

Sample SGP-3 was diluted and transferred from Low Level analysis to full scan TO-15 due to high levels of target compounds.

Dilution was performed on sample SGP-4 due to the presence of high level target species.

The Relative Percent Difference (RPD) of the LCS/LCSD analyzed on instrument MSD-2 exceeded the acceptance limit for 1,4-Dichlorobenzene.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See

data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SGP-3

Lab ID#: 1312183-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	22	89	55	220
Chloroform	5.6	6.1	27	30
Trichloroethene	5.6	12	30	68
Tetrachloroethene	5.6	1700	38	11000

Client Sample ID: SGP-4

Lab ID#: 1312183-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	7.0	21	16	50
2-Propanol	7.0	330	17	820
trans-1,2-Dichloroethene	1.4	1.7	5.5	6.8
Benzene	1.4	1.5	4.4	4.7
Trichloroethene	1.4	78	7.5	420
Toluene	1.4	1.7	5.2	6.6
Tetrachloroethene	1.4	500	9.4	3400
Chlorobenzene	1.4	1.8	6.4	8.5

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Client Sample ID: SGP-3

Lab ID#: 1312183-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121808**	**Date of Collection:**	**12/6/13 10:36:00 AM**
Dil. Factor:	**11.2**	**Date of Analysis:**	**12/18/13 01:35 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.6	Not Detected	28	Not Detected
Freon 114	5.6	Not Detected	39	Not Detected
Chloromethane	56	Not Detected	120	Not Detected
Vinyl Chloride	5.6	Not Detected	14	Not Detected
1,3-Butadiene	5.6	Not Detected	12	Not Detected
Bromomethane	56	Not Detected	220	Not Detected
Chloroethane	22	Not Detected	59	Not Detected
Freon 11	5.6	Not Detected	31	Not Detected
Ethanol	22	Not Detected	42	Not Detected
Freon 113	5.6	Not Detected	43	Not Detected
1,1-Dichloroethene	5.6	Not Detected	22	Not Detected
Acetone	56	Not Detected	130	Not Detected
2-Propanol	22	89	55	220
Carbon Disulfide	22	Not Detected	70	Not Detected
3-Chloropropene	22	Not Detected	70	Not Detected
Methylene Chloride	56	Not Detected	190	Not Detected
Methyl tert-butyl ether	5.6	Not Detected	20	Not Detected
trans-1,2-Dichloroethene	5.6	Not Detected	22	Not Detected
Hexane	5.6	Not Detected	20	Not Detected
1,1-Dichloroethane	5.6	Not Detected	23	Not Detected
2-Butanone (Methyl Ethyl Ketone)	22	Not Detected	66	Not Detected
cis-1,2-Dichloroethene	5.6	Not Detected	22	Not Detected
Tetrahydrofuran	5.6	Not Detected	16	Not Detected
Chloroform	5.6	6.1	27	30
1,1,1-Trichloroethane	5.6	Not Detected	30	Not Detected
Cyclohexane	5.6	Not Detected	19	Not Detected
Carbon Tetrachloride	5.6	Not Detected	35	Not Detected
2,2,4-Trimethylpentane	5.6	Not Detected	26	Not Detected
Benzene	5.6	Not Detected	18	Not Detected
1,2-Dichloroethane	5.6	Not Detected	23	Not Detected
Heptane	5.6	Not Detected	23	Not Detected
Trichloroethene	5.6	12	30	68
1,2-Dichloropropane	5.6	Not Detected	26	Not Detected
1,4-Dioxane	22	Not Detected	81	Not Detected
Bromodichloromethane	5.6	Not Detected	38	Not Detected
cis-1,3-Dichloropropene	5.6	Not Detected	25	Not Detected
4-Methyl-2-pentanone	5.6	Not Detected	23	Not Detected
Toluene	5.6	Not Detected	21	Not Detected
trans-1,3-Dichloropropene	5.6	Not Detected	25	Not Detected
1,1,2-Trichloroethane	5.6	Not Detected	30	Not Detected
Tetrachloroethene	5.6	1700	38	11000
2-Hexanone	22	Not Detected	92	Not Detected

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Client Sample ID: SGP-3

Lab ID#: 1312183-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121808**	**Date of Collection: 12/6/13 10:36:00 AM**	
Dil. Factor:	**11.2**	**Date of Analysis: 12/18/13 01:35 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.6	Not Detected	48	Not Detected
1,2-Dibromoethane (EDB)	5.6	Not Detected	43	Not Detected
Chlorobenzene	5.6	Not Detected	26	Not Detected
Ethyl Benzene	5.6	Not Detected	24	Not Detected
m,p-Xylene	5.6	Not Detected	24	Not Detected
o-Xylene	5.6	Not Detected	24	Not Detected
Styrene	5.6	Not Detected	24	Not Detected
Bromoform	5.6	Not Detected	58	Not Detected
Cumene	5.6	Not Detected	28	Not Detected
1,1,2,2-Tetrachloroethane	5.6	Not Detected	38	Not Detected
Propylbenzene	5.6	Not Detected	28	Not Detected
4-Ethyltoluene	5.6	Not Detected	28	Not Detected
1,3,5-Trimethylbenzene	5.6	Not Detected	28	Not Detected
1,2,4-Trimethylbenzene	5.6	Not Detected	28	Not Detected
1,3-Dichlorobenzene	5.6	Not Detected	34	Not Detected
1,4-Dichlorobenzene	5.6	Not Detected	34	Not Detected
alpha-Chlorotoluene	5.6	Not Detected	29	Not Detected
1,2-Dichlorobenzene	5.6	Not Detected	34	Not Detected
1,2,4-Trichlorobenzene	22	Not Detected UJ	170	Not Detected UJ
Hexachlorobutadiene	22	Not Detected	240	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	86	70-130

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Client Sample ID: SGP-4

Lab ID#: 1312183-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121822**	**Date of Collection: 12/6/13 11:13:00 AM**	
Dil. Factor:	**13.9**	**Date of Analysis: 12/18/13 11:03 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.4	Not Detected	6.9	Not Detected
Freon 114	1.4	Not Detected	9.7	Not Detected
Chloromethane	7.0	Not Detected	14	Not Detected
Vinyl Chloride	1.4	Not Detected	3.6	Not Detected
1,3-Butadiene	1.4	Not Detected	3.1	Not Detected
Bromomethane	7.0	Not Detected	27	Not Detected
Chloroethane	7.0	Not Detected	18	Not Detected
Freon 11	1.4	Not Detected	7.8	Not Detected
Ethanol	7.0	Not Detected	13	Not Detected
Freon 113	1.4	Not Detected	11	Not Detected
1,1-Dichloroethene	1.4	Not Detected	5.5	Not Detected
Acetone	7.0	21	16	50
2-Propanol	7.0	330	17	820
Carbon Disulfide	7.0	Not Detected	22	Not Detected
3-Chloropropene	7.0	Not Detected	22	Not Detected
Methylene Chloride	2.8	Not Detected	9.6	Not Detected
Methyl tert-butyl ether	1.4	Not Detected	5.0	Not Detected
trans-1,2-Dichloroethene	1.4	1.7	5.5	6.8
Hexane	1.4	Not Detected	4.9	Not Detected
1,1-Dichloroethane	1.4	Not Detected	5.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	7.0	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	1.4	Not Detected	5.5	Not Detected
Tetrahydrofuran	7.0	Not Detected	20	Not Detected
Chloroform	1.4	Not Detected	6.8	Not Detected
1,1,1-Trichloroethane	1.4	Not Detected	7.6	Not Detected
Cyclohexane	1.4	Not Detected	4.8	Not Detected
Carbon Tetrachloride	1.4	Not Detected	8.7	Not Detected
2,2,4-Trimethylpentane	7.0	Not Detected	32	Not Detected
Benzene	1.4	1.5	4.4	4.7
1,2-Dichloroethane	1.4	Not Detected	5.6	Not Detected
Heptane	1.4	Not Detected	5.7	Not Detected
Trichloroethene	1.4	78	7.5	420
1,2-Dichloropropane	1.4	Not Detected	6.4	Not Detected
1,4-Dioxane	1.4	Not Detected	5.0	Not Detected
Bromodichloromethane	1.4	Not Detected	9.3	Not Detected
cis-1,3-Dichloropropene	1.4	Not Detected	6.3	Not Detected
4-Methyl-2-pentanone	1.4	Not Detected	5.7	Not Detected
Toluene	1.4	1.7	5.2	6.6
trans-1,3-Dichloropropene	1.4	Not Detected	6.3	Not Detected
1,1,2-Trichloroethane	1.4	Not Detected	7.6	Not Detected
Tetrachloroethene	1.4	500	9.4	3400
2-Hexanone	7.0	Not Detected	28	Not Detected

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Client Sample ID: SGP-4

Lab ID#: 1312183-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121822**	**Date of Collection: 12/6/13 11:13:00 AM**	
Dil. Factor:	**13.9**	**Date of Analysis: 12/18/13 11:03 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.4	Not Detected	12	Not Detected
1,2-Dibromoethane (EDB)	1.4	Not Detected	11	Not Detected
Chlorobenzene	1.4	1.8	6.4	8.5
Ethyl Benzene	1.4	Not Detected	6.0	Not Detected
m,p-Xylene	1.4	Not Detected	6.0	Not Detected
o-Xylene	1.4	Not Detected	6.0	Not Detected
Styrene	1.4	Not Detected	5.9	Not Detected
Bromoform	1.4	Not Detected	14	Not Detected
Cumene	1.4	Not Detected	6.8	Not Detected
1,1,2,2-Tetrachloroethane	1.4	Not Detected	9.5	Not Detected
Propylbenzene	1.4	Not Detected	6.8	Not Detected
4-Ethyltoluene	1.4	Not Detected	6.8	Not Detected
1,3,5-Trimethylbenzene	1.4	Not Detected	6.8	Not Detected
1,2,4-Trimethylbenzene	1.4	Not Detected	6.8	Not Detected
1,3-Dichlorobenzene	1.4	Not Detected	8.4	Not Detected
1,4-Dichlorobenzene	1.4	Not Detected	8.4	Not Detected
alpha-Chlorotoluene	1.4	Not Detected	7.2	Not Detected
1,2-Dichlorobenzene	1.4	Not Detected	8.4	Not Detected
1,2,4-Trichlorobenzene	7.0	Not Detected UJ	52	Not Detected UJ
Hexachlorobutadiene	7.0	Not Detected UJ	74	Not Detected UJ

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	82	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	86	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1312183-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:42 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1312183-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:42 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected UJ	15	Not Detected UJ
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	89	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1312183-03B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121806**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 11:48 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.10	Not Detected	0.49	Not Detected
Freon 114	0.10	Not Detected	0.70	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.10	Not Detected	0.26	Not Detected
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
3-Chloropropene	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
Carbon Tetrachloride	0.10	Not Detected	0.63	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
1,2-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,2-Dichloropropane	0.10	Not Detected	0.46	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
Bromodichloromethane	0.10	Not Detected	0.67	Not Detected
cis-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
trans-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
1,1,2-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
2-Hexanone	0.50	Not Detected	2.0	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1312183-03B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121806**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 11:48 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.10	Not Detected	0.85	Not Detected
1,2-Dibromoethane (EDB)	0.10	Not Detected	0.77	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
Bromoform	0.10	Not Detected	1.0	Not Detected
Cumene	0.10	Not Detected	0.49	Not Detected
1,1,2,2-Tetrachloroethane	0.10	Not Detected	0.69	Not Detected
Propylbenzene	0.10	Not Detected	0.49	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
alpha-Chlorotoluene	0.10	Not Detected	0.52	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected UJ	3.7	Not Detected UJ
Hexachlorobutadiene	0.50	Not Detected UJ	5.3	Not Detected UJ

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	87	70-130

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Client Sample ID: CCV

Lab ID#: 1312183-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 07:51 AM**	

Compound	%Recovery
Freon 12	81
Freon 114	72
Chloromethane	73
Vinyl Chloride	76
1,3-Butadiene	73
Bromomethane	85
Chloroethane	76
Freon 11	81
Ethanol	84
Freon 113	76
1,1-Dichloroethene	77
Acetone	89
2-Propanol	76
Carbon Disulfide	82
3-Chloropropene	84
Methylene Chloride	77
Methyl tert-butyl ether	76
trans-1,2-Dichloroethene	77
Hexane	77
1,1-Dichloroethane	77
2-Butanone (Methyl Ethyl Ketone)	82
cis-1,2-Dichloroethene	80
Tetrahydrofuran	79
Chloroform	81
1,1,1-Trichloroethane	82
Cyclohexane	77
Carbon Tetrachloride	84
2,2,4-Trimethylpentane	78
Benzene	80
1,2-Dichloroethane	87
Heptane	83
Trichloroethene	82
1,2-Dichloropropane	83
1,4-Dioxane	78
Bromodichloromethane	84
cis-1,3-Dichloropropene	86
4-Methyl-2-pentanone	84
Toluene	82
trans-1,3-Dichloropropene	90
1,1,2-Trichloroethane	81
Tetrachloroethene	81
2-Hexanone	83

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Client Sample ID: CCV

Lab ID#: 1312183-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 07:51 AM**	

Compound	%Recovery
Dibromochloromethane	86
1,2-Dibromoethane (EDB)	84
Chlorobenzene	79
Ethyl Benzene	84
m,p-Xylene	82
o-Xylene	84
Styrene	83
Bromoform	84
Cumene	84
1,1,2,2-Tetrachloroethane	80
Propylbenzene	86
4-Ethyltoluene	84
1,3,5-Trimethylbenzene	83
1,2,4-Trimethylbenzene	83
1,3-Dichlorobenzene	75
1,4-Dichlorobenzene	83
alpha-Chlorotoluene	88
1,2-Dichlorobenzene	78
1,2,4-Trichlorobenzene	64 Q
Hexachlorobutadiene	76

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: CCV

Lab ID#: 1312183-04B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:08 AM**	

Compound	%Recovery
Freon 12	94
Freon 114	104
Chloromethane	98
Vinyl Chloride	114
1,3-Butadiene	108
Bromomethane	99
Chloroethane	102
Freon 11	84
Ethanol	89
Freon 113	97
1,1-Dichloroethene	107
Acetone	78
2-Propanol	91
Carbon Disulfide	100
3-Chloropropene	100
Methylene Chloride	103
Methyl tert-butyl ether	94
trans-1,2-Dichloroethene	104
Hexane	99
1,1-Dichloroethane	93
2-Butanone (Methyl Ethyl Ketone)	103
cis-1,2-Dichloroethene	107
Tetrahydrofuran	94
Chloroform	96
1,1,1-Trichloroethane	90
Cyclohexane	103
Carbon Tetrachloride	106
2,2,4-Trimethylpentane	96
Benzene	101
1,2-Dichloroethane	86
Heptane	103
Trichloroethene	108
1,2-Dichloropropane	98
1,4-Dioxane	111
Bromodichloromethane	101
cis-1,3-Dichloropropene	105
4-Methyl-2-pentanone	92
Toluene	102
trans-1,3-Dichloropropene	100
1,1,2-Trichloroethane	109
Tetrachloroethene	100
2-Hexanone	95

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Client Sample ID: CCV

Lab ID#: 1312183-04B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:08 AM**	

Compound	%Recovery
Dibromochloromethane	104
1,2-Dibromoethane (EDB)	106
Chlorobenzene	100
Ethyl Benzene	101
m,p-Xylene	103
o-Xylene	99
Styrene	99
Bromoform	99
Cumene	93
1,1,2,2-Tetrachloroethane	93
Propylbenzene	86
4-Ethyltoluene	87
1,3,5-Trimethylbenzene	84
1,2,4-Trimethylbenzene	82
1,3-Dichlorobenzene	82
1,4-Dichlorobenzene	78
alpha-Chlorotoluene	79
1,2-Dichlorobenzene	80
1,2,4-Trichlorobenzene	62 Q
Hexachlorobutadiene	63 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	81	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	87	70-130

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Client Sample ID: LCS

Lab ID#: 1312183-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 08:25 AM**	

Compound	%Recovery	Method Limits
Freon 12	88	70-130
Freon 114	83	70-130
Chloromethane	83	70-130
Vinyl Chloride	86	70-130
1,3-Butadiene	83	70-130
Bromomethane	94	70-130
Chloroethane	85	70-130
Freon 11	85	70-130
Ethanol	102	70-130
Freon 113	93	70-130
1,1-Dichloroethene	94	70-130
Acetone	84	70-130
2-Propanol	90	70-130
Carbon Disulfide	80	70-130
3-Chloropropene	90	70-130
Methylene Chloride	91	70-130
Methyl tert-butyl ether	85	70-130
trans-1,2-Dichloroethene	74	70-130
Hexane	85	70-130
1,1-Dichloroethane	88	70-130
2-Butanone (Methyl Ethyl Ketone)	91	70-130
cis-1,2-Dichloroethene	100	70-130
Tetrahydrofuran	87	70-130
Chloroform	89	70-130
1,1,1-Trichloroethane	88	70-130
Cyclohexane	86	70-130
Carbon Tetrachloride	91	70-130
2,2,4-Trimethylpentane	86	70-130
Benzene	85	70-130
1,2-Dichloroethane	90	70-130
Heptane	89	70-130
Trichloroethene	87	70-130
1,2-Dichloropropane	87	70-130
1,4-Dioxane	86	70-130
Bromodichloromethane	92	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	94	70-130
Toluene	86	70-130
trans-1,3-Dichloropropene	88	70-130
1,1,2-Trichloroethane	83	70-130
Tetrachloroethene	84	70-130
2-Hexanone	97	70-130

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Client Sample ID: LCS

Lab ID#: 1312183-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 08:25 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	92	70-130
1,2-Dibromoethane (EDB)	86	70-130
Chlorobenzene	81	70-130
Ethyl Benzene	86	70-130
m,p-Xylene	84	70-130
o-Xylene	83	70-130
Styrene	90	70-130
Bromoform	90	70-130
Cumene	86	70-130
1,1,2,2-Tetrachloroethane	80	70-130
Propylbenzene	88	70-130
4-Ethyltoluene	85	70-130
1,3,5-Trimethylbenzene	87	70-130
1,2,4-Trimethylbenzene	86	70-130
1,3-Dichlorobenzene	90	70-130
1,4-Dichlorobenzene	67 Q	70-130
alpha-Chlorotoluene	100	70-130
1,2-Dichlorobenzene	79	70-130
1,2,4-Trichlorobenzene	66 Q	70-130
Hexachlorobutadiene	73	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 1312183-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 08:56 AM**	

Compound	%Recovery	Method Limits
Freon 12	88	70-130
Freon 114	83	70-130
Chloromethane	81	70-130
Vinyl Chloride	84	70-130
1,3-Butadiene	82	70-130
Bromomethane	93	70-130
Chloroethane	86	70-130
Freon 11	84	70-130
Ethanol	99	70-130
Freon 113	95	70-130
1,1-Dichloroethene	92	70-130
Acetone	85	70-130
2-Propanol	92	70-130
Carbon Disulfide	80	70-130
3-Chloropropene	90	70-130
Methylene Chloride	91	70-130
Methyl tert-butyl ether	86	70-130
trans-1,2-Dichloroethene	73	70-130
Hexane	84	70-130
1,1-Dichloroethane	88	70-130
2-Butanone (Methyl Ethyl Ketone)	90	70-130
cis-1,2-Dichloroethene	98	70-130
Tetrahydrofuran	88	70-130
Chloroform	89	70-130
1,1,1-Trichloroethane	88	70-130
Cyclohexane	87	70-130
Carbon Tetrachloride	92	70-130
2,2,4-Trimethylpentane	86	70-130
Benzene	86	70-130
1,2-Dichloroethane	90	70-130
Heptane	87	70-130
Trichloroethene	86	70-130
1,2-Dichloropropane	87	70-130
1,4-Dioxane	85	70-130
Bromodichloromethane	92	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	94	70-130
Toluene	85	70-130
trans-1,3-Dichloropropene	92	70-130
1,1,2-Trichloroethane	86	70-130
Tetrachloroethene	86	70-130
2-Hexanone	101	70-130

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Client Sample ID: LCSD

Lab ID#: 1312183-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2121804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 08:56 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	94	70-130
1,2-Dibromoethane (EDB)	88	70-130
Chlorobenzene	84	70-130
Ethyl Benzene	86	70-130
m,p-Xylene	88	70-130
o-Xylene	87	70-130
Styrene	92	70-130
Bromoform	94	70-130
Cumene	90	70-130
1,1,2,2-Tetrachloroethane	83	70-130
Propylbenzene	92	70-130
4-Ethyltoluene	88	70-130
1,3,5-Trimethylbenzene	89	70-130
1,2,4-Trimethylbenzene	85	70-130
1,3-Dichlorobenzene	79	70-130
1,4-Dichlorobenzene	87	70-130
alpha-Chlorotoluene	108	70-130
1,2-Dichlorobenzene	82	70-130
1,2,4-Trichlorobenzene	69 Q	70-130
Hexachlorobutadiene	77	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1312183-05B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:54 AM**	

Compound	%Recovery	Method Limits
Freon 12	95	70-130
Freon 114	106	70-130
Chloromethane	98	70-130
Vinyl Chloride	114	70-130
1,3-Butadiene	107	70-130
Bromomethane	114	70-130
Chloroethane	109	70-130
Freon 11	87	70-130
Ethanol	86	70-130
Freon 113	116	70-130
1,1-Dichloroethene	126	70-130
Acetone	80	70-130
2-Propanol	94	70-130
Carbon Disulfide	96	70-130
3-Chloropropene	106	70-130
Methylene Chloride	116	70-130
Methyl tert-butyl ether	99	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	103	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	106	70-130
cis-1,2-Dichloroethene	124	70-130
Tetrahydrofuran	96	70-130
Chloroform	100	70-130
1,1,1-Trichloroethane	93	70-130
Cyclohexane	110	70-130
Carbon Tetrachloride	95	70-130
2,2,4-Trimethylpentane	101	70-130
Benzene	100	70-130
1,2-Dichloroethane	85	70-130
Heptane	101	70-130
Trichloroethene	107	70-130
1,2-Dichloropropane	97	70-130
1,4-Dioxane	109	70-130
Bromodichloromethane	102	70-130
cis-1,3-Dichloropropene	108	70-130
4-Methyl-2-pentanone	91	70-130
Toluene	98	70-130
trans-1,3-Dichloropropene	98	70-130
1,1,2-Trichloroethane	110	70-130
Tetrachloroethene	101	70-130
2-Hexanone	104	70-130

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Client Sample ID: LCS

Lab ID#: 1312183-05B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 09:54 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	110	70-130
1,2-Dibromoethane (EDB)	105	70-130
Chlorobenzene	100	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	102	70-130
o-Xylene	98	70-130
Styrene	99	70-130
Bromoform	102	70-130
Cumene	94	70-130
1,1,2,2-Tetrachloroethane	93	70-130
Propylbenzene	88	70-130
4-Ethyltoluene	88	70-130
1,3,5-Trimethylbenzene	84	70-130
1,2,4-Trimethylbenzene	80	70-130
1,3-Dichlorobenzene	80	70-130
1,4-Dichlorobenzene	76	70-130
alpha-Chlorotoluene	86	70-130
1,2-Dichlorobenzene	79	70-130
1,2,4-Trichlorobenzene	66 Q	70-130
Hexachlorobutadiene	67 Q	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	88	70-130

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Client Sample ID: LCSD

Lab ID#: 1312183-05BB

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 10:37 AM**	

Compound	%Recovery	Method Limits
Freon 12	99	70-130
Freon 114	109	70-130
Chloromethane	101	70-130
Vinyl Chloride	118	70-130
1,3-Butadiene	108	70-130
Bromomethane	118	70-130
Chloroethane	112	70-130
Freon 11	91	70-130
Ethanol	90	70-130
Freon 113	119	70-130
1,1-Dichloroethene	130	70-130
Acetone	85	70-130
2-Propanol	98	70-130
Carbon Disulfide	100	70-130
3-Chloropropene	112	70-130
Methylene Chloride	117	70-130
Methyl tert-butyl ether	103	70-130
trans-1,2-Dichloroethene	96	70-130
Hexane	108	70-130
1,1-Dichloroethane	102	70-130
2-Butanone (Methyl Ethyl Ketone)	113	70-130
cis-1,2-Dichloroethene	129	70-130
Tetrahydrofuran	101	70-130
Chloroform	105	70-130
1,1,1-Trichloroethane	98	70-130
Cyclohexane	113	70-130
Carbon Tetrachloride	101	70-130
2,2,4-Trimethylpentane	103	70-130
Benzene	100	70-130
1,2-Dichloroethane	85	70-130
Heptane	103	70-130
Trichloroethene	106	70-130
1,2-Dichloropropane	97	70-130
1,4-Dioxane	112	70-130
Bromodichloromethane	103	70-130
cis-1,3-Dichloropropene	110	70-130
4-Methyl-2-pentanone	93	70-130
Toluene	99	70-130
trans-1,3-Dichloropropene	95	70-130
1,1,2-Trichloroethane	106	70-130
Tetrachloroethene	100	70-130
2-Hexanone	104	70-130

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Client Sample ID: LCSD

Lab ID#: 1312183-05BB

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/18/13 10:37 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	108	70-130
1,2-Dibromoethane (EDB)	105	70-130
Chlorobenzene	99	70-130
Ethyl Benzene	102	70-130
m,p-Xylene	101	70-130
o-Xylene	94	70-130
Styrene	97	70-130
Bromoform	100	70-130
Cumene	95	70-130
1,1,2,2-Tetrachloroethane	91	70-130
Propylbenzene	86	70-130
4-Ethyltoluene	86	70-130
1,3,5-Trimethylbenzene	80	70-130
1,2,4-Trimethylbenzene	76	70-130
1,3-Dichlorobenzene	80	70-130
1,4-Dichlorobenzene	76	70-130
alpha-Chlorotoluene	87	70-130
1,2-Dichlorobenzene	78	70-130
1,2,4-Trichlorobenzene	63 Q	70-130
Hexachlorobutadiene	67 Q	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	87	70-130

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager: Jon Einarsen
Collected by: (Print and Sign): Jon Einarsen
Company: Zipper Geo Assoc. Email: jeinarsen@zipperzeo.com
Address: 19023 36th Ave W City: Lynnwood State: Wa Zip: 98036
Phone: Voice 425 582 9923 Fax:

Project Info:
P.O. #: 1001.22
Project #: 1001.22
Project Name: Prime Cleaners

Turn Around Time:
☐ Normal
☒ Rush 2 days speedy

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum: Initial	Final	Receipt	Final (psi)
01A	OSAKA GRILL	35245	6/3/14	0915-1816	TO-15 SIM	-30	-6.25		
02A	PRIME CLEANERS	34238		1009-1813		-30	-5.5		
03A	Money TREE	94600		1003-1807		-30	-7		
04A	Ambient	4915		1125-1822		-30	-7		
05A	SG-1	37682		1316-1826	TO-15 LL	-30	-5		
06A	SG-2	37652		1336		-30	-5		
07A	SG-3	36558		1137		-30	-5		
08A	SG-4	36566		1155		-30	-5		
09A	SG-5	37307		1109		-28	-5		
10A	SG-6	35562		1036		-30	-5		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
	6/4/14 1145		6/6/14 1000
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes: shipped in 2 boxes

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	UPS		NA	Good	Yes No None	1406062A

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6/9/2014
Mr. Jon Einarsen
Zipper Geo Associates, LLC
19023 36th Avenue West
Suite D
Lynwood WA 98036

Project Name: Prime Cleaners
Project #: 1001.22
Workorder #: 1406082A

Dear Mr. Jon Einarsen

The following report includes the data for the above referenced project for sample(s) received on 6/6/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Karen Stempson

Project Manager

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WORK ORDER #: 1406082A

Work Order Summary

CLIENT:	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036	**BILL TO:**	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036
PHONE:	425-582-9928	**P.O. #**	1001.22
FAX:		**PROJECT #**	1001.22 Prime Cleaners
DATE RECEIVED:	06/06/2014	**CONTACT:**	Karen Stempson
DATE COMPLETED:	06/09/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	OSAKA GRILL	Modified TO-15 SIM	6.5 "Hg	5 psi
02A	PRIME CLEANERS	Modified TO-15 SIM	5.5 "Hg	5 psi
03A	Money TREE	Modified TO-15 SIM	5.5 "Hg	5 psi
04A	Ambient	Modified TO-15 SIM	6.5 "Hg	5 psi
05A	Lab Blank	Modified TO-15 SIM	NA	NA
06A	CCV	Modified TO-15 SIM	NA	NA
07A	LCS	Modified TO-15 SIM	NA	NA
07AA	LCSD	Modified TO-15 SIM	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 06/09/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 956
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15 SIM
Zipper Geo Associates, LLC
Workorder# 1406082A

Four 6 Liter Summa Canister (SIM Certified) samples were received on June 06, 2014. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on samples OSAKA GRILL and Money TREE due to the presence of high level non-target species.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: OSAKA GRILL

Lab ID#: 1406082A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.17	0.21	0.55	0.69
Trichloroethene	0.068	0.070	0.37	0.37
Toluene	0.068	0.59	0.26	2.2
Tetrachloroethene	0.068	0.48	0.46	3.2
m,p-Xylene	0.14	0.18	0.59	0.80
o-Xylene	0.068	0.079	0.30	0.34

Client Sample ID: PRIME CLEANERS

Lab ID#: 1406082A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.082	0.093	0.26	0.30
Trichloroethene	0.033	0.39	0.18	2.1
Toluene	0.033	0.61	0.12	2.3
Tetrachloroethene	0.033	0.51	0.22	3.5
Ethyl Benzene	0.033	0.051	0.14	0.22
m,p-Xylene	0.066	0.15	0.28	0.66
o-Xylene	0.033	0.061	0.14	0.26

Client Sample ID: Money TREE

Lab ID#: 1406082A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	0.16	0.63	0.62	2.4

Client Sample ID: Ambient

Lab ID#: 1406082A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	0.034	0.24	0.13	0.92
m,p-Xylene	0.068	0.080	0.30	0.35

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Client Sample ID: OSAKA GRILL

Lab ID#: 1406082A-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e060611sim**	**Date of Collection: 6/3/14 6:16:00 PM**	
Dil. Factor:	**3.42**	**Date of Analysis: 6/6/14 06:43 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.034	Not Detected	0.087	Not Detected
1,1-Dichloroethene	0.034	Not Detected	0.14	Not Detected
1,1-Dichloroethane	0.068	Not Detected	0.28	Not Detected
cis-1,2-Dichloroethene	0.068	Not Detected	0.27	Not Detected
1,1,1-Trichloroethane	0.068	Not Detected	0.37	Not Detected
Benzene	0.17	0.21	0.55	0.69
1,2-Dichloroethane	0.068	Not Detected	0.28	Not Detected
Trichloroethene	0.068	0.070	0.37	0.37
Toluene	0.068	0.59	0.26	2.2
1,1,2-Trichloroethane	0.068	Not Detected	0.37	Not Detected
Tetrachloroethene	0.068	0.48	0.46	3.2
Ethyl Benzene	0.068	Not Detected	0.30	Not Detected
m,p-Xylene	0.14	0.18	0.59	0.80
o-Xylene	0.068	0.079	0.30	0.34
1,1,2,2-Tetrachloroethane	0.068	Not Detected	0.47	Not Detected
trans-1,2-Dichloroethene	0.34	Not Detected	1.4	Not Detected
Methyl tert-butyl ether	0.34	Not Detected	1.2	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	126	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: PRIME CLEANERS

Lab ID#: 1406082A-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e060612sim**	**Date of Collection: 6/3/14 6:13:00 PM**	
Dil. Factor:	**1.64**	**Date of Analysis: 6/6/14 07:46 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.042	Not Detected
1,1-Dichloroethene	0.016	Not Detected	0.065	Not Detected
1,1-Dichloroethane	0.033	Not Detected	0.13	Not Detected
cis-1,2-Dichloroethene	0.033	Not Detected	0.13	Not Detected
1,1,1-Trichloroethane	0.033	Not Detected	0.18	Not Detected
Benzene	0.082	0.093	0.26	0.30
1,2-Dichloroethane	0.033	Not Detected	0.13	Not Detected
Trichloroethene	0.033	0.39	0.18	2.1
Toluene	0.033	0.61	0.12	2.3
1,1,2-Trichloroethane	0.033	Not Detected	0.18	Not Detected
Tetrachloroethene	0.033	0.51	0.22	3.5
Ethyl Benzene	0.033	0.051	0.14	0.22
m,p-Xylene	0.066	0.15	0.28	0.66
o-Xylene	0.033	0.061	0.14	0.26
1,1,2,2-Tetrachloroethane	0.033	Not Detected	0.22	Not Detected
trans-1,2-Dichloroethene	0.16	Not Detected	0.65	Not Detected
Methyl tert-butyl ether	0.16	Not Detected	0.59	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	130	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: Money TREE

Lab ID#: 1406082A-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e060613sim**	**Date of Collection: 6/3/14 6:07:00 PM**	
Dil. Factor:	**8.20**	**Date of Analysis: 6/6/14 08:53 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.082	Not Detected	0.21	Not Detected
1,1-Dichloroethene	0.082	Not Detected	0.32	Not Detected
1,1-Dichloroethane	0.16	Not Detected	0.66	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.65	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.89	Not Detected
Benzene	0.41	Not Detected	1.3	Not Detected
1,2-Dichloroethane	0.16	Not Detected	0.66	Not Detected
Trichloroethene	0.16	Not Detected	0.88	Not Detected
Toluene	0.16	0.63	0.62	2.4
1,1,2-Trichloroethane	0.16	Not Detected	0.89	Not Detected
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected
Ethyl Benzene	0.16	Not Detected	0.71	Not Detected
m,p-Xylene	0.33	Not Detected	1.4	Not Detected
o-Xylene	0.16	Not Detected	0.71	Not Detected
1,1,2,2-Tetrachloroethane	0.16	Not Detected	1.1	Not Detected
trans-1,2-Dichloroethene	0.82	Not Detected	3.2	Not Detected
Methyl tert-butyl ether	0.82	Not Detected	3.0	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	126	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: Ambient

Lab ID#: 1406082A-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e060614sim**	**Date of Collection: 6/3/14 6:22:00 PM**	
Dil. Factor:	**1.71**	**Date of Analysis: 6/6/14 10:00 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.017	Not Detected	0.044	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.068	Not Detected
1,1-Dichloroethane	0.034	Not Detected	0.14	Not Detected
cis-1,2-Dichloroethene	0.034	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.034	Not Detected	0.19	Not Detected
Benzene	0.086	Not Detected	0.27	Not Detected
1,2-Dichloroethane	0.034	Not Detected	0.14	Not Detected
Trichloroethene	0.034	Not Detected	0.18	Not Detected
Toluene	0.034	0.24	0.13	0.92
1,1,2-Trichloroethane	0.034	Not Detected	0.19	Not Detected
Tetrachloroethene	0.034	Not Detected	0.23	Not Detected
Ethyl Benzene	0.034	Not Detected	0.15	Not Detected
m,p-Xylene	0.068	0.080	0.30	0.35
o-Xylene	0.034	Not Detected	0.15	Not Detected
1,1,2,2-Tetrachloroethane	0.034	Not Detected	0.23	Not Detected
trans-1,2-Dichloroethene	0.17	Not Detected	0.68	Not Detected
Methyl tert-butyl ether	0.17	Not Detected	0.62	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	130	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1406082A-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e060606sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/6/14 01:41 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
1,2-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
1,1,2-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
1,1,2,2-Tetrachloroethane	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	126	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: CCV

Lab ID#: 1406082A-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e060602sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/6/14 09:18 AM**	

Compound	%Recovery
Vinyl Chloride	87
1,1-Dichloroethene	76
1,1-Dichloroethane	88
cis-1,2-Dichloroethene	78
1,1,1-Trichloroethane	96
Benzene	78
1,2-Dichloroethane	121
Trichloroethene	85
Toluene	85
1,1,2-Trichloroethane	88
Tetrachloroethene	96
Ethyl Benzene	86
m,p-Xylene	87
o-Xylene	88
1,1,2,2-Tetrachloroethane	87
trans-1,2-Dichloroethene	78
Methyl tert-butyl ether	86

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	122	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: LCS

Lab ID#: 1406082A-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e060603sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/6/14 10:02 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	95	70-130
1,1-Dichloroethene	91	70-130
1,1-Dichloroethane	98	70-130
cis-1,2-Dichloroethene	96	70-130
1,1,1-Trichloroethane	105	70-130
Benzene	84	70-130
1,2-Dichloroethane	132 Q	70-130
Trichloroethene	92	70-130
Toluene	90	70-130
1,1,2-Trichloroethane	92	70-130
Tetrachloroethene	101	70-130
Ethyl Benzene	92	70-130
m,p-Xylene	94	70-130
o-Xylene	92	70-130
1,1,2,2-Tetrachloroethane	94	70-130
trans-1,2-Dichloroethene	72	70-130
Methyl tert-butyl ether	90	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	115	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: LCSD

Lab ID#: 1406082A-07AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e060604sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/6/14 10:48 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	95	70-130
1,1-Dichloroethene	90	70-130
1,1-Dichloroethane	97	70-130
cis-1,2-Dichloroethene	95	70-130
1,1,1-Trichloroethane	106	70-130
Benzene	83	70-130
1,2-Dichloroethane	131 Q	70-130
Trichloroethene	92	70-130
Toluene	89	70-130
1,1,2-Trichloroethane	92	70-130
Tetrachloroethene	101	70-130
Ethyl Benzene	92	70-130
m,p-Xylene	94	70-130
o-Xylene	93	70-130
1,1,2,2-Tetrachloroethane	95	70-130
trans-1,2-Dichloroethene	71	70-130
Methyl tert-butyl ether	89	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	125	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	109	70-130

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6/11/2014

Mr. Jon Einarsen
Zipper Geo Associates, LLC
19023 36th Avenue West
Suite D
Lynwood WA 98036

Project Name: Prime Cleaners
Project #: 1001.22
Workorder #: 1406082B

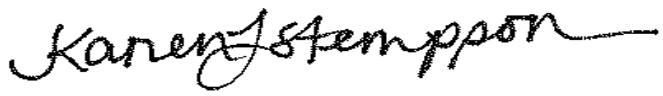
Dear Mr. Jon Einarsen

The following report includes the data for the above referenced project for sample(s) received on 6/6/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Karen Stempson

Project Manager

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WORK ORDER #: 1406082B

Work Order Summary

CLIENT:	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036	**BILL TO:**	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036
PHONE:	425-582-9928	**P.O. #**	1001.22
FAX:		**PROJECT #**	1001.22 Prime Cleaners
DATE RECEIVED:	06/06/2014	**CONTACT:**	Karen Stempson
DATE COMPLETED:	06/11/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
05A	SG-1	Modified TO-15	3.0 "Hg	15 psi
06A	SG-2	Modified TO-15	4.5 "Hg	15 psi
07A	SG-3	Modified TO-15	5.0 "Hg	15 psi
08A	SG-4	Modified TO-15	4.5 "Hg	15 psi
09A	SG-5	Modified TO-15	4.5 "Hg	15 psi
10A	SG-6	Modified TO-15	4.5 "Hg	15 psi
11A	Lab Blank	Modified TO-15	NA	NA
11B	Lab Blank	Modified TO-15	NA	NA
12A	CCV	Modified TO-15	NA	NA
12B	CCV	Modified TO-15	NA	NA
13A	LCS	Modified TO-15	NA	NA
13AA	LCSD	Modified TO-15	NA	NA
13B	LCS	Modified TO-15	NA	NA
13BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 06/11/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
Zipper Geo Associates, LLC
Workorder# 1406082B

Six 1 Liter Summa Canister (100% Certified) samples were received on June 06, 2014. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on samples SG-1, SG-2, SG-3, SG-4, SG-5 and SG-6 due to the presence of high level target species.

2-Propanol exceeded the instrument's calibration range for samples SG-1, SG-2 and SG-4 and was flagged accordingly.

Ethanol exceeded the instrument's calibration range for sample SG-1 and was flagged accordingly.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG-1

Lab ID#: 1406082B-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	11	2900 E	21	5600 E
Acetone	11	270	27	650
2-Propanol	11	7800 E	28	19000 E
Tetrachloroethene	2.2	240	15	1600

Client Sample ID: SG-2

Lab ID#: 1406082B-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	190	27000 E	470	66000 E
Trichloroethene	48	87	260	470
Tetrachloroethene	48	1400	320	9900

Client Sample ID: SG-3

Lab ID#: 1406082B-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	39	3300	95	8100
Chloroform	9.7	24	47	120
Trichloroethene	9.7	31	52	160
Tetrachloroethene	9.7	3600	66	24000

Client Sample ID: SG-4

Lab ID#: 1406082B-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	19	2700 E	47	6600 E
Trichloroethene	4.8	160	26	840
Tetrachloroethene	4.8	790	32	5400

Client Sample ID: SG-5

Lab ID#: 1406082B-09A

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG-5

Lab ID#: 1406082B-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	19	390	47	960
Chloroform	4.8	14	23	71
Trichloroethene	4.8	68	26	360
Tetrachloroethene	4.8	1300	32	8700

Client Sample ID: SG-6

Lab ID#: 1406082B-10A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	24000	2400000 E	58000	5900000 E

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Client Sample ID: SG-1

Lab ID#: 1406082B-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060909**	**Date of Collection: 6/3/14 1:19:00 PM**	
Dil. Factor:	**22.4**	**Date of Analysis: 6/9/14 02:51 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	2.2	Not Detected	11	Not Detected
Freon 114	2.2	Not Detected	16	Not Detected
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	2.2	Not Detected	5.7	Not Detected
1,3-Butadiene	2.2	Not Detected	5.0	Not Detected
Bromomethane	11	Not Detected	43	Not Detected
Chloroethane	11	Not Detected	30	Not Detected
Freon 11	2.2	Not Detected	12	Not Detected
Ethanol	11	2900 E	21	5600 E
Freon 113	2.2	Not Detected	17	Not Detected
1,1-Dichloroethene	2.2	Not Detected	8.9	Not Detected
Acetone	11	270	27	650
2-Propanol	11	7800 E	28	19000 E
Carbon Disulfide	11	Not Detected	35	Not Detected
3-Chloropropene	11	Not Detected	35	Not Detected
Methylene Chloride	4.5	Not Detected	16	Not Detected
Methyl tert-butyl ether	2.2	Not Detected	8.1	Not Detected
trans-1,2-Dichloroethene	2.2	Not Detected	8.9	Not Detected
Hexane	2.2	Not Detected	7.9	Not Detected
1,1-Dichloroethane	2.2	Not Detected	9.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	11	Not Detected	33	Not Detected
cis-1,2-Dichloroethene	2.2	Not Detected	8.9	Not Detected
Tetrahydrofuran	11	Not Detected	33	Not Detected
Chloroform	2.2	Not Detected	11	Not Detected
1,1,1-Trichloroethane	2.2	Not Detected	12	Not Detected
Cyclohexane	2.2	Not Detected	7.7	Not Detected
Carbon Tetrachloride	2.2	Not Detected UJ	14	Not Detected UJ
2,2,4-Trimethylpentane	11	Not Detected	52	Not Detected
Benzene	2.2	Not Detected	7.2	Not Detected
1,2-Dichloroethane	2.2	Not Detected	9.1	Not Detected
Heptane	2.2	Not Detected	9.2	Not Detected
Trichloroethene	2.2	Not Detected	12	Not Detected
1,2-Dichloropropane	2.2	Not Detected	10	Not Detected
1,4-Dioxane	2.2	Not Detected	8.1	Not Detected
Bromodichloromethane	2.2	Not Detected	15	Not Detected
cis-1,3-Dichloropropene	2.2	Not Detected	10	Not Detected
4-Methyl-2-pentanone	2.2	Not Detected	9.2	Not Detected
Toluene	2.2	Not Detected	8.4	Not Detected
trans-1,3-Dichloropropene	2.2	Not Detected	10	Not Detected
1,1,2-Trichloroethane	2.2	Not Detected	12	Not Detected
Tetrachloroethene	2.2	240	15	1600
2-Hexanone	11	Not Detected	46	Not Detected

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Client Sample ID: SG-1

Lab ID#: 1406082B-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060909**	**Date of Collection: 6/3/14 1:19:00 PM**	
Dil. Factor:	**22.4**	**Date of Analysis: 6/9/14 02:51 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	2.2	Not Detected	19	Not Detected
1,2-Dibromoethane (EDB)	2.2	Not Detected	17	Not Detected
Chlorobenzene	2.2	Not Detected	10	Not Detected
Ethyl Benzene	2.2	Not Detected	9.7	Not Detected
m,p-Xylene	2.2	Not Detected	9.7	Not Detected
o-Xylene	2.2	Not Detected	9.7	Not Detected
Styrene	2.2	Not Detected	9.5	Not Detected
Bromoform	2.2	Not Detected	23	Not Detected
Cumene	2.2	Not Detected	11	Not Detected
1,1,2,2-Tetrachloroethane	2.2	Not Detected	15	Not Detected
Propylbenzene	2.2	Not Detected	11	Not Detected
4-Ethyltoluene	2.2	Not Detected	11	Not Detected
1,3,5-Trimethylbenzene	2.2	Not Detected	11	Not Detected
1,2,4-Trimethylbenzene	2.2	Not Detected	11	Not Detected
1,3-Dichlorobenzene	2.2	Not Detected	13	Not Detected
1,4-Dichlorobenzene	2.2	Not Detected	13	Not Detected
alpha-Chlorotoluene	2.2	Not Detected	12	Not Detected
1,2-Dichlorobenzene	2.2	Not Detected	13	Not Detected
1,2,4-Trichlorobenzene	11	Not Detected	83	Not Detected
Hexachlorobutadiene	11	Not Detected	120	Not Detected

E = Exceeds instrument calibration range.
UJ = Analyte associated with low bias in the CCV and/or LCS.
Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	90	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	102	70-130

eurofins | Air Toxics

Client Sample ID: SG-2

Lab ID#: 1406082B-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061008**	**Date of Collection:**	**6/3/14 1:36:00 PM**
Dil. Factor:	**95.0**	**Date of Analysis:**	**6/10/14 11:33 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	48	Not Detected	230	Not Detected
Freon 114	48	Not Detected	330	Not Detected
Chloromethane	480	Not Detected	980	Not Detected
Vinyl Chloride	48	Not Detected	120	Not Detected
1,3-Butadiene	48	Not Detected	100	Not Detected
Bromomethane	480	Not Detected	1800	Not Detected
Chloroethane	190	Not Detected	500	Not Detected
Freon 11	48	Not Detected	270	Not Detected
Ethanol	190	Not Detected	360	Not Detected
Freon 113	48	Not Detected	360	Not Detected
1,1-Dichloroethene	48	Not Detected	190	Not Detected
Acetone	480	Not Detected	1100	Not Detected
2-Propanol	190	27000 E	470	66000 E
Carbon Disulfide	190	Not Detected	590	Not Detected
3-Chloropropene	190	Not Detected	590	Not Detected
Methylene Chloride	480	Not Detected	1600	Not Detected
Methyl tert-butyl ether	48	Not Detected	170	Not Detected
trans-1,2-Dichloroethene	48	Not Detected	190	Not Detected
Hexane	48	Not Detected	170	Not Detected
1,1-Dichloroethane	48	Not Detected	190	Not Detected
2-Butanone (Methyl Ethyl Ketone)	190	Not Detected	560	Not Detected
cis-1,2-Dichloroethene	48	Not Detected	190	Not Detected
Tetrahydrofuran	48	Not Detected	140	Not Detected
Chloroform	48	Not Detected	230	Not Detected
1,1,1-Trichloroethane	48	Not Detected	260	Not Detected
Cyclohexane	48	Not Detected	160	Not Detected
Carbon Tetrachloride	48	Not Detected	300	Not Detected
2,2,4-Trimethylpentane	48	Not Detected	220	Not Detected
Benzene	48	Not Detected	150	Not Detected
1,2-Dichloroethane	48	Not Detected	190	Not Detected
Heptane	48	Not Detected	190	Not Detected
Trichloroethene	48	87	260	470
1,2-Dichloropropane	48	Not Detected	220	Not Detected
1,4-Dioxane	190	Not Detected	680	Not Detected
Bromodichloromethane	48	Not Detected	320	Not Detected
cis-1,3-Dichloropropene	48	Not Detected	220	Not Detected
4-Methyl-2-pentanone	48	Not Detected	190	Not Detected
Toluene	48	Not Detected	180	Not Detected
trans-1,3-Dichloropropene	48	Not Detected	220	Not Detected
1,1,2-Trichloroethane	48	Not Detected	260	Not Detected
Tetrachloroethene	48	1400	320	9900
2-Hexanone	190	Not Detected	780	Not Detected

eurofins | Air Toxics

Client Sample ID: SG-2

Lab ID#: 1406082B-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061008**	**Date of Collection: 6/3/14 1:36:00 PM**	
Dil. Factor:	**95.0**	**Date of Analysis: 6/10/14 11:33 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	48	Not Detected	400	Not Detected
1,2-Dibromoethane (EDB)	48	Not Detected	360	Not Detected
Chlorobenzene	48	Not Detected	220	Not Detected
Ethyl Benzene	48	Not Detected	210	Not Detected
m,p-Xylene	48	Not Detected	210	Not Detected
o-Xylene	48	Not Detected	210	Not Detected
Styrene	48	Not Detected	200	Not Detected
Bromoform	48	Not Detected	490	Not Detected
Cumene	48	Not Detected	230	Not Detected
1,1,2,2-Tetrachloroethane	48	Not Detected	330	Not Detected
Propylbenzene	48	Not Detected	230	Not Detected
4-Ethyltoluene	48	Not Detected	230	Not Detected
1,3,5-Trimethylbenzene	48	Not Detected	230	Not Detected
1,2,4-Trimethylbenzene	48	Not Detected	230	Not Detected
1,3-Dichlorobenzene	48	Not Detected	280	Not Detected
1,4-Dichlorobenzene	48	Not Detected	280	Not Detected
alpha-Chlorotoluene	48	Not Detected	240	Not Detected
1,2-Dichlorobenzene	48	Not Detected	280	Not Detected
1,2,4-Trichlorobenzene	190	Not Detected	1400	Not Detected
Hexachlorobutadiene	190	Not Detected	2000	Not Detected

E = Exceeds instrument calibration range.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: SG-3

Lab ID#: 1406082B-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061010**	**Date of Collection:**	**6/3/14 11:37:00 AM**
Dil. Factor:	**19.4**	**Date of Analysis:**	**6/10/14 12:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	9.7	Not Detected	48	Not Detected
Freon 114	9.7	Not Detected	68	Not Detected
Chloromethane	97	Not Detected	200	Not Detected
Vinyl Chloride	9.7	Not Detected	25	Not Detected
1,3-Butadiene	9.7	Not Detected	21	Not Detected
Bromomethane	97	Not Detected	380	Not Detected
Chloroethane	39	Not Detected	100	Not Detected
Freon 11	9.7	Not Detected	54	Not Detected
Ethanol	39	Not Detected	73	Not Detected
Freon 113	9.7	Not Detected	74	Not Detected
1,1-Dichloroethene	9.7	Not Detected	38	Not Detected
Acetone	97	Not Detected	230	Not Detected
2-Propanol	39	3300	95	8100
Carbon Disulfide	39	Not Detected	120	Not Detected
3-Chloropropene	39	Not Detected	120	Not Detected
Methylene Chloride	97	Not Detected	340	Not Detected
Methyl tert-butyl ether	9.7	Not Detected	35	Not Detected
trans-1,2-Dichloroethene	9.7	Not Detected	38	Not Detected
Hexane	9.7	Not Detected	34	Not Detected
1,1-Dichloroethane	9.7	Not Detected	39	Not Detected
2-Butanone (Methyl Ethyl Ketone)	39	Not Detected	110	Not Detected
cis-1,2-Dichloroethene	9.7	Not Detected	38	Not Detected
Tetrahydrofuran	9.7	Not Detected	29	Not Detected
Chloroform	9.7	24	47	120
1,1,1-Trichloroethane	9.7	Not Detected	53	Not Detected
Cyclohexane	9.7	Not Detected	33	Not Detected
Carbon Tetrachloride	9.7	Not Detected	61	Not Detected
2,2,4-Trimethylpentane	9.7	Not Detected	45	Not Detected
Benzene	9.7	Not Detected	31	Not Detected
1,2-Dichloroethane	9.7	Not Detected	39	Not Detected
Heptane	9.7	Not Detected	40	Not Detected
Trichloroethene	9.7	31	52	160
1,2-Dichloropropane	9.7	Not Detected	45	Not Detected
1,4-Dioxane	39	Not Detected	140	Not Detected
Bromodichloromethane	9.7	Not Detected	65	Not Detected
cis-1,3-Dichloropropene	9.7	Not Detected	44	Not Detected
4-Methyl-2-pentanone	9.7	Not Detected	40	Not Detected
Toluene	9.7	Not Detected	36	Not Detected
trans-1,3-Dichloropropene	9.7	Not Detected	44	Not Detected
1,1,2-Trichloroethane	9.7	Not Detected	53	Not Detected
Tetrachloroethene	9.7	3600	66	24000
2-Hexanone	39	Not Detected	160	Not Detected

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Client Sample ID: SG-3

Lab ID#: 1406082B-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061010**	**Date of Collection: 6/3/14 11:37:00 AM**	
Dil. Factor:	**19.4**	**Date of Analysis: 6/10/14 12:17 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	9.7	Not Detected	83	Not Detected
1,2-Dibromoethane (EDB)	9.7	Not Detected	74	Not Detected
Chlorobenzene	9.7	Not Detected	45	Not Detected
Ethyl Benzene	9.7	Not Detected	42	Not Detected
m,p-Xylene	9.7	Not Detected	42	Not Detected
o-Xylene	9.7	Not Detected	42	Not Detected
Styrene	9.7	Not Detected	41	Not Detected
Bromoform	9.7	Not Detected	100	Not Detected
Cumene	9.7	Not Detected	48	Not Detected
1,1,2,2-Tetrachloroethane	9.7	Not Detected	66	Not Detected
Propylbenzene	9.7	Not Detected	48	Not Detected
4-Ethyltoluene	9.7	Not Detected	48	Not Detected
1,3,5-Trimethylbenzene	9.7	Not Detected	48	Not Detected
1,2,4-Trimethylbenzene	9.7	Not Detected	48	Not Detected
1,3-Dichlorobenzene	9.7	Not Detected	58	Not Detected
1,4-Dichlorobenzene	9.7	Not Detected	58	Not Detected
alpha-Chlorotoluene	9.7	Not Detected	50	Not Detected
1,2-Dichlorobenzene	9.7	Not Detected	58	Not Detected
1,2,4-Trichlorobenzene	39	Not Detected	290	Not Detected
Hexachlorobutadiene	39	Not Detected	410	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: SG-4

Lab ID#: 1406082B-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061011**	**Date of Collection:**	**6/3/14 11:55:00 AM**
Dil. Factor:	**9.51**	**Date of Analysis:**	**6/10/14 12:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	4.8	Not Detected	24	Not Detected
Freon 114	4.8	Not Detected	33	Not Detected
Chloromethane	48	Not Detected	98	Not Detected
Vinyl Chloride	4.8	Not Detected	12	Not Detected
1,3-Butadiene	4.8	Not Detected	10	Not Detected
Bromomethane	48	Not Detected	180	Not Detected
Chloroethane	19	Not Detected	50	Not Detected
Freon 11	4.8	Not Detected	27	Not Detected
Ethanol	19	Not Detected	36	Not Detected
Freon 113	4.8	Not Detected	36	Not Detected
1,1-Dichloroethene	4.8	Not Detected	19	Not Detected
Acetone	48	Not Detected	110	Not Detected
2-Propanol	19	2700 E	47	6600 E
Carbon Disulfide	19	Not Detected	59	Not Detected
3-Chloropropene	19	Not Detected	60	Not Detected
Methylene Chloride	48	Not Detected	160	Not Detected
Methyl tert-butyl ether	4.8	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	4.8	Not Detected	19	Not Detected
Hexane	4.8	Not Detected	17	Not Detected
1,1-Dichloroethane	4.8	Not Detected	19	Not Detected
2-Butanone (Methyl Ethyl Ketone)	19	Not Detected	56	Not Detected
cis-1,2-Dichloroethene	4.8	Not Detected	19	Not Detected
Tetrahydrofuran	4.8	Not Detected	14	Not Detected
Chloroform	4.8	Not Detected	23	Not Detected
1,1,1-Trichloroethane	4.8	Not Detected	26	Not Detected
Cyclohexane	4.8	Not Detected	16	Not Detected
Carbon Tetrachloride	4.8	Not Detected	30	Not Detected
2,2,4-Trimethylpentane	4.8	Not Detected	22	Not Detected
Benzene	4.8	Not Detected	15	Not Detected
1,2-Dichloroethane	4.8	Not Detected	19	Not Detected
Heptane	4.8	Not Detected	19	Not Detected
Trichloroethene	4.8	160	26	840
1,2-Dichloropropane	4.8	Not Detected	22	Not Detected
1,4-Dioxane	19	Not Detected	68	Not Detected
Bromodichloromethane	4.8	Not Detected	32	Not Detected
cis-1,3-Dichloropropene	4.8	Not Detected	22	Not Detected
4-Methyl-2-pentanone	4.8	Not Detected	19	Not Detected
Toluene	4.8	Not Detected	18	Not Detected
trans-1,3-Dichloropropene	4.8	Not Detected	22	Not Detected
1,1,2-Trichloroethane	4.8	Not Detected	26	Not Detected
Tetrachloroethene	4.8	790	32	5400
2-Hexanone	19	Not Detected	78	Not Detected

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Client Sample ID: SG-4

Lab ID#: 1406082B-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061011**	**Date of Collection:**	**6/3/14 11:55:00 AM**
Dil. Factor:	**9.51**	**Date of Analysis:**	**6/10/14 12:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	4.8	Not Detected	40	Not Detected
1,2-Dibromoethane (EDB)	4.8	Not Detected	36	Not Detected
Chlorobenzene	4.8	Not Detected	22	Not Detected
Ethyl Benzene	4.8	Not Detected	21	Not Detected
m,p-Xylene	4.8	Not Detected	21	Not Detected
o-Xylene	4.8	Not Detected	21	Not Detected
Styrene	4.8	Not Detected	20	Not Detected
Bromoform	4.8	Not Detected	49	Not Detected
Cumene	4.8	Not Detected	23	Not Detected
1,1,2,2-Tetrachloroethane	4.8	Not Detected	33	Not Detected
Propylbenzene	4.8	Not Detected	23	Not Detected
4-Ethyltoluene	4.8	Not Detected	23	Not Detected
1,3,5-Trimethylbenzene	4.8	Not Detected	23	Not Detected
1,2,4-Trimethylbenzene	4.8	Not Detected	23	Not Detected
1,3-Dichlorobenzene	4.8	Not Detected	28	Not Detected
1,4-Dichlorobenzene	4.8	Not Detected	28	Not Detected
alpha-Chlorotoluene	4.8	Not Detected	25	Not Detected
1,2-Dichlorobenzene	4.8	Not Detected	28	Not Detected
1,2,4-Trichlorobenzene	19	Not Detected	140	Not Detected
Hexachlorobutadiene	19	Not Detected	200	Not Detected

E = Exceeds instrument calibration range.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: SG-5

Lab ID#: 1406082B-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061012**	**Date of Collection:**	**6/3/14 11:09:00 AM**
Dil. Factor:	**9.51**	**Date of Analysis:**	**6/10/14 01:02 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	4.8	Not Detected	24	Not Detected
Freon 114	4.8	Not Detected	33	Not Detected
Chloromethane	48	Not Detected	98	Not Detected
Vinyl Chloride	4.8	Not Detected	12	Not Detected
1,3-Butadiene	4.8	Not Detected	10	Not Detected
Bromomethane	48	Not Detected	180	Not Detected
Chloroethane	19	Not Detected	50	Not Detected
Freon 11	4.8	Not Detected	27	Not Detected
Ethanol	19	Not Detected	36	Not Detected
Freon 113	4.8	Not Detected	36	Not Detected
1,1-Dichloroethene	4.8	Not Detected	19	Not Detected
Acetone	48	Not Detected	110	Not Detected
2-Propanol	19	390	47	960
Carbon Disulfide	19	Not Detected	59	Not Detected
3-Chloropropene	19	Not Detected	60	Not Detected
Methylene Chloride	48	Not Detected	160	Not Detected
Methyl tert-butyl ether	4.8	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	4.8	Not Detected	19	Not Detected
Hexane	4.8	Not Detected	17	Not Detected
1,1-Dichloroethane	4.8	Not Detected	19	Not Detected
2-Butanone (Methyl Ethyl Ketone)	19	Not Detected	56	Not Detected
cis-1,2-Dichloroethene	4.8	Not Detected	19	Not Detected
Tetrahydrofuran	4.8	Not Detected	14	Not Detected
Chloroform	4.8	14	23	71
1,1,1-Trichloroethane	4.8	Not Detected	26	Not Detected
Cyclohexane	4.8	Not Detected	16	Not Detected
Carbon Tetrachloride	4.8	Not Detected	30	Not Detected
2,2,4-Trimethylpentane	4.8	Not Detected	22	Not Detected
Benzene	4.8	Not Detected	15	Not Detected
1,2-Dichloroethane	4.8	Not Detected	19	Not Detected
Heptane	4.8	Not Detected	19	Not Detected
Trichloroethene	4.8	68	26	360
1,2-Dichloropropane	4.8	Not Detected	22	Not Detected
1,4-Dioxane	19	Not Detected	68	Not Detected
Bromodichloromethane	4.8	Not Detected	32	Not Detected
cis-1,3-Dichloropropene	4.8	Not Detected	22	Not Detected
4-Methyl-2-pentanone	4.8	Not Detected	19	Not Detected
Toluene	4.8	Not Detected	18	Not Detected
trans-1,3-Dichloropropene	4.8	Not Detected	22	Not Detected
1,1,2-Trichloroethane	4.8	Not Detected	26	Not Detected
Tetrachloroethene	4.8	1300	32	8700
2-Hexanone	19	Not Detected	78	Not Detected

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Client Sample ID: SG-5

Lab ID#: 1406082B-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061012**	**Date of Collection:**	**6/3/14 11:09:00 AM**
Dil. Factor:	**9.51**	**Date of Analysis:**	**6/10/14 01:02 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	4.8	Not Detected	40	Not Detected
1,2-Dibromoethane (EDB)	4.8	Not Detected	36	Not Detected
Chlorobenzene	4.8	Not Detected	22	Not Detected
Ethyl Benzene	4.8	Not Detected	21	Not Detected
m,p-Xylene	4.8	Not Detected	21	Not Detected
o-Xylene	4.8	Not Detected	21	Not Detected
Styrene	4.8	Not Detected	20	Not Detected
Bromoform	4.8	Not Detected	49	Not Detected
Cumene	4.8	Not Detected	23	Not Detected
1,1,2,2-Tetrachloroethane	4.8	Not Detected	33	Not Detected
Propylbenzene	4.8	Not Detected	23	Not Detected
4-Ethyltoluene	4.8	Not Detected	23	Not Detected
1,3,5-Trimethylbenzene	4.8	Not Detected	23	Not Detected
1,2,4-Trimethylbenzene	4.8	Not Detected	23	Not Detected
1,3-Dichlorobenzene	4.8	Not Detected	28	Not Detected
1,4-Dichlorobenzene	4.8	Not Detected	28	Not Detected
alpha-Chlorotoluene	4.8	Not Detected	25	Not Detected
1,2-Dichlorobenzene	4.8	Not Detected	28	Not Detected
1,2,4-Trichlorobenzene	19	Not Detected	140	Not Detected
Hexachlorobutadiene	19	Not Detected	200	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	89	70-130

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Client Sample ID: SG-6

Lab ID#: 1406082B-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061009**	**Date of Collection:**	**6/3/14 10:36:00 AM**
Dil. Factor:	**11900**	**Date of Analysis:**	**6/10/14 11:55 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	6000	Not Detected	29000	Not Detected
Freon 114	6000	Not Detected	42000	Not Detected
Chloromethane	60000	Not Detected	120000	Not Detected
Vinyl Chloride	6000	Not Detected	15000	Not Detected
1,3-Butadiene	6000	Not Detected	13000	Not Detected
Bromomethane	60000	Not Detected	230000	Not Detected
Chloroethane	24000	Not Detected	63000	Not Detected
Freon 11	6000	Not Detected	33000	Not Detected
Ethanol	24000	Not Detected	45000	Not Detected
Freon 113	6000	Not Detected	46000	Not Detected
1,1-Dichloroethene	6000	Not Detected	24000	Not Detected
Acetone	60000	Not Detected	140000	Not Detected
2-Propanol	24000	2400000 E	58000	5900000 E
Carbon Disulfide	24000	Not Detected	74000	Not Detected
3-Chloropropene	24000	Not Detected	74000	Not Detected
Methylene Chloride	60000	Not Detected	210000	Not Detected
Methyl tert-butyl ether	6000	Not Detected	21000	Not Detected
trans-1,2-Dichloroethene	6000	Not Detected	24000	Not Detected
Hexane	6000	Not Detected	21000	Not Detected
1,1-Dichloroethane	6000	Not Detected	24000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	24000	Not Detected	70000	Not Detected
cis-1,2-Dichloroethene	6000	Not Detected	24000	Not Detected
Tetrahydrofuran	6000	Not Detected	18000	Not Detected
Chloroform	6000	Not Detected	29000	Not Detected
1,1,1-Trichloroethane	6000	Not Detected	32000	Not Detected
Cyclohexane	6000	Not Detected	20000	Not Detected
Carbon Tetrachloride	6000	Not Detected	37000	Not Detected
2,2,4-Trimethylpentane	6000	Not Detected	28000	Not Detected
Benzene	6000	Not Detected	19000	Not Detected
1,2-Dichloroethane	6000	Not Detected	24000	Not Detected
Heptane	6000	Not Detected	24000	Not Detected
Trichloroethene	6000	Not Detected	32000	Not Detected
1,2-Dichloropropane	6000	Not Detected	27000	Not Detected
1,4-Dioxane	24000	Not Detected	86000	Not Detected
Bromodichloromethane	6000	Not Detected	40000	Not Detected
cis-1,3-Dichloropropene	6000	Not Detected	27000	Not Detected
4-Methyl-2-pentanone	6000	Not Detected	24000	Not Detected
Toluene	6000	Not Detected	22000	Not Detected
trans-1,3-Dichloropropene	6000	Not Detected	27000	Not Detected
1,1,2-Trichloroethane	6000	Not Detected	32000	Not Detected
Tetrachloroethene	6000	Not Detected	40000	Not Detected
2-Hexanone	24000	Not Detected	97000	Not Detected

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Client Sample ID: SG-6

Lab ID#: 1406082B-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061009**	**Date of Collection: 6/3/14 10:36:00 AM**	
Dil. Factor:	**11900**	**Date of Analysis: 6/10/14 11:55 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	6000	Not Detected	51000	Not Detected
1,2-Dibromoethane (EDB)	6000	Not Detected	46000	Not Detected
Chlorobenzene	6000	Not Detected	27000	Not Detected
Ethyl Benzene	6000	Not Detected	26000	Not Detected
m,p-Xylene	6000	Not Detected	26000	Not Detected
o-Xylene	6000	Not Detected	26000	Not Detected
Styrene	6000	Not Detected	25000	Not Detected
Bromoform	6000	Not Detected	62000	Not Detected
Cumene	6000	Not Detected	29000	Not Detected
1,1,2,2-Tetrachloroethane	6000	Not Detected	41000	Not Detected
Propylbenzene	6000	Not Detected	29000	Not Detected
4-Ethyltoluene	6000	Not Detected	29000	Not Detected
1,3,5-Trimethylbenzene	6000	Not Detected	29000	Not Detected
1,2,4-Trimethylbenzene	6000	Not Detected	29000	Not Detected
1,3-Dichlorobenzene	6000	Not Detected	36000	Not Detected
1,4-Dichlorobenzene	6000	Not Detected	36000	Not Detected
alpha-Chlorotoluene	6000	Not Detected	31000	Not Detected
1,2-Dichlorobenzene	6000	Not Detected	36000	Not Detected
1,2,4-Trichlorobenzene	24000	Not Detected	180000	Not Detected
Hexachlorobutadiene	24000	Not Detected	250000	Not Detected

E = Exceeds instrument calibration range.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1406082B-11A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060906**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 12:10 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.10	Not Detected	0.49	Not Detected
Freon 114	0.10	Not Detected	0.70	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.10	Not Detected	0.26	Not Detected
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
3-Chloropropene	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
Carbon Tetrachloride	0.10	Not Detected UJ	0.63	Not Detected UJ
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
1,2-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,2-Dichloropropane	0.10	Not Detected	0.46	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
Bromodichloromethane	0.10	Not Detected	0.67	Not Detected
cis-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
trans-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
1,1,2-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
2-Hexanone	0.50	Not Detected	2.0	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1406082B-11A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060906**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 12:10 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.10	Not Detected	0.85	Not Detected
1,2-Dibromoethane (EDB)	0.10	Not Detected	0.77	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
Bromoform	0.10	Not Detected	1.0	Not Detected
Cumene	0.10	Not Detected	0.49	Not Detected
1,1,2,2-Tetrachloroethane	0.10	Not Detected	0.69	Not Detected
Propylbenzene	0.10	Not Detected	0.49	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
alpha-Chlorotoluene	0.10	Not Detected	0.52	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected	3.7	Not Detected
Hexachlorobutadiene	0.50	Not Detected	5.3	Not Detected

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	86	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1406082B-11B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061007**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/10/14 11:01 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1406082B-11B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061007**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/10/14 11:01 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: CCV

Lab ID#: 1406082B-12A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060905**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 11:15 AM**

Compound	%Recovery
Freon 12	82
Freon 114	91
Chloromethane	76
Vinyl Chloride	79
1,3-Butadiene	74
Bromomethane	94
Chloroethane	83
Freon 11	88
Ethanol	83
Freon 113	94
1,1-Dichloroethene	90
Acetone	77
2-Propanol	82
Carbon Disulfide	89
3-Chloropropene	81
Methylene Chloride	86
Methyl tert-butyl ether	87
trans-1,2-Dichloroethene	94
Hexane	78
1,1-Dichloroethane	83
2-Butanone (Methyl Ethyl Ketone)	89
cis-1,2-Dichloroethene	88
Tetrahydrofuran	78
Chloroform	86
1,1,1-Trichloroethane	87
Cyclohexane	86
Carbon Tetrachloride	62 Q
2,2,4-Trimethylpentane	80
Benzene	93
1,2-Dichloroethane	91
Heptane	86
Trichloroethene	98
1,2-Dichloropropane	89
1,4-Dioxane	92
Bromodichloromethane	94
cis-1,3-Dichloropropene	94
4-Methyl-2-pentanone	88
Toluene	95
trans-1,3-Dichloropropene	96
1,1,2-Trichloroethane	92
Tetrachloroethene	101
2-Hexanone	84

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Client Sample ID: CCV

Lab ID#: 1406082B-12A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060905**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 11:15 AM**	

Compound	%Recovery
Dibromochloromethane	107
1,2-Dibromoethane (EDB)	98
Chlorobenzene	96
Ethyl Benzene	99
m,p-Xylene	101
o-Xylene	104
Styrene	102
Bromoform	112
Cumene	102
1,1,2,2-Tetrachloroethane	97
Propylbenzene	104
4-Ethyltoluene	112
1,3,5-Trimethylbenzene	104
1,2,4-Trimethylbenzene	110
1,3-Dichlorobenzene	112
1,4-Dichlorobenzene	108
alpha-Chlorotoluene	92
1,2-Dichlorobenzene	104
1,2,4-Trichlorobenzene	115
Hexachlorobutadiene	107

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	86	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	113	70-130

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Client Sample ID: CCV

Lab ID#: 1406082B-12B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061002**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 6/10/14 08:34 AM**

Compound	%Recovery
Freon 12	111
Freon 114	106
Chloromethane	131 Q
Vinyl Chloride	127
1,3-Butadiene	129
Bromomethane	116
Chloroethane	116
Freon 11	107
Ethanol	129
Freon 113	104
1,1-Dichloroethene	104
Acetone	115
2-Propanol	125
Carbon Disulfide	113
3-Chloropropene	115
Methylene Chloride	124
Methyl tert-butyl ether	113
trans-1,2-Dichloroethene	110
Hexane	127
1,1-Dichloroethane	112
2-Butanone (Methyl Ethyl Ketone)	115
cis-1,2-Dichloroethene	106
Tetrahydrofuran	130
Chloroform	104
1,1,1-Trichloroethane	103
Cyclohexane	112
Carbon Tetrachloride	104
2,2,4-Trimethylpentane	121
Benzene	117
1,2-Dichloroethane	111
Heptane	121
Trichloroethene	110
1,2-Dichloropropane	120
1,4-Dioxane	115
Bromodichloromethane	116
cis-1,3-Dichloropropene	112
4-Methyl-2-pentanone	123
Toluene	112
trans-1,3-Dichloropropene	111
1,1,2-Trichloroethane	110
Tetrachloroethene	102
2-Hexanone	115

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Client Sample ID: CCV

Lab ID#: 1406082B-12B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061002**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/10/14 08:34 AM**	

Compound	%Recovery
Dibromochloromethane	106
1,2-Dibromoethane (EDB)	111
Chlorobenzene	104
Ethyl Benzene	113
m,p-Xylene	111
o-Xylene	113
Styrene	118
Bromoform	102
Cumene	114
1,1,2,2-Tetrachloroethane	111
Propylbenzene	110
4-Ethyltoluene	112
1,3,5-Trimethylbenzene	109
1,2,4-Trimethylbenzene	108
1,3-Dichlorobenzene	101
1,4-Dichlorobenzene	100
alpha-Chlorotoluene	109
1,2-Dichlorobenzene	100
1,2,4-Trichlorobenzene	72
Hexachlorobutadiene	72

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCS

Lab ID#: 1406082B-13A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 09:57 AM**	

Compound	%Recovery	Method Limits
Freon 12	86	70-130
Freon 114	94	70-130
Chloromethane	79	70-130
Vinyl Chloride	84	70-130
1,3-Butadiene	77	70-130
Bromomethane	98	70-130
Chloroethane	87	70-130
Freon 11	90	70-130
Ethanol	88	70-130
Freon 113	109	70-130
1,1-Dichloroethene	102	70-130
Acetone	86	70-130
2-Propanol	81	70-130
Carbon Disulfide	85	70-130
3-Chloropropene	76	70-130
Methylene Chloride	100	70-130
Methyl tert-butyl ether	88	70-130
trans-1,2-Dichloroethene	82	70-130
Hexane	82	70-130
1,1-Dichloroethane	87	70-130
2-Butanone (Methyl Ethyl Ketone)	92	70-130
cis-1,2-Dichloroethene	102	70-130
Tetrahydrofuran	80	70-130
Chloroform	92	70-130
1,1,1-Trichloroethane	90	70-130
Cyclohexane	94	70-130
Carbon Tetrachloride	58 Q	70-130
2,2,4-Trimethylpentane	84	70-130
Benzene	94	70-130
1,2-Dichloroethane	88	70-130
Heptane	87	70-130
Trichloroethene	97	70-130
1,2-Dichloropropane	87	70-130
1,4-Dioxane	92	70-130
Bromodichloromethane	94	70-130
cis-1,3-Dichloropropene	96	70-130
4-Methyl-2-pentanone	88	70-130
Toluene	92	70-130
trans-1,3-Dichloropropene	81	70-130
1,1,2-Trichloroethane	86	70-130
Tetrachloroethene	99	70-130
2-Hexanone	77	70-130

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Client Sample ID: LCS

Lab ID#: 1406082B-13A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 09:57 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	101	70-130
1,2-Dibromoethane (EDB)	92	70-130
Chlorobenzene	90	70-130
Ethyl Benzene	94	70-130
m,p-Xylene	96	70-130
o-Xylene	96	70-130
Styrene	96	70-130
Bromoform	104	70-130
Cumene	97	70-130
1,1,2,2-Tetrachloroethane	87	70-130
Propylbenzene	98	70-130
4-Ethyltoluene	104	70-130
1,3,5-Trimethylbenzene	93	70-130
1,2,4-Trimethylbenzene	102	70-130
1,3-Dichlorobenzene	102	70-130
1,4-Dichlorobenzene	100	70-130
alpha-Chlorotoluene	96	70-130
1,2-Dichlorobenzene	100	70-130
1,2,4-Trichlorobenzene	108	70-130
Hexachlorobutadiene	105	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	89	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	112	70-130

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Client Sample ID: LCSD

Lab ID#: 1406082B-13AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 10:39 AM**	

Compound	%Recovery	Method Limits
Freon 12	83	70-130
Freon 114	91	70-130
Chloromethane	76	70-130
Vinyl Chloride	79	70-130
1,3-Butadiene	74	70-130
Bromomethane	94	70-130
Chloroethane	83	70-130
Freon 11	88	70-130
Ethanol	78	70-130
Freon 113	106	70-130
1,1-Dichloroethene	98	70-130
Acetone	82	70-130
2-Propanol	78	70-130
Carbon Disulfide	82	70-130
3-Chloropropene	74	70-130
Methylene Chloride	93	70-130
Methyl tert-butyl ether	84	70-130
trans-1,2-Dichloroethene	78	70-130
Hexane	77	70-130
1,1-Dichloroethane	84	70-130
2-Butanone (Methyl Ethyl Ketone)	88	70-130
cis-1,2-Dichloroethene	100	70-130
Tetrahydrofuran	79	70-130
Chloroform	89	70-130
1,1,1-Trichloroethane	86	70-130
Cyclohexane	88	70-130
Carbon Tetrachloride	55 Q	70-130
2,2,4-Trimethylpentane	80	70-130
Benzene	92	70-130
1,2-Dichloroethane	89	70-130
Heptane	85	70-130
Trichloroethene	95	70-130
1,2-Dichloropropane	86	70-130
1,4-Dioxane	92	70-130
Bromodichloromethane	93	70-130
cis-1,3-Dichloropropene	96	70-130
4-Methyl-2-pentanone	85	70-130
Toluene	92	70-130
trans-1,3-Dichloropropene	81	70-130
1,1,2-Trichloroethane	88	70-130
Tetrachloroethene	97	70-130
2-Hexanone	77	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1406082B-13AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v060904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/9/14 10:39 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	101	70-130
1,2-Dibromoethane (EDB)	91	70-130
Chlorobenzene	89	70-130
Ethyl Benzene	93	70-130
m,p-Xylene	97	70-130
o-Xylene	96	70-130
Styrene	95	70-130
Bromoform	101	70-130
Cumene	99	70-130
1,1,2,2-Tetrachloroethane	86	70-130
Propylbenzene	100	70-130
4-Ethyltoluene	105	70-130
1,3,5-Trimethylbenzene	96	70-130
1,2,4-Trimethylbenzene	101	70-130
1,3-Dichlorobenzene	105	70-130
1,4-Dichlorobenzene	102	70-130
alpha-Chlorotoluene	97	70-130
1,2-Dichlorobenzene	100	70-130
1,2,4-Trichlorobenzene	113	70-130
Hexachlorobutadiene	111	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	87	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	111	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1406082B-13B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/10/14 08:55 AM**	

Compound	%Recovery	Method Limits
Freon 12	110	70-130
Freon 114	106	70-130
Chloromethane	130	70-130
Vinyl Chloride	129	70-130
1,3-Butadiene	128	70-130
Bromomethane	117	70-130
Chloroethane	113	70-130
Freon 11	108	70-130
Ethanol	128	70-130
Freon 113	116	70-130
1,1-Dichloroethene	118	70-130
Acetone	118	70-130
2-Propanol	126	70-130
Carbon Disulfide	104	70-130
3-Chloropropene	116	70-130
Methylene Chloride	137 Q	70-130
Methyl tert-butyl ether	111	70-130
trans-1,2-Dichloroethene	96	70-130
Hexane	127	70-130
1,1-Dichloroethane	115	70-130
2-Butanone (Methyl Ethyl Ketone)	119	70-130
cis-1,2-Dichloroethene	120	70-130
Tetrahydrofuran	128	70-130
Chloroform	106	70-130
1,1,1-Trichloroethane	103	70-130
Cyclohexane	115	70-130
Carbon Tetrachloride	105	70-130
2,2,4-Trimethylpentane	126	70-130
Benzene	109	70-130
1,2-Dichloroethane	104	70-130
Heptane	116	70-130
Trichloroethene	104	70-130
1,2-Dichloropropane	111	70-130
1,4-Dioxane	109	70-130
Bromodichloromethane	110	70-130
cis-1,3-Dichloropropene	107	70-130
4-Methyl-2-pentanone	116	70-130
Toluene	101	70-130
trans-1,3-Dichloropropene	102	70-130
1,1,2-Trichloroethane	103	70-130
Tetrachloroethene	98	70-130
2-Hexanone	124	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1406082B-13B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/10/14 08:55 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	104	70-130
1,2-Dibromoethane (EDB)	105	70-130
Chlorobenzene	99	70-130
Ethyl Benzene	104	70-130
m,p-Xylene	106	70-130
o-Xylene	104	70-130
Styrene	110	70-130
Bromoform	100	70-130
Cumene	110	70-130
1,1,2,2-Tetrachloroethane	102	70-130
Propylbenzene	106	70-130
4-Ethyltoluene	109	70-130
1,3,5-Trimethylbenzene	102	70-130
1,2,4-Trimethylbenzene	102	70-130
1,3-Dichlorobenzene	95	70-130
1,4-Dichlorobenzene	93	70-130
alpha-Chlorotoluene	111	70-130
1,2-Dichlorobenzene	95	70-130
1,2,4-Trichlorobenzene	76	70-130
Hexachlorobutadiene	77	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 1406082B-13BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061005**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/10/14 09:47 AM**	

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Freon 114	101	70-130
Chloromethane	122	70-130
Vinyl Chloride	122	70-130
1,3-Butadiene	123	70-130
Bromomethane	110	70-130
Chloroethane	109	70-130
Freon 11	100	70-130
Ethanol	116	70-130
Freon 113	108	70-130
1,1-Dichloroethene	113	70-130
Acetone	109	70-130
2-Propanol	121	70-130
Carbon Disulfide	99	70-130
3-Chloropropene	112	70-130
Methylene Chloride	130	70-130
Methyl tert-butyl ether	108	70-130
trans-1,2-Dichloroethene	90	70-130
Hexane	124	70-130
1,1-Dichloroethane	109	70-130
2-Butanone (Methyl Ethyl Ketone)	112	70-130
cis-1,2-Dichloroethene	114	70-130
Tetrahydrofuran	121	70-130
Chloroform	99	70-130
1,1,1-Trichloroethane	98	70-130
Cyclohexane	109	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	122	70-130
Benzene	105	70-130
1,2-Dichloroethane	100	70-130
Heptane	112	70-130
Trichloroethene	100	70-130
1,2-Dichloropropane	107	70-130
1,4-Dioxane	107	70-130
Bromodichloromethane	104	70-130
cis-1,3-Dichloropropene	106	70-130
4-Methyl-2-pentanone	116	70-130
Toluene	98	70-130
trans-1,3-Dichloropropene	98	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	94	70-130
2-Hexanone	121	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1406082B-13BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17061005**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/10/14 09:47 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	99	70-130
1,2-Dibromoethane (EDB)	102	70-130
Chlorobenzene	94	70-130
Ethyl Benzene	102	70-130
m,p-Xylene	104	70-130
o-Xylene	103	70-130
Styrene	108	70-130
Bromoform	96	70-130
Cumene	108	70-130
1,1,2,2-Tetrachloroethane	100	70-130
Propylbenzene	104	70-130
4-Ethyltoluene	104	70-130
1,3,5-Trimethylbenzene	106	70-130
1,2,4-Trimethylbenzene	102	70-130
1,3-Dichlorobenzene	95	70-130
1,4-Dichlorobenzene	94	70-130
alpha-Chlorotoluene	111	70-130
1,2-Dichlorobenzene	96	70-130
1,2,4-Trichlorobenzene	88	70-130
Hexachlorobutadiene	87	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	98	70-130

DPE PILOT STUDY RESULTS

April 18, 2014

Mr. Jon Einarsen
Zipper Geo Associates
19023 - 36th Ave W., Suite D
Lynnwood, WA 98036-

Dear Mr. Einarsen,

On April 17th, 1 sample was received by our laboratory and assigned our laboratory project number EV14040092. The project was identified as your 1001.22. The sample identification and requested analyses are outlined on the attached chain of custody record.

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

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

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS JOB#:	EV14040092
		ALS SAMPLE#:	EV14040092-01
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	04/17/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	4/16/2014 4:40:00 PM
CLIENT SAMPLE ID	Baker Tank	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Chloromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	04/17/2014	GAP
Bromomethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Chloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Acetone	EPA-8260	U	25	1	UG/L	04/17/2014	GAP
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	04/17/2014	GAP
Acrylonitrile	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
2-Butanone	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Chloroform	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Benzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Trichloroethene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Dibromomethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
Toluene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
2-Hexanone	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Tetrachloroethylene	EPA-8260	**2.0**	2.0	1	UG/L	04/17/2014	GAP
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	04/17/2014	GAP

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS JOB#:	EV14040092
		ALS SAMPLE#:	EV14040092-01
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	04/17/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	4/16/2014 4:40:00 PM
CLIENT SAMPLE ID	Baker Tank	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
m,p-Xylene	EPA-8260	**9.2**	4.0	1	UG/L	04/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**107**	04/17/2014	GAP
Toluene-d8	EPA-8260	**101**	04/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**104**	04/17/2014	GAP

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

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ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS SDG#:	EV14040092
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY BLANK RESULTS

MB-041514W - Batch 80784 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Chloromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	04/15/2014	GAP
Bromomethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Chloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Acetone	EPA-8260	U	25	1	UG/L	04/15/2014	GAP
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	04/15/2014	GAP
Acrylonitrile	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
2-Butanone	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Chloroform	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Benzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Trichloroethene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Dibromomethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
Toluene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
2-Hexanone	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Tetrachloroethylene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	04/15/2014	GAP

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CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS SDG#:	EV14040092
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY BLANK RESULTS

MB-041514W - Batch 80784 - Water by EPA-8260

Chlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	04/15/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS SDG#:	EV14040092
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 80784 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	EPA-8260	**96.2**			04/15/2014	GAP
1,1-Dichloroethene - BSD	EPA-8260	**95.2**	**1**		04/15/2014	GAP
Benzene - BS	EPA-8260	**85.6**			04/15/2014	GAP
Benzene - BSD	EPA-8260	**84.9**	**1**		04/15/2014	GAP
Trichloroethene - BS	EPA-8260	**94.2**			04/15/2014	GAP
Trichloroethene - BSD	EPA-8260	**93.8**	**0**		04/15/2014	GAP
Toluene - BS	EPA-8260	**93.4**			04/15/2014	GAP
Toluene - BSD	EPA-8260	**92.7**	**1**		04/15/2014	GAP
Chlorobenzene - BS	EPA-8260	**93.0**			04/15/2014	GAP
Chlorobenzene - BSD	EPA-8260	**92.9**	**0**		04/15/2014	GAP

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

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

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV1404092

Date 4/17/14 Page 1 Of 1

PROJECT ID:	1001.22
REPORT TO COMPANY:	ZGA
PROJECT MANAGER:	Jon Einarsen
ADDRESS:	19023 36th Ave W Suite D Lynnwood wa 98036
PHONE:	425-582-9928 FAX:
P.O. #:	1001.22 E-MAIL: jeinarsen@zippergeo.com
INVOICE TO COMPANY:	ZGA
ATTENTION:	Jon Einarsen
ADDRESS:	

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. BAKER TANK	4/16/14	1640	H_2O	1							X									3	
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

LABORATORY COPY

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Logan Schumacher / ZGA / 4-17-14 / 11:55
   Received By: Shawn Robinson ALS 4/17/14 11:55
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 Standard | 5 | X | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER: Specify:

* Turnaround request less than standard may incur Rush Charges

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4/28/2014
Mr. Jon Einarsen
Zipper Geo Associates, LLC
19023 36th Avenue West
Suite D
Lynwood WA 98036

Project Name:
Project #: 1001.22
Workorder #: 1404381

Dear Mr. Jon Einarsen

The following report includes the data for the above referenced project for sample(s) received on 4/22/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Karen Stempson

Project Manager

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WORK ORDER #: 1404381

Work Order Summary

CLIENT:	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036	**BILL TO:**	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036
PHONE:	425-582-9928	**P.O. #**	1001.22
FAX:		**PROJECT #**	1001.22
DATE RECEIVED:	04/22/2014	**CONTACT:**	Karen Stempson
DATE COMPLETED:	04/24/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	DPE effluent #2	Modified TO-15	3.9 "Hg	14.8 psi
02A	DPE effluent #1	Modified TO-15	0.9 psi	15.2 psi
03A	Lab Blank	Modified TO-15	NA	NA
04A	CCV	Modified TO-15	NA	NA
05A	LCS	Modified TO-15	NA	NA
05AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 04/28/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
Zipper Geo Associates, LLC
Workorder# 1404381

Two 1 Liter Summa Canister (100% Certified) samples were received on April 22, 2014. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

Despite the use of flow controllers for sample collection, the final canister vacuums for sample DPE effluent #1 were measured at ambient pressure by the laboratory upon sample receipt.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Due to the linear calibration range of the instrument, the reporting limit for alpha-Chlorotoluene was raised from 0.1 ppbv to 0.5 ppbv.

Dilution was performed on samples DPE effluent #2 and DPE effluent #1 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See

data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: DPE effluent #2

Lab ID#: 1404381-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	2.3	4.5	5.5	11
Chloroform	0.46	0.86	2.2	4.2
Trichloroethene	0.46	1.5	2.5	8.3
Tetrachloroethene	0.46	100	3.1	700
m,p-Xylene	0.46	1.5	2.0	6.6

Client Sample ID: DPE effluent #1

Lab ID#: 1404381-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	3.2	4.8	7.6	11
Toluene	0.64	0.85	2.4	3.2
Tetrachloroethene	0.64	56	4.3	380
Ethyl Benzene	0.64	14	2.8	59
m,p-Xylene	0.64	170	2.8	750
o-Xylene	0.64	23	2.8	100

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Client Sample ID: DPE effluent #2

Lab ID#: 1404381-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042319**	**Date of Collection: 4/16/14 3:30:00 PM**	
Dil. Factor:	**4.60**	**Date of Analysis: 4/23/14 10:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.46	Not Detected	2.3	Not Detected
Freon 114	0.46	Not Detected	3.2	Not Detected
Chloromethane	2.3	Not Detected	4.7	Not Detected
Vinyl Chloride	0.46	Not Detected	1.2	Not Detected
1,3-Butadiene	0.46	Not Detected	1.0	Not Detected
Bromomethane	2.3	Not Detected	8.9	Not Detected
Chloroethane	2.3	Not Detected	6.1	Not Detected
Freon 11	0.46	Not Detected	2.6	Not Detected
Ethanol	2.3	Not Detected	4.3	Not Detected
Freon 113	0.46	Not Detected	3.5	Not Detected
1,1-Dichloroethene	0.46	Not Detected	1.8	Not Detected
Acetone	2.3	4.5	5.5	11
2-Propanol	2.3	Not Detected	5.6	Not Detected
Carbon Disulfide	2.3	Not Detected	7.2	Not Detected
3-Chloropropene	2.3	Not Detected	7.2	Not Detected
Methylene Chloride	0.92	Not Detected	3.2	Not Detected
Methyl tert-butyl ether	0.46	Not Detected	1.6	Not Detected
trans-1,2-Dichloroethene	0.46	Not Detected	1.8	Not Detected
Hexane	0.46	Not Detected	1.6	Not Detected
1,1-Dichloroethane	0.46	Not Detected	1.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.3	Not Detected	6.8	Not Detected
cis-1,2-Dichloroethene	0.46	Not Detected	1.8	Not Detected
Tetrahydrofuran	2.3	Not Detected	6.8	Not Detected
Chloroform	0.46	0.86	2.2	4.2
1,1,1-Trichloroethane	0.46	Not Detected	2.5	Not Detected
Cyclohexane	0.46	Not Detected	1.6	Not Detected
Carbon Tetrachloride	0.46	Not Detected	2.9	Not Detected
2,2,4-Trimethylpentane	2.3	Not Detected	11	Not Detected
Benzene	0.46	Not Detected	1.5	Not Detected
1,2-Dichloroethane	0.46	Not Detected	1.9	Not Detected
Heptane	0.46	Not Detected	1.9	Not Detected
Trichloroethene	0.46	1.5	2.5	8.3
1,2-Dichloropropane	0.46	Not Detected	2.1	Not Detected
1,4-Dioxane	0.46	Not Detected	1.6	Not Detected
Bromodichloromethane	0.46	Not Detected	3.1	Not Detected
cis-1,3-Dichloropropene	0.46	Not Detected	2.1	Not Detected
4-Methyl-2-pentanone	0.46	Not Detected	1.9	Not Detected
Toluene	0.46	Not Detected	1.7	Not Detected
trans-1,3-Dichloropropene	0.46	Not Detected	2.1	Not Detected
1,1,2-Trichloroethane	0.46	Not Detected	2.5	Not Detected
Tetrachloroethene	0.46	100	3.1	700
2-Hexanone	2.3	Not Detected	9.4	Not Detected

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Client Sample ID: DPE effluent #2

Lab ID#: 1404381-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042319**	**Date of Collection: 4/16/14 3:30:00 PM**	
Dil. Factor:	**4.60**	**Date of Analysis: 4/23/14 10:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.46	Not Detected	3.9	Not Detected
1,2-Dibromoethane (EDB)	0.46	Not Detected	3.5	Not Detected
Chlorobenzene	0.46	Not Detected	2.1	Not Detected
Ethyl Benzene	0.46	Not Detected	2.0	Not Detected
m,p-Xylene	0.46	1.5	2.0	6.6
o-Xylene	0.46	Not Detected	2.0	Not Detected
Styrene	0.46	Not Detected	2.0	Not Detected
Bromoform	0.46	Not Detected	4.8	Not Detected
Cumene	0.46	Not Detected	2.3	Not Detected
1,1,2,2-Tetrachloroethane	0.46	Not Detected	3.2	Not Detected
Propylbenzene	0.46	Not Detected	2.3	Not Detected
4-Ethyltoluene	0.46	Not Detected	2.3	Not Detected
1,3,5-Trimethylbenzene	0.46	Not Detected	2.3	Not Detected
1,2,4-Trimethylbenzene	0.46	Not Detected	2.3	Not Detected
1,3-Dichlorobenzene	0.46	Not Detected	2.8	Not Detected
1,4-Dichlorobenzene	0.46	Not Detected	2.8	Not Detected
alpha-Chlorotoluene	2.3	Not Detected	12	Not Detected
1,2-Dichlorobenzene	0.46	Not Detected	2.8	Not Detected
1,2,4-Trichlorobenzene	2.3	Not Detected UJ	17	Not Detected UJ
Hexachlorobutadiene	2.3	Not Detected UJ	24	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	85	70-130

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Client Sample ID: DPE effluent #1

Lab ID#: 1404381-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042320**	**Date of Collection:**	**4/16/14 8:50:00 AM**
Dil. Factor:	**6.40**	**Date of Analysis:**	**4/23/14 11:02 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.64	Not Detected	3.2	Not Detected
Freon 114	0.64	Not Detected	4.5	Not Detected
Chloromethane	3.2	Not Detected	6.6	Not Detected
Vinyl Chloride	0.64	Not Detected	1.6	Not Detected
1,3-Butadiene	0.64	Not Detected	1.4	Not Detected
Bromomethane	3.2	Not Detected	12	Not Detected
Chloroethane	3.2	Not Detected	8.4	Not Detected
Freon 11	0.64	Not Detected	3.6	Not Detected
Ethanol	3.2	Not Detected	6.0	Not Detected
Freon 113	0.64	Not Detected	4.9	Not Detected
1,1-Dichloroethene	0.64	Not Detected	2.5	Not Detected
Acetone	3.2	4.8	7.6	11
2-Propanol	3.2	Not Detected	7.9	Not Detected
Carbon Disulfide	3.2	Not Detected	10	Not Detected
3-Chloropropene	3.2	Not Detected	10	Not Detected
Methylene Chloride	1.3	Not Detected	4.4	Not Detected
Methyl tert-butyl ether	0.64	Not Detected	2.3	Not Detected
trans-1,2-Dichloroethene	0.64	Not Detected	2.5	Not Detected
Hexane	0.64	Not Detected	2.2	Not Detected
1,1-Dichloroethane	0.64	Not Detected	2.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.2	Not Detected	9.4	Not Detected
cis-1,2-Dichloroethene	0.64	Not Detected	2.5	Not Detected
Tetrahydrofuran	3.2	Not Detected	9.4	Not Detected
Chloroform	0.64	Not Detected	3.1	Not Detected
1,1,1-Trichloroethane	0.64	Not Detected	3.5	Not Detected
Cyclohexane	0.64	Not Detected	2.2	Not Detected
Carbon Tetrachloride	0.64	Not Detected	4.0	Not Detected
2,2,4-Trimethylpentane	3.2	Not Detected	15	Not Detected
Benzene	0.64	Not Detected	2.0	Not Detected
1,2-Dichloroethane	0.64	Not Detected	2.6	Not Detected
Heptane	0.64	Not Detected	2.6	Not Detected
Trichloroethene	0.64	Not Detected	3.4	Not Detected
1,2-Dichloropropane	0.64	Not Detected	3.0	Not Detected
1,4-Dioxane	0.64	Not Detected	2.3	Not Detected
Bromodichloromethane	0.64	Not Detected	4.3	Not Detected
cis-1,3-Dichloropropene	0.64	Not Detected	2.9	Not Detected
4-Methyl-2-pentanone	0.64	Not Detected	2.6	Not Detected
Toluene	0.64	0.85	2.4	3.2
trans-1,3-Dichloropropene	0.64	Not Detected	2.9	Not Detected
1,1,2-Trichloroethane	0.64	Not Detected	3.5	Not Detected
Tetrachloroethene	0.64	56	4.3	380
2-Hexanone	3.2	Not Detected	13	Not Detected

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Client Sample ID: DPE effluent #1

Lab ID#: 1404381-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042320**	**Date of Collection: 4/16/14 8:50:00 AM**	
Dil. Factor:	**6.40**	**Date of Analysis: 4/23/14 11:02 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.64	Not Detected	5.4	Not Detected
1,2-Dibromoethane (EDB)	0.64	Not Detected	4.9	Not Detected
Chlorobenzene	0.64	Not Detected	2.9	Not Detected
Ethyl Benzene	0.64	14	2.8	59
m,p-Xylene	0.64	170	2.8	750
o-Xylene	0.64	23	2.8	100
Styrene	0.64	Not Detected	2.7	Not Detected
Bromoform	0.64	Not Detected	6.6	Not Detected
Cumene	0.64	Not Detected	3.1	Not Detected
1,1,2,2-Tetrachloroethane	0.64	Not Detected	4.4	Not Detected
Propylbenzene	0.64	Not Detected	3.1	Not Detected
4-Ethyltoluene	0.64	Not Detected	3.1	Not Detected
1,3,5-Trimethylbenzene	0.64	Not Detected	3.1	Not Detected
1,2,4-Trimethylbenzene	0.64	Not Detected	3.1	Not Detected
1,3-Dichlorobenzene	0.64	Not Detected	3.8	Not Detected
1,4-Dichlorobenzene	0.64	Not Detected	3.8	Not Detected
alpha-Chlorotoluene	3.2	Not Detected	16	Not Detected
1,2-Dichlorobenzene	0.64	Not Detected	3.8	Not Detected
1,2,4-Trichlorobenzene	3.2	Not Detected UJ	24	Not Detected UJ
Hexachlorobutadiene	3.2	Not Detected UJ	34	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1404381-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042306**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 12:02 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.10	Not Detected	0.49	Not Detected
Freon 114	0.10	Not Detected	0.70	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.10	Not Detected	0.26	Not Detected
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
3-Chloropropene	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
Carbon Tetrachloride	0.10	Not Detected	0.63	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
1,2-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,2-Dichloropropane	0.10	Not Detected	0.46	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
Bromodichloromethane	0.10	Not Detected	0.67	Not Detected
cis-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
trans-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
1,1,2-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
2-Hexanone	0.50	Not Detected	2.0	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1404381-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042306**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 12:02 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.10	Not Detected	0.85	Not Detected
1,2-Dibromoethane (EDB)	0.10	Not Detected	0.77	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
Bromoform	0.10	Not Detected	1.0	Not Detected
Cumene	0.10	Not Detected	0.49	Not Detected
1,1,2,2-Tetrachloroethane	0.10	Not Detected	0.69	Not Detected
Propylbenzene	0.10	Not Detected	0.49	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected UJ	3.7	Not Detected UJ
Hexachlorobutadiene	0.50	Not Detected UJ	5.3	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: CCV

Lab ID#: 1404381-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 09:17 AM**	

Compound	%Recovery
Freon 12	119
Freon 114	123
Chloromethane	123
Vinyl Chloride	119
1,3-Butadiene	119
Bromomethane	122
Chloroethane	110
Freon 11	110
Ethanol	132 Q
Freon 113	110
1,1-Dichloroethene	116
Acetone	112
2-Propanol	114
Carbon Disulfide	108
3-Chloropropene	117
Methylene Chloride	100
Methyl tert-butyl ether	113
trans-1,2-Dichloroethene	110
Hexane	118
1,1-Dichloroethane	109
2-Butanone (Methyl Ethyl Ketone)	108
cis-1,2-Dichloroethene	105
Tetrahydrofuran	140 Q
Chloroform	106
1,1,1-Trichloroethane	111
Cyclohexane	108
Carbon Tetrachloride	105
2,2,4-Trimethylpentane	112
Benzene	100
1,2-Dichloroethane	104
Heptane	108
Trichloroethene	97
1,2-Dichloropropane	101
1,4-Dioxane	115
Bromodichloromethane	104
cis-1,3-Dichloropropene	106
4-Methyl-2-pentanone	118
Toluene	102
trans-1,3-Dichloropropene	104
1,1,2-Trichloroethane	98
Tetrachloroethene	98
2-Hexanone	103

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Client Sample ID: CCV

Lab ID#: 1404381-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 09:17 AM**	

Compound	%Recovery
Dibromochloromethane	108
1,2-Dibromoethane (EDB)	103
Chlorobenzene	98
Ethyl Benzene	105
m,p-Xylene	108
o-Xylene	104
Styrene	103
Bromoform	103
Cumene	105
1,1,2,2-Tetrachloroethane	101
Propylbenzene	101
4-Ethyltoluene	101
1,3,5-Trimethylbenzene	98
1,2,4-Trimethylbenzene	94
1,3-Dichlorobenzene	95
1,4-Dichlorobenzene	95
alpha-Chlorotoluene	100
1,2-Dichlorobenzene	90
1,2,4-Trichlorobenzene	64 Q
Hexachlorobutadiene	64 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1404381-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 10:05 AM**	

Compound	%Recovery	Method Limits
Freon 12	104	70-130
Freon 114	108	70-130
Chloromethane	109	70-130
Vinyl Chloride	106	70-130
1,3-Butadiene	101	70-130
Bromomethane	115	70-130
Chloroethane	97	70-130
Freon 11	98	70-130
Ethanol	108	70-130
Freon 113	114	70-130
1,1-Dichloroethene	114	70-130
Acetone	100	70-130
2-Propanol	104	70-130
Carbon Disulfide	94	70-130
3-Chloropropene	108	70-130
Methylene Chloride	104	70-130
Methyl tert-butyl ether	102	70-130
trans-1,2-Dichloroethene	87	70-130
Hexane	109	70-130
1,1-Dichloroethane	103	70-130
2-Butanone (Methyl Ethyl Ketone)	103	70-130
cis-1,2-Dichloroethene	108	70-130
Tetrahydrofuran	101	70-130
Chloroform	99	70-130
1,1,1-Trichloroethane	103	70-130
Cyclohexane	107	70-130
Carbon Tetrachloride	106	70-130
2,2,4-Trimethylpentane	102	70-130
Benzene	102	70-130
1,2-Dichloroethane	104	70-130
Heptane	108	70-130
Trichloroethene	103	70-130
1,2-Dichloropropane	102	70-130
1,4-Dioxane	112	70-130
Bromodichloromethane	109	70-130
cis-1,3-Dichloropropene	112	70-130
4-Methyl-2-pentanone	119	70-130
Toluene	102	70-130
trans-1,3-Dichloropropene	102	70-130
1,1,2-Trichloroethane	99	70-130
Tetrachloroethene	99	70-130
2-Hexanone	108	70-130

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Client Sample ID: LCS

Lab ID#: 1404381-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 10:05 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	114	70-130
1,2-Dibromoethane (EDB)	102	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	104	70-130
m,p-Xylene	109	70-130
o-Xylene	103	70-130
Styrene	104	70-130
Bromoform	110	70-130
Cumene	105	70-130
1,1,2,2-Tetrachloroethane	100	70-130
Propylbenzene	101	70-130
4-Ethyltoluene	98	70-130
1,3,5-Trimethylbenzene	94	70-130
1,2,4-Trimethylbenzene	90	70-130
1,3-Dichlorobenzene	95	70-130
1,4-Dichlorobenzene	93	70-130
alpha-Chlorotoluene	108	70-130
1,2-Dichlorobenzene	90	70-130
1,2,4-Trichlorobenzene	73	70-130
Hexachlorobutadiene	68 Q	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCSD

Lab ID#: 1404381-05AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 10:48 AM**	

Compound	%Recovery	Method Limits
Freon 12	93	70-130
Freon 114	96	70-130
Chloromethane	86	70-130
Vinyl Chloride	95	70-130
1,3-Butadiene	93	70-130
Bromomethane	106	70-130
Chloroethane	89	70-130
Freon 11	90	70-130
Ethanol	106	70-130
Freon 113	106	70-130
1,1-Dichloroethene	108	70-130
Acetone	92	70-130
2-Propanol	94	70-130
Carbon Disulfide	88	70-130
3-Chloropropene	105	70-130
Methylene Chloride	97	70-130
Methyl tert-butyl ether	96	70-130
trans-1,2-Dichloroethene	81	70-130
Hexane	102	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	96	70-130
cis-1,2-Dichloroethene	104	70-130
Tetrahydrofuran	117	70-130
Chloroform	92	70-130
1,1,1-Trichloroethane	96	70-130
Cyclohexane	102	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	93	70-130
Benzene	98	70-130
1,2-Dichloroethane	97	70-130
Heptane	106	70-130
Trichloroethene	95	70-130
1,2-Dichloropropane	95	70-130
1,4-Dioxane	107	70-130
Bromodichloromethane	102	70-130
cis-1,3-Dichloropropene	106	70-130
4-Methyl-2-pentanone	112	70-130
Toluene	98	70-130
trans-1,3-Dichloropropene	97	70-130
1,1,2-Trichloroethane	95	70-130
Tetrachloroethene	99	70-130
2-Hexanone	106	70-130

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Client Sample ID: LCSD

Lab ID#: 1404381-05AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 10:48 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	108	70-130
1,2-Dibromoethane (EDB)	102	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	107	70-130
o-Xylene	102	70-130
Styrene	104	70-130
Bromoform	105	70-130
Cumene	105	70-130
1,1,2,2-Tetrachloroethane	99	70-130
Propylbenzene	100	70-130
4-Ethyltoluene	100	70-130
1,3,5-Trimethylbenzene	97	70-130
1,2,4-Trimethylbenzene	90	70-130
1,3-Dichlorobenzene	96	70-130
1,4-Dichlorobenzene	95	70-130
alpha-Chlorotoluene	108	70-130
1,2-Dichlorobenzene	91	70-130
1,2,4-Trichlorobenzene	72	70-130
Hexachlorobutadiene	64 Q	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	87	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	98	70-130

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Jon Einarsen

Collected by: (Print and Sign) Jon Einarsen

Company Zipper GEO Email jeinarsen@zippergeo.com

Address 19023 36th Ave W Suited City Lynnwood State WA Zip 98203

Phone 425 582 9928 Fax

Project Info:
P.O. # 1001.22
Project # 1001.22
Project Name

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	DPE effluent #2	37746	4/16/14	1530	TO-15	-29.5	-5.0		
02A	DPE effluent #1	35680	4/16/14	0850	TO-15				

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	4/18/14 1405	[signature]	4.22.14 1035
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:
A flow controller was not used for can # 35680 & initial and final vacuum were not measured

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	UPS		NA	Good	Yes No None	1404381

APPENDIX D

GLOBAL REMEDIATION SOLUTIONS LLC.
A DIVISION OF PNE CORP.
1121 Columbia Blvd., Longview, WA 98632
(360) 423-2245 / Fax (360) 423-2272 / Toll Free 1-800-533-2867
www.pnecorp.com

Jon Einarson
Zipper Geo Associates, LLC
19023 36th Avenue West
Suite D
Lynwood, Washington 98036

May 8, 2014

Subject: **DPE Pilot Testing Event Summary**
Marketplace Retail Center
18001 Bothell Everett Highway, Bothell, Washington

Introduction

Global Remediation Solutions, LLC (GRS) is pleased to present this summary of environmental services at the above-referenced site to Zipper Geo Associates, LLC (ZGA). The objective of the scope of work for this project was presented to the ZGA for review and approved to be completed. The scope was developed to evaluate extracting groundwater and soil vapor, commonly called dual-phase extraction (DPE) for use as an alternative remediation technology to remove halogenated volatile organics compounds (HVOCs) detected at the site. The summary of the pilot testing may be used in corrective action plan documents to present a remedial option for a "No Further Action" determination from the Washington Department of Ecology (Ecology).

GRS performed two (2) separate DPE events to observe the subsurface response to the vacuum energy applied using a mobile DPE unit. The mobile DPE unit is designed to extract soil vapors and groundwater using one piece of equipment. The unit operation lowers the local groundwater table (surrounding DPE-1), exposing saturated soils amenable to soil vapor extraction (SVE) technology. Under the high vacuum conditions HVOCs that are adsorbed to the local soils would be transferred to the vapor phase and removed with the extracted soil vapor.

DPE Pilot Study Testing Procedures

GRS and ZGA personnel arrived at Marketplace Retail Center located at 18001 Bothell Everett Highway, Bothell, Washington (site) April 15, 2014 to setup the portable generator, DPE trailer unit and placed the 4,200-gallon holding tanks for storage of recovered water. The designated work zone was coned and marked with "caution tape" to separate the Market Place Retail parking lot from access to the equipment. Monitoring wells VMW-1, MW-2, MW-3, MW-4 and MW-9 (see Figure 1 attached) were opened to equilibrate with atmospheric pressure and the baseline groundwater depths to water (DTW) readings were collected. Water level measurements were referenced to below the top of the well casing (btoc).

The static water levels were measured in each monitoring well using a Geotech Oil/Water Interface Tape. The probe of the Oil/Water Interface Tape operated on a dual principle: sonic for liquid level indication, and conductivity for water sensing. The instrument emitted a steady tone when the probe encountered oil and an intermittent beep when it encountered water.

The probe on the Oil/Water Interface Tape was lowered into the well until the instrument detected floating product (if present). The tape connected to the probe was used to obtain a depth-to-product measurement, from the reference point, to within 0.01 feet. The probe was lowered further into the well until the instrument detected water. The depth-to-water, relative to the same reference point, was recorded each day prior to starting the DPE equipment.

Initial Depth to Water Summary

Date	DPE-1 (feet btoc)	MW-2 (feet btoc)	MW-3 (feet btoc)	MW-4 (feet btoc)	MW-9 (feet btoc)
04/15/14	23.73	23.03	23.59	23.19	25.09
04/16/14	23.75	23.05	24.64	23.12	25.05

The extraction point (stinger) was placed in DPE-1 at a depth of approximately 27 feet btoc. An additional vapor monitoring well (screened above the local groundwater level) VMW-1 well along with monitoring wells: MW-2, VMW-1, MW-2, MW-3, MW-4 and MW-9

were used to measure the response to vacuum energy for the pilot study. Vacuum monitoring (Magnehelic™) gauges were attached to the well casings and the extraction well DPE-1 was plumbed to the mobile DPE system.

The DPE system was operated at the highest vacuum to safely extract groundwater and soil vapors from the subsurface during the test. The extracted groundwater was piped to the onsite holding tank for storage and offsite disposal. The monitoring wells MW-2, MW-3, MW-4 and MW-9 were used to measure depth to groundwater and wellhead vacuum/pressure. Periodic DPE system readings, including influent vacuum at the wellhead connection and DPE system vacuum at the pump head were collected. Please refer to Table 1 attached for detailed information and a summary of the field parameters collected over the duration of the DPE event.

The system was started at 14:40 on April 15, 2014 and the entire vacuum developed by the DPE system (25 inches Hg) was directed to the wellhead stinger to increase groundwater drawdown rates. The DPE system was operated continuously for 305 minutes with site parameter readings recorded on field logs. The DPE system was shutdown on at 20:05 with a total of approximately 400 gallons of groundwater extracted and stored in the onsite tank. The local groundwater levels and wellhead pressures were allowed to return to equilibrium. DTW measurements in the extraction well DPE-1 were recorded on field logs and the site was secured prior to departure.

On April 16, 2014 the initial DTW measurement in the extraction point DPE-1, MW-2, MW-2, MW-3, MW-4 and MW-9 were collected prior to starting the DPE equipment.

The DPE system was started at 9:00 with the stinger placed in DPE-1 at a depth of approximately 27 feet btoc. The entire vacuum developed by the DPE system was directed to the wellhead stingers to increase groundwater drawdown rates. The system was left operating with well DPE-1 connected as the extraction point for the 420 minutes. The average total vacuum developed and directed to DPE-1 from the DPE system was 25 inches Hg.

On April 16, 2014 samples of the effluent off gas were collected prior to the termination of the DPE event in laboratory prepared “Summa” canisters. The canisters were labeled with a sample number, date, time, and sampler name and shipped under the appropriate Chain-of-Custody procedures. The off gas air samples were shipped to Air Toxics, LTD in Folsom, California for halogenated volatile organic compounds (HVOCs) by EPA Method TO-15.

The DPE system was shutdown on April 1, 2014 at 16:20 and the local groundwater levels and wellhead pressures were allowed to return to equilibrium. Extraction point DPE – 1 depth to water levels were collected 20 minutes after system shutdown.

A sample of the accumulated effluent water in the Baker tank was collected in bottles, labeled with a sample number, date, time, and sampler name and stored in an ice chest containing frozen "blue ice." Appropriate Chain-of-Custody procedures were also followed. Extracted groundwater samples were delivered to ALS Laboratories in Everett, Washington for analysis by analyzed for HVOCs by EPA Method 8260.

DPE Pilot Study Test Results

The DPE pilot testing event was conducted on April 15, 2014 and April 16, 2014. The monitoring well parameters recorded during the DPE pilot study are presented in Table 1 attached. Groundwater elevation changes observed in the monitoring wells are shown on Figure 2 and Figure 3 attached. Decreasing groundwater elevations were observed in monitoring wells MW-4 and MW-4 within approximately 220 minutes after the DPE system was started. Groundwater elevations were recovered to static within approximately 30 minutes after the DPE system was shut down. Wellhead pressure changes were greatest in VMW-1 and ranged from -0.05 to -0.82 inches of water column (inches W.C.) and MW-3 had vacuum readings ranging from -0.120 to -0.40 inches of water column (inches W.C.)

During the DPE pilot study, approximately 1,017 gallons of groundwater were extracted during 780 minutes of operation. The extracted groundwater was stored in the onsite tank from the beginning of the DPE event for proper disposal at PSC disposal facility in Tacoma, Washington. The groundwater extraction rate was approximately 1.36 gallons per minute (gpm).

During the testing monitoring well MW-2, MW-3 and MW-4 the maximum DTW changes were recorded were 0.08-feet, 0.20-feet and 0.24-feet respectively. Following the termination of the DPE event the DTW in extraction well DPE-1 was monitored for 20 minutes. The well returned to the within 0.10 feet of the initial DTW measurement.

The information from the laboratory analysis was used to estimate the halogenated volatile organic compounds (HVOCs) removed during the extraction event. The total pounds of HVOCs removed were estimated at only 0.02 pounds removed over 745 minutes of extracting on DPE-1. The liquid-phase contaminant concentration and removal calculation summary is presented in Table 2 and the vapor-phase contaminant

concentration and removal calculation summary is presented in Table 3 attached. Laboratory reports for samples submitted are attached.

Field permeability to air flow is a soil property that relates to how easily a gas will flow through soil matrix. High permeabilities are characteristic of coarse-grained soil such as gravel and sand, while low permeabilities are characteristic of silts and clay. EPA guidance suggests that soil vapor extraction (SVE) may not be appropriate for sites with field permeabilities of less than 0.1 darcy (USEPA 1991). Field permeabilities were calculated using the following equation (Johnson et al. 1989):

$$\frac{Q}{H} = P_w \pi \frac{k}{\mu} \frac{\left[1 - \left(P_m / P_w\right)^2\right]}{\ln\left(R_w / R_m\right)^2}$$

Where:

Q	=	Flow from extraction well (cm^3/s)
H	=	Screened interval (cm)
μ	=	Viscosity of air (1.8 x 10-4 g/cm-s)
Pw	=	Absolute vacuum at extraction well (1.01 x 106 $g/cm\text{-}s^2$)
Pm	=	Absolute vacuum at monitoring well ($g/cm\text{-}s^2$)
Rw	=	Radius of extraction well (cm)
Rm	=	Distance of monitoring well from extraction well (cm)
k	=	Permeability to air flow (cm^2) (1 darcy = 10-8 cm^2)

From this equation, the permeability to air flow was calculated for the average vacuum applied (25 inches Hg) to the extraction point DPE-1 to be equal to 1.448 x 10-8 cm2 or 1.448 darcy. This value of the “k” permeability is typical to soil types of fractured rock with silty-sands to clayey-silts (Freeze & Cherry- Groundwater 1979).

The radius of influence (ROI) or effective radius is the maximum radial distance away from the extraction point that induced vacuum or groundwater drawdown is measured. The ROI was estimated based upon a semi-log plot of measured drawdown verses distance from the extraction point. The draw down verses distance relationship is a variation modeled after the distance-drawdown plots generated from stead state groundwater pumping tests (Driscoll, 1986). This application (The Modified Jacob’s

Method) is based upon the assumption that during a period in which a vacuum is applied to the soil, the log of the distance from the applied vacuum is proportional to the induced pressure drop or drawdown at the point from which the distance was measured. Field readings are plotted against the log of the distance from the extraction point. Assuming homogenous soils, the resulting trend can be approximated by a straight line. The point at which the induced vacuum is zero or a point that the line crosses the x-axis (distance) can be assumed to be the maximum theoretical ROI (see Figure 4 attached). The theoretical ROI was calculated using the field data collected and the modified Cooper-Jacobs method of data reduction to exceed 90 feet. To be more conservative a 40 foot ROI would be more appropriate for a system well field design.

Conclusions

Dual-phase extraction appears to be an effective technology for the soil vapors from the vadose zone at the site. DPE also appears to be an effective technology for depressing the groundwater table to increase the unsaturated zone thickness. The groundwater table was lowered 0.08 to 0.24 feet during the pilot test in the area surround monitoring well DPE-1. A groundwater extraction rate of less than 1.36 gpm was observed during the pilot test with a vapor extraction rate of 60 cfm at 25 inches Hg system vacuum. Approximately 1,017 gallons of groundwater was extracted in 745 minutes of system operation. An effective DPE radius of influence of approximately 40 feet based on the theoretical calculations and by monitored wellhead pressure readings observed during the pilot test.

While the extraction system was operating induced vacuum readings were collected inside the existing dry cleaner space and in the restaurant kitchen area. ZGA had installed vapor monitoring points during previous soil vapor gas sampling testing. These vapor points were used to see if the induced vacuum would be seen underneath the structures. The access to the points was limited by the tenants but vacuum readings ranging form 0.02 to 0.13 inches W.C. were seen in the restaurant area at the beginning of the testing but were zero for the remainder of the testing event.

It should be noted that during the testing MW-2, MW-3 and MW-4 induced vacuum readings (negative pressure) changed to positive pressure readings. This is common for lower permeability soils may have reverted back to vacuum readings if the extraction energy was continued for a longer period or for continuous flow as with a permanent system.

Closing

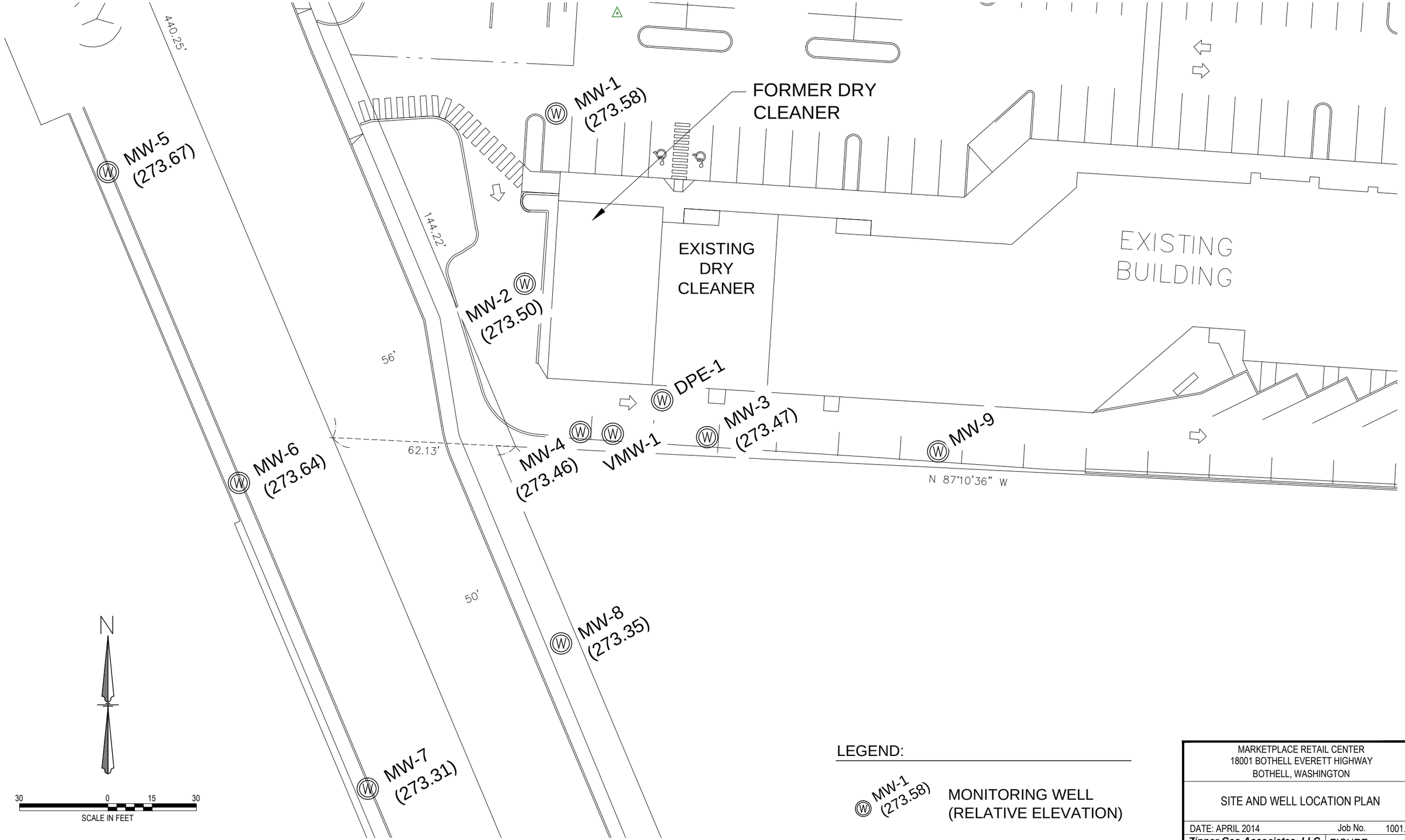
We trust this information will meet your needs and reporting support at this time. GRS appreciates the opportunity to be of service on this project. Should you require additional information or have any questions regarding this report, please contact us at (503) 708-6321.

Sincerely,

Global Remediation Solutions, LLC
A PNE Corp Company

Charles S. Swift
Project Manager

Attachments:
Figure 1 – DPE Testing – Site and Well Location Plan
Figure 2 – DPE Testing – Depth to Water Changes – April 15, 2014 Graph
Figure 3 – DPE Testing – Depth to Water Changes – April 16, 2014 Graph
Figure 4 – DPE Testing – Induce Vacuum vs. Distance Graph
Table 1 – DPE Testing Field Data Summary – April 15, 2014 to April 16, 204
Table 2 – DPE Testing Extracted Groundwater Results
Table 3 – DPE Testing Soil Vapors Extracted Results
Table 4 – DPE Testing Soil Permeability - “k” Value
Laboratory Summary Reports



LEGEND:

MW-1 (273.58) — MONITORING WELL (RELATIVE ELEVATION)

MARKETPLACE RETAIL CENTER
18001 BOTHELL EVERETT HIGHWAY
BOTHELL, WASHINGTON

SITE AND WELL LOCATION PLAN

DATE: APRIL 2014 | Job No. 1001.24

Zipper Geo Associates, LLC
19023 36th Ave. W.,Suite D
Lynnwood, WA

FIGURE 1

SHT. 1 of 1

FIGURE 2
Marketplace Retail Center DPE Testing.
Depth to Water vs. Time
April 15, 2014

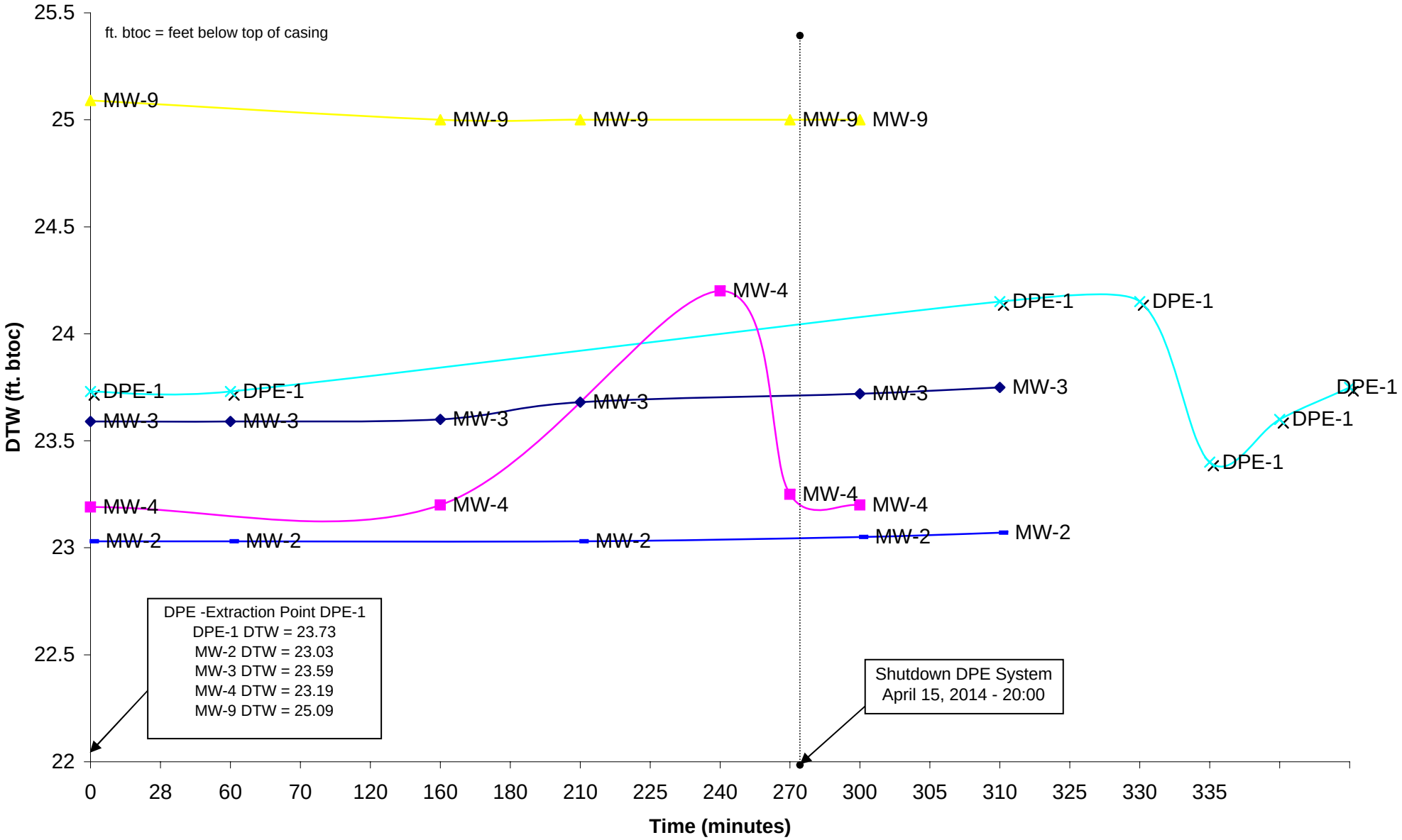


FIGURE 3
Marketplace Retail Center DPE Testing
Depth to Water vs. Time
April 16, 2014

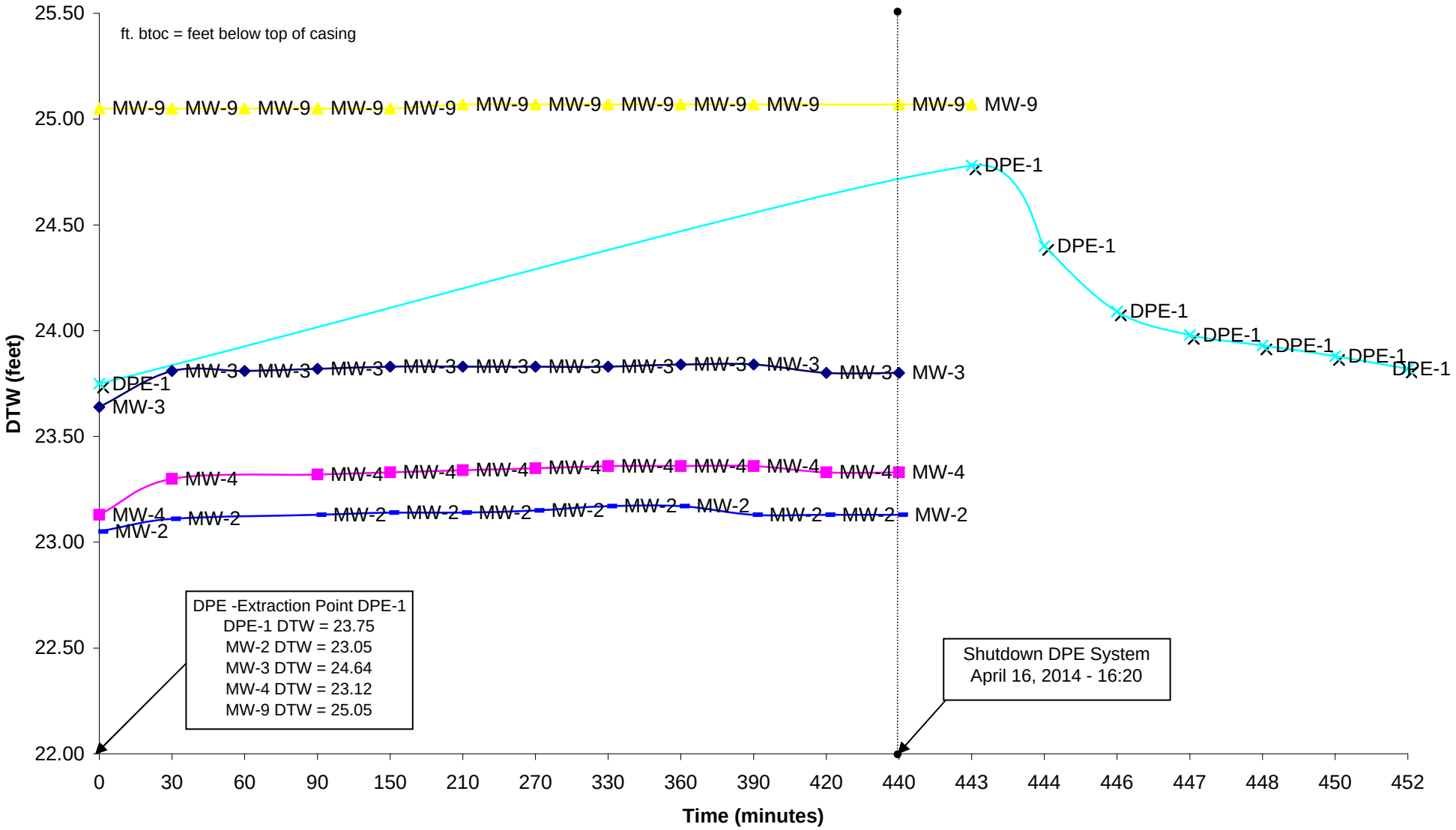


FIGURE 4
Marketplace Retail Center DPE Testing 04/16/14 - 11:30
Induced Vacuum vs. Distance

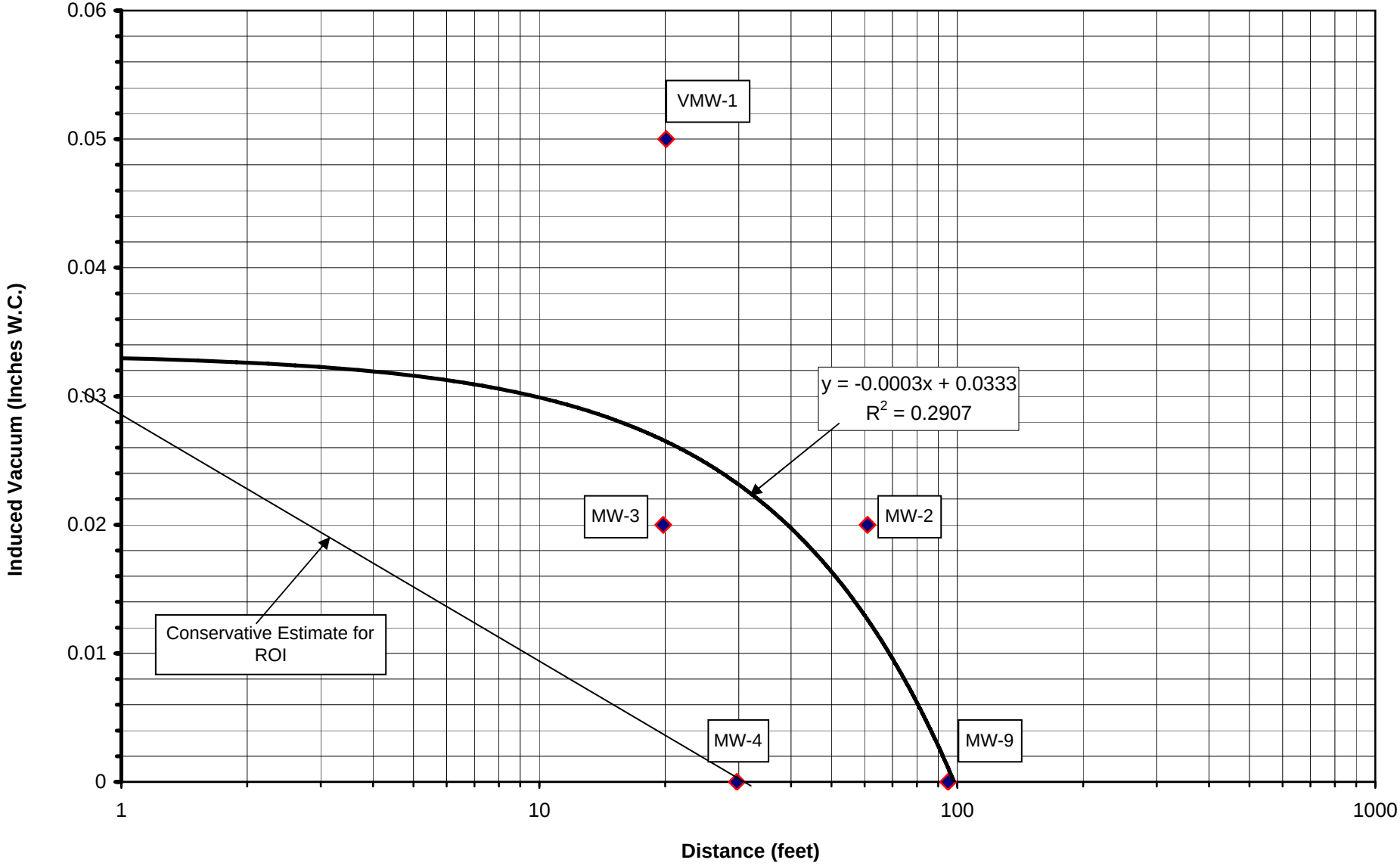


TABLE 1
DPE TESTING EVENT DATA SUMMARY

Zipper Geo Associates, LLC
Marketplace Retail Center
Dual-Phase Extraction Pilot Testing

DATE - 4/15/2014
AVERAGE DPE SYSTEM EXTRACTION 25 INCHES HG
EXTRACTION STINGER SET AT 27 FEET BSG

Time	Test Duration Minutes	DPE-1 Inches Hg	DPE-1 DTW - Feet	VMW-1 DTW - Feet	VMW-1 Inches W.C.	MW-2 DTW - Feet	MW-2 Inches W.C.	MW-3 DTW - Feet	MW-3 Inches W.C.	MW-4 DTW - Feet	MW-4 Inches W.C.	SGP-5 (Osaka Grill) Inches W.C.	MW-9 DTW - Feet
Baseline		0	23.73	NO WATER	0	23.03	0	23.59	0.00	23.19	0.00	0.00	25.09
		0:00											
14:40	0.00	15	23.73		0.5	23.03	0	23.59	0.10	23.19	0.10		25.09
15:08	28.00	15			0.8		0		0.10		0.00		
15:40	60.00	18			0.8		0		0.10		0.00		
16:10	70.00	15			0.82		0	23.6	0.08				
17:00	120.00	16			0.3		0		0.00			0.13	
17:40	160.00	15			0.26	23.03	0	23.68	0.01	23.2	0.00		25.00
18:00	180.00											0.04	
18:30	210.00	16			0.18		0		0.00		+.01		25.00
18:45	225.00				0.12							0.02	
19:00	240.00	18			0.12	23.05	+0.15	23.72	0.40	24.2	0.00	0.00	
19:30	270.00	18			0.12		+0.05		0.25	23.25	0.00		25.00
20:00	300.00	18	24.15		0.05	23.07		23.75		23.2			25.00
STOP TESTING 20:05	305.00												
20:10	310.00	0	24.15										
20:15	325.00	0	23.4										
20:20	330.00	0	23.6										
20:25	335.00	0	23.75										

DATE - 4/16/2014
AVERAGE DPE SYSTEM EXTRACTION 25 INCHES HG
EXTRACTION STINGER SET AT 27 FEET BSG

Time		DPE-1 Inches Hg	DPE-1 DTW - Feet	VMW-1 DTW - Feet	VMW-1 Inches W.C.	MW-2 DTW - Feet	MW-2 Inches W.C.	MW-3 DTW - Feet	MW-3 Inches W.C.	MW-4 DTW - Feet	MW-4 Inches W.C.	SGP-5 (Osaka Grill) Inches W.C.	MW-9 DTW - Feet
Baseline		0	23.75	NO WATER	0	23.05	0	23.64	0.00	23.12	0.00	0.00	25.05
START TESTING 9:00	0.00											NO ACCESS	25.05
9:00	0.00	13.00	23.75		0.10	23.05	0.03	23.64	0.03	23.13	0.10	NO ACCESS	25.05
9:30	30.00					23.11		23.81		23.30			25.05
10:00	60.00	13.00			0.10		0.03	23.81	0.00		0.00	NO ACCESS	25.05
10:30	90.00	12.50			0.10	23.13	0.00	23.82	0.00	23.32	0.00	NO ACCESS	25.05
11:30	150.00	13.00			0.05	23.14	0.01	23.83	0.01	23.33	+.20	NO ACCESS	25.07
12:30	210.00	13.00			0.10	23.14	+.21	23.83	0.00	23.34	+.20	NO ACCESS	25.07
13:30	270.00	12.50			0.05	23.15	+.21	23.83	+.02	23.35	+.05	NO ACCESS	25.07
14:30	330.00	12.50			0.50	23.17	+.03	23.83	+.02	23.36	+.10	NO ACCESS	25.07
15:00	360.00					23.17	+.12	23.84	0.00	23.36	0.00	0.00	25.07
15:30	390.00	11.50			0.25	23.13	+.04	23.84	+.08	23.36	+.05	NO ACCESS	
16:00	420.00	13.00			0.25	23.13	+.05	23.80	+.08	23.33	+.05		25.07
STOP TESTING 16:20	440.00					23.13		23.80		23.33			25.07
16:23	443.00		24.78										
16:24	444.00		24.40										
16:26	446.00		24.09										
16:27	447.00		23.98										
16:28	448.00		23.93										
16:30	450.00		23.88										
16:42	452.00		23.82										

TABLE 1
DPE Testing Event
Extracted Groundwater Sample Results

PARAMETER	VALUE
Tetrachloroethene (PCE)	
Concentration (µg/L)	2.00
Estimated Total Gallons	1,017
Lbs Removed per Gallon	0.000000017
Lbs Removed	0.00002

PARAMETER	VALUE
m,p xlyenes	
Concentration (µg/L)	9.20
Estimated Total Gallons	1,017
Lbs Removed per Gallon	0.000000077
Lbs Removed	0.00008

Notes:
Samples Collected from the Baker Tank on 04/16/2014.
1 Pound = 454 grams
1 gram = 1,000,000 µgrams
1 Liter = 0.26417 Gallons

TO CALCULATE TOTAL POUNDS REMOVED:

$$\textbf{Total Lbs Removed} = \frac{\text{Conc. (µ gram) / Liter}}{} \times \frac{1\text{ lb}}{454\text{ gram}} \times \frac{1\text{ gram}}{10\text{^}6\text{ µ gram}} \times \frac{1\text{ Liter}}{0.26417\text{ Gal}} \times \text{Total Gallons}$$

TABLE 3
DPE Testing Event
Extracted Soil Vapor Sample Results

Date	Sample ID	Contaminant	Laboratory Sample Results parts per million volume (ppmv)	Molecular Weight (1) grams per - mole (g/mole)	Flowrate Estimated (2) cubic feet per minute (cfm)	Potential To Emit Actual Flow Rate pounds per minute (lb/min)	Potential To Emit Actual Flow Rate (3) pounds per test event (lbs)
4/16/2014	**Effluent Sample**	Acetone	0.0045	58.08	60.00	0.0000000	0.00003
	14:35:00 PM	Chloroform	0.0086	119.38	60.00	0.0000002	0.00012
	15 hp DPE Pump	Trichloroethene	0.0015	131.42	60.00	0.0000000	0.00002
	25-inches Hg.	Tetrachloroethene	1.0000	165.83	60.00	0.0000254	0.01985
	Total System Vacuum	m,p - xylenes	0.0015	106.16	60.00	0.0000000	0.00002
					Estimated HVOCs (lbs) Removed (4)	**0.0000257**	**0.0200**
					Total Estimated Mass (lbs) HVOCs Per Year		**13.51**

Notes:
SCFM = Flow rate of gas (standard cubic feet per minute)
1 Pound = 453.6 grams
1 Pound = 453.6 grams
1 Liter = 0.03531 cubic feet
1 Mole of gas = 24.46 Liters volume at STP (77”F and 29.92 "w.c.)
ft/min = feet per minute
W.C. = Water Column

TO CALCULATE TOTAL POUNDS REMOVED:

$$\textbf{TOTAL LBS REMOVED} = \frac{\textbf{MW}\ g}{1\ mole} \times \frac{1\ lb}{453.6\ g} \times \frac{1\ mole}{24.46\ std\ L} \times \frac{1\ L}{0.03531\ cu\ ft} \times \frac{\textbf{SCFM}\ std\ cu\ ft}{min} \times \textbf{CONC}\ ppmv \times 1x10^{6}/ppmv$$

(1) = Taken from the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards.
(2) = Perfomance curves used from manufacturer data the air stream was saturated no velocity measurements taken.
(3) = Potential emission rate as indicated by no treatment or no Best Available Control Technology (BACT) Method on 780 minutes of operation
(4) = Total calculated from samples collected on April 16, 2014 sample results and reported as HVOCs Emitted.

TABLE 4
DPE Testing Event
Soil Permeability Value "k"

Field permeabilities were calculated using the following equation (Johnson et al. 1989)

$$\frac{Q}{H} = P_w \pi \frac{k}{\mu} \frac{\left[1 - \left(P_m / P_w\right)^2\right]}{\ln\left(R_w / R_m\right)^2}$$

Where:

Q	=	1.178E+04	Flow from extraction well (cm^3/s)
H	=	5.182E+02	Screened interval (cm)
μ	=	1.800E-04	Viscosity of air (1.8 x 10-4 g/cm-s)
Pw	=	7.362E+05	Absolute vacuum at extraction well DPE-1 (g/cm-s2)
Pm	=	8.219E+02	Absolute vacuum at monitoring well VMW-1 (g/cm-s2)
Rw	=	1.013E+01	Radius of extraction well DPE-1 (cm)
Rm	=	6.106E+02	Distance of monitoring well VMW-1 from extraction well DPE-1 (cm)
k	=	1.448E-08	Permeability to air flow (cm^2)
k	=	1.448	Permeability to air flow (darcy)

Using DPE-1 Extraction Point and VMW-1 as Monitoring Point

Notes:		
Pw (average)	25.00	inches Hg
	846,570.00	gr/cm-sec^2
Pm (average)	0.50	inches W.C.
	1,245.31	gr/cm-sec^2
Q (average)	60.00	ft^3/min
	28,316.85	cm^3/sec
1 darcy	0.00000001	cm^2
1 foot	30.48	cm
1 inch Hg	33,862.80	gr/cm-sec^2
1ft^3	28316.85	cm^3

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4/28/2014
Mr. Jon Einarsen
Zipper Geo Associates, LLC
19023 36th Avenue West
Suite D
Lynwood WA 98036

Project Name:
Project #: 1001.22
Workorder #: 1404381

Dear Mr. Jon Einarsen

The following report includes the data for the above referenced project for sample(s) received on 4/22/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Karen Stempson

Project Manager

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WORK ORDER #: 1404381

Work Order Summary

CLIENT:	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036	**BILL TO:**	Mr. Jon Einarsen Zipper Geo Associates, LLC 19023 36th Avenue West Suite D Lynwood, WA 98036
PHONE:	425-582-9928	**P.O. #**	1001.22
FAX:		**PROJECT #**	1001.22
DATE RECEIVED:	04/22/2014	**CONTACT:**	Karen Stempson
DATE COMPLETED:	04/24/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	DPE effluent #2	Modified TO-15	3.9 "Hg	14.8 psi
02A	DPE effluent #1	Modified TO-15	0.9 psi	15.2 psi
03A	Lab Blank	Modified TO-15	NA	NA
04A	CCV	Modified TO-15	NA	NA
05A	LCS	Modified TO-15	NA	NA
05AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 04/28/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
Zipper Geo Associates, LLC
Workorder# 1404381

Two 1 Liter Summa Canister (100% Certified) samples were received on April 22, 2014. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

Despite the use of flow controllers for sample collection, the final canister vacuums for sample DPE effluent #1 were measured at ambient pressure by the laboratory upon sample receipt.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Due to the linear calibration range of the instrument, the reporting limit for alpha-Chlorotoluene was raised from 0.1 ppbv to 0.5 ppbv.

Dilution was performed on samples DPE effluent #2 and DPE effluent #1 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See

data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: DPE effluent #2

Lab ID#: 1404381-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	2.3	4.5	5.5	11
Chloroform	0.46	0.86	2.2	4.2
Trichloroethene	0.46	1.5	2.5	8.3
Tetrachloroethene	0.46	100	3.1	700
m,p-Xylene	0.46	1.5	2.0	6.6

Client Sample ID: DPE effluent #1

Lab ID#: 1404381-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	3.2	4.8	7.6	11
Toluene	0.64	0.85	2.4	3.2
Tetrachloroethene	0.64	56	4.3	380
Ethyl Benzene	0.64	14	2.8	59
m,p-Xylene	0.64	170	2.8	750
o-Xylene	0.64	23	2.8	100

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Client Sample ID: DPE effluent #2

Lab ID#: 1404381-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042319**	**Date of Collection: 4/16/14 3:30:00 PM**	
Dil. Factor:	**4.60**	**Date of Analysis: 4/23/14 10:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.46	Not Detected	2.3	Not Detected
Freon 114	0.46	Not Detected	3.2	Not Detected
Chloromethane	2.3	Not Detected	4.7	Not Detected
Vinyl Chloride	0.46	Not Detected	1.2	Not Detected
1,3-Butadiene	0.46	Not Detected	1.0	Not Detected
Bromomethane	2.3	Not Detected	8.9	Not Detected
Chloroethane	2.3	Not Detected	6.1	Not Detected
Freon 11	0.46	Not Detected	2.6	Not Detected
Ethanol	2.3	Not Detected	4.3	Not Detected
Freon 113	0.46	Not Detected	3.5	Not Detected
1,1-Dichloroethene	0.46	Not Detected	1.8	Not Detected
Acetone	2.3	4.5	5.5	11
2-Propanol	2.3	Not Detected	5.6	Not Detected
Carbon Disulfide	2.3	Not Detected	7.2	Not Detected
3-Chloropropene	2.3	Not Detected	7.2	Not Detected
Methylene Chloride	0.92	Not Detected	3.2	Not Detected
Methyl tert-butyl ether	0.46	Not Detected	1.6	Not Detected
trans-1,2-Dichloroethene	0.46	Not Detected	1.8	Not Detected
Hexane	0.46	Not Detected	1.6	Not Detected
1,1-Dichloroethane	0.46	Not Detected	1.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.3	Not Detected	6.8	Not Detected
cis-1,2-Dichloroethene	0.46	Not Detected	1.8	Not Detected
Tetrahydrofuran	2.3	Not Detected	6.8	Not Detected
Chloroform	0.46	0.86	2.2	4.2
1,1,1-Trichloroethane	0.46	Not Detected	2.5	Not Detected
Cyclohexane	0.46	Not Detected	1.6	Not Detected
Carbon Tetrachloride	0.46	Not Detected	2.9	Not Detected
2,2,4-Trimethylpentane	2.3	Not Detected	11	Not Detected
Benzene	0.46	Not Detected	1.5	Not Detected
1,2-Dichloroethane	0.46	Not Detected	1.9	Not Detected
Heptane	0.46	Not Detected	1.9	Not Detected
Trichloroethene	0.46	1.5	2.5	8.3
1,2-Dichloropropane	0.46	Not Detected	2.1	Not Detected
1,4-Dioxane	0.46	Not Detected	1.6	Not Detected
Bromodichloromethane	0.46	Not Detected	3.1	Not Detected
cis-1,3-Dichloropropene	0.46	Not Detected	2.1	Not Detected
4-Methyl-2-pentanone	0.46	Not Detected	1.9	Not Detected
Toluene	0.46	Not Detected	1.7	Not Detected
trans-1,3-Dichloropropene	0.46	Not Detected	2.1	Not Detected
1,1,2-Trichloroethane	0.46	Not Detected	2.5	Not Detected
Tetrachloroethene	0.46	100	3.1	700
2-Hexanone	2.3	Not Detected	9.4	Not Detected

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Client Sample ID: DPE effluent #2

Lab ID#: 1404381-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042319**	**Date of Collection: 4/16/14 3:30:00 PM**	
Dil. Factor:	**4.60**	**Date of Analysis: 4/23/14 10:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.46	Not Detected	3.9	Not Detected
1,2-Dibromoethane (EDB)	0.46	Not Detected	3.5	Not Detected
Chlorobenzene	0.46	Not Detected	2.1	Not Detected
Ethyl Benzene	0.46	Not Detected	2.0	Not Detected
m,p-Xylene	0.46	1.5	2.0	6.6
o-Xylene	0.46	Not Detected	2.0	Not Detected
Styrene	0.46	Not Detected	2.0	Not Detected
Bromoform	0.46	Not Detected	4.8	Not Detected
Cumene	0.46	Not Detected	2.3	Not Detected
1,1,2,2-Tetrachloroethane	0.46	Not Detected	3.2	Not Detected
Propylbenzene	0.46	Not Detected	2.3	Not Detected
4-Ethyltoluene	0.46	Not Detected	2.3	Not Detected
1,3,5-Trimethylbenzene	0.46	Not Detected	2.3	Not Detected
1,2,4-Trimethylbenzene	0.46	Not Detected	2.3	Not Detected
1,3-Dichlorobenzene	0.46	Not Detected	2.8	Not Detected
1,4-Dichlorobenzene	0.46	Not Detected	2.8	Not Detected
alpha-Chlorotoluene	2.3	Not Detected	12	Not Detected
1,2-Dichlorobenzene	0.46	Not Detected	2.8	Not Detected
1,2,4-Trichlorobenzene	2.3	Not Detected UJ	17	Not Detected UJ
Hexachlorobutadiene	2.3	Not Detected UJ	24	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	85	70-130

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Client Sample ID: DPE effluent #1

Lab ID#: 1404381-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042320**	**Date of Collection:**	**4/16/14 8:50:00 AM**
Dil. Factor:	**6.40**	**Date of Analysis:**	**4/23/14 11:02 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.64	Not Detected	3.2	Not Detected
Freon 114	0.64	Not Detected	4.5	Not Detected
Chloromethane	3.2	Not Detected	6.6	Not Detected
Vinyl Chloride	0.64	Not Detected	1.6	Not Detected
1,3-Butadiene	0.64	Not Detected	1.4	Not Detected
Bromomethane	3.2	Not Detected	12	Not Detected
Chloroethane	3.2	Not Detected	8.4	Not Detected
Freon 11	0.64	Not Detected	3.6	Not Detected
Ethanol	3.2	Not Detected	6.0	Not Detected
Freon 113	0.64	Not Detected	4.9	Not Detected
1,1-Dichloroethene	0.64	Not Detected	2.5	Not Detected
Acetone	3.2	4.8	7.6	11
2-Propanol	3.2	Not Detected	7.9	Not Detected
Carbon Disulfide	3.2	Not Detected	10	Not Detected
3-Chloropropene	3.2	Not Detected	10	Not Detected
Methylene Chloride	1.3	Not Detected	4.4	Not Detected
Methyl tert-butyl ether	0.64	Not Detected	2.3	Not Detected
trans-1,2-Dichloroethene	0.64	Not Detected	2.5	Not Detected
Hexane	0.64	Not Detected	2.2	Not Detected
1,1-Dichloroethane	0.64	Not Detected	2.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.2	Not Detected	9.4	Not Detected
cis-1,2-Dichloroethene	0.64	Not Detected	2.5	Not Detected
Tetrahydrofuran	3.2	Not Detected	9.4	Not Detected
Chloroform	0.64	Not Detected	3.1	Not Detected
1,1,1-Trichloroethane	0.64	Not Detected	3.5	Not Detected
Cyclohexane	0.64	Not Detected	2.2	Not Detected
Carbon Tetrachloride	0.64	Not Detected	4.0	Not Detected
2,2,4-Trimethylpentane	3.2	Not Detected	15	Not Detected
Benzene	0.64	Not Detected	2.0	Not Detected
1,2-Dichloroethane	0.64	Not Detected	2.6	Not Detected
Heptane	0.64	Not Detected	2.6	Not Detected
Trichloroethene	0.64	Not Detected	3.4	Not Detected
1,2-Dichloropropane	0.64	Not Detected	3.0	Not Detected
1,4-Dioxane	0.64	Not Detected	2.3	Not Detected
Bromodichloromethane	0.64	Not Detected	4.3	Not Detected
cis-1,3-Dichloropropene	0.64	Not Detected	2.9	Not Detected
4-Methyl-2-pentanone	0.64	Not Detected	2.6	Not Detected
Toluene	0.64	0.85	2.4	3.2
trans-1,3-Dichloropropene	0.64	Not Detected	2.9	Not Detected
1,1,2-Trichloroethane	0.64	Not Detected	3.5	Not Detected
Tetrachloroethene	0.64	56	4.3	380
2-Hexanone	3.2	Not Detected	13	Not Detected

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Client Sample ID: DPE effluent #1

Lab ID#: 1404381-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042320**	**Date of Collection: 4/16/14 8:50:00 AM**	
Dil. Factor:	**6.40**	**Date of Analysis: 4/23/14 11:02 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.64	Not Detected	5.4	Not Detected
1,2-Dibromoethane (EDB)	0.64	Not Detected	4.9	Not Detected
Chlorobenzene	0.64	Not Detected	2.9	Not Detected
Ethyl Benzene	0.64	14	2.8	59
m,p-Xylene	0.64	170	2.8	750
o-Xylene	0.64	23	2.8	100
Styrene	0.64	Not Detected	2.7	Not Detected
Bromoform	0.64	Not Detected	6.6	Not Detected
Cumene	0.64	Not Detected	3.1	Not Detected
1,1,2,2-Tetrachloroethane	0.64	Not Detected	4.4	Not Detected
Propylbenzene	0.64	Not Detected	3.1	Not Detected
4-Ethyltoluene	0.64	Not Detected	3.1	Not Detected
1,3,5-Trimethylbenzene	0.64	Not Detected	3.1	Not Detected
1,2,4-Trimethylbenzene	0.64	Not Detected	3.1	Not Detected
1,3-Dichlorobenzene	0.64	Not Detected	3.8	Not Detected
1,4-Dichlorobenzene	0.64	Not Detected	3.8	Not Detected
alpha-Chlorotoluene	3.2	Not Detected	16	Not Detected
1,2-Dichlorobenzene	0.64	Not Detected	3.8	Not Detected
1,2,4-Trichlorobenzene	3.2	Not Detected UJ	24	Not Detected UJ
Hexachlorobutadiene	3.2	Not Detected UJ	34	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1404381-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042306**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 12:02 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.10	Not Detected	0.49	Not Detected
Freon 114	0.10	Not Detected	0.70	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.10	Not Detected	0.26	Not Detected
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
3-Chloropropene	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
Carbon Tetrachloride	0.10	Not Detected	0.63	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
1,2-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,2-Dichloropropane	0.10	Not Detected	0.46	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
Bromodichloromethane	0.10	Not Detected	0.67	Not Detected
cis-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
trans-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
1,1,2-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
2-Hexanone	0.50	Not Detected	2.0	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1404381-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042306**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 12:02 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.10	Not Detected	0.85	Not Detected
1,2-Dibromoethane (EDB)	0.10	Not Detected	0.77	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
Bromoform	0.10	Not Detected	1.0	Not Detected
Cumene	0.10	Not Detected	0.49	Not Detected
1,1,2,2-Tetrachloroethane	0.10	Not Detected	0.69	Not Detected
Propylbenzene	0.10	Not Detected	0.49	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected UJ	3.7	Not Detected UJ
Hexachlorobutadiene	0.50	Not Detected UJ	5.3	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: CCV

Lab ID#: 1404381-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 09:17 AM**	

Compound	%Recovery
Freon 12	119
Freon 114	123
Chloromethane	123
Vinyl Chloride	119
1,3-Butadiene	119
Bromomethane	122
Chloroethane	110
Freon 11	110
Ethanol	132 Q
Freon 113	110
1,1-Dichloroethene	116
Acetone	112
2-Propanol	114
Carbon Disulfide	108
3-Chloropropene	117
Methylene Chloride	100
Methyl tert-butyl ether	113
trans-1,2-Dichloroethene	110
Hexane	118
1,1-Dichloroethane	109
2-Butanone (Methyl Ethyl Ketone)	108
cis-1,2-Dichloroethene	105
Tetrahydrofuran	140 Q
Chloroform	106
1,1,1-Trichloroethane	111
Cyclohexane	108
Carbon Tetrachloride	105
2,2,4-Trimethylpentane	112
Benzene	100
1,2-Dichloroethane	104
Heptane	108
Trichloroethene	97
1,2-Dichloropropane	101
1,4-Dioxane	115
Bromodichloromethane	104
cis-1,3-Dichloropropene	106
4-Methyl-2-pentanone	118
Toluene	102
trans-1,3-Dichloropropene	104
1,1,2-Trichloroethane	98
Tetrachloroethene	98
2-Hexanone	103

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Client Sample ID: CCV

Lab ID#: 1404381-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 09:17 AM**	

Compound	%Recovery
Dibromochloromethane	108
1,2-Dibromoethane (EDB)	103
Chlorobenzene	98
Ethyl Benzene	105
m,p-Xylene	108
o-Xylene	104
Styrene	103
Bromoform	103
Cumene	105
1,1,2,2-Tetrachloroethane	101
Propylbenzene	101
4-Ethyltoluene	101
1,3,5-Trimethylbenzene	98
1,2,4-Trimethylbenzene	94
1,3-Dichlorobenzene	95
1,4-Dichlorobenzene	95
alpha-Chlorotoluene	100
1,2-Dichlorobenzene	90
1,2,4-Trichlorobenzene	64 Q
Hexachlorobutadiene	64 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1404381-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 10:05 AM**	

Compound	%Recovery	Method Limits
Freon 12	104	70-130
Freon 114	108	70-130
Chloromethane	109	70-130
Vinyl Chloride	106	70-130
1,3-Butadiene	101	70-130
Bromomethane	115	70-130
Chloroethane	97	70-130
Freon 11	98	70-130
Ethanol	108	70-130
Freon 113	114	70-130
1,1-Dichloroethene	114	70-130
Acetone	100	70-130
2-Propanol	104	70-130
Carbon Disulfide	94	70-130
3-Chloropropene	108	70-130
Methylene Chloride	104	70-130
Methyl tert-butyl ether	102	70-130
trans-1,2-Dichloroethene	87	70-130
Hexane	109	70-130
1,1-Dichloroethane	103	70-130
2-Butanone (Methyl Ethyl Ketone)	103	70-130
cis-1,2-Dichloroethene	108	70-130
Tetrahydrofuran	101	70-130
Chloroform	99	70-130
1,1,1-Trichloroethane	103	70-130
Cyclohexane	107	70-130
Carbon Tetrachloride	106	70-130
2,2,4-Trimethylpentane	102	70-130
Benzene	102	70-130
1,2-Dichloroethane	104	70-130
Heptane	108	70-130
Trichloroethene	103	70-130
1,2-Dichloropropane	102	70-130
1,4-Dioxane	112	70-130
Bromodichloromethane	109	70-130
cis-1,3-Dichloropropene	112	70-130
4-Methyl-2-pentanone	119	70-130
Toluene	102	70-130
trans-1,3-Dichloropropene	102	70-130
1,1,2-Trichloroethane	99	70-130
Tetrachloroethene	99	70-130
2-Hexanone	108	70-130

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Client Sample ID: LCS

Lab ID#: 1404381-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 10:05 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	114	70-130
1,2-Dibromoethane (EDB)	102	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	104	70-130
m,p-Xylene	109	70-130
o-Xylene	103	70-130
Styrene	104	70-130
Bromoform	110	70-130
Cumene	105	70-130
1,1,2,2-Tetrachloroethane	100	70-130
Propylbenzene	101	70-130
4-Ethyltoluene	98	70-130
1,3,5-Trimethylbenzene	94	70-130
1,2,4-Trimethylbenzene	90	70-130
1,3-Dichlorobenzene	95	70-130
1,4-Dichlorobenzene	93	70-130
alpha-Chlorotoluene	108	70-130
1,2-Dichlorobenzene	90	70-130
1,2,4-Trichlorobenzene	73	70-130
Hexachlorobutadiene	68 Q	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCSD

Lab ID#: 1404381-05AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 10:48 AM**	

Compound	%Recovery	Method Limits
Freon 12	93	70-130
Freon 114	96	70-130
Chloromethane	86	70-130
Vinyl Chloride	95	70-130
1,3-Butadiene	93	70-130
Bromomethane	106	70-130
Chloroethane	89	70-130
Freon 11	90	70-130
Ethanol	106	70-130
Freon 113	106	70-130
1,1-Dichloroethene	108	70-130
Acetone	92	70-130
2-Propanol	94	70-130
Carbon Disulfide	88	70-130
3-Chloropropene	105	70-130
Methylene Chloride	97	70-130
Methyl tert-butyl ether	96	70-130
trans-1,2-Dichloroethene	81	70-130
Hexane	102	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	96	70-130
cis-1,2-Dichloroethene	104	70-130
Tetrahydrofuran	117	70-130
Chloroform	92	70-130
1,1,1-Trichloroethane	96	70-130
Cyclohexane	102	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	93	70-130
Benzene	98	70-130
1,2-Dichloroethane	97	70-130
Heptane	106	70-130
Trichloroethene	95	70-130
1,2-Dichloropropane	95	70-130
1,4-Dioxane	107	70-130
Bromodichloromethane	102	70-130
cis-1,3-Dichloropropene	106	70-130
4-Methyl-2-pentanone	112	70-130
Toluene	98	70-130
trans-1,3-Dichloropropene	97	70-130
1,1,2-Trichloroethane	95	70-130
Tetrachloroethene	99	70-130
2-Hexanone	106	70-130

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Client Sample ID: LCSD

Lab ID#: 1404381-05AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**c042304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/23/14 10:48 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	108	70-130
1,2-Dibromoethane (EDB)	102	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	107	70-130
o-Xylene	102	70-130
Styrene	104	70-130
Bromoform	105	70-130
Cumene	105	70-130
1,1,2,2-Tetrachloroethane	99	70-130
Propylbenzene	100	70-130
4-Ethyltoluene	100	70-130
1,3,5-Trimethylbenzene	97	70-130
1,2,4-Trimethylbenzene	90	70-130
1,3-Dichlorobenzene	96	70-130
1,4-Dichlorobenzene	95	70-130
alpha-Chlorotoluene	108	70-130
1,2-Dichlorobenzene	91	70-130
1,2,4-Trichlorobenzene	72	70-130
Hexachlorobutadiene	64 Q	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	87	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	98	70-130

April 18, 2014

Mr. Jon Einarsen
Zipper Geo Associates
19023 - 36th Ave W., Suite D
Lynnwood, WA 98036-

Dear Mr. Einarsen,

On April 17th, 1 sample was received by our laboratory and assigned our laboratory project number EV14040092. The project was identified as your 1001.22. The sample identification and requested analyses are outlined on the attached chain of custody record.

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

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

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS JOB#:	EV14040092
		ALS SAMPLE#:	EV14040092-01
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	04/17/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	4/16/2014 4:40:00 PM
CLIENT SAMPLE ID	Baker Tank	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Chloromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	04/17/2014	GAP
Bromomethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Chloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Acetone	EPA-8260	U	25	1	UG/L	04/17/2014	GAP
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	04/17/2014	GAP
Acrylonitrile	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
2-Butanone	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Chloroform	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Benzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Trichloroethene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Dibromomethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
Toluene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
2-Hexanone	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Tetrachloroethylene	EPA-8260	**2.0**	2.0	1	UG/L	04/17/2014	GAP
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	04/17/2014	GAP

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS JOB#:	EV14040092
		ALS SAMPLE#:	EV14040092-01
CLIENT CONTACT:	Jon Einarsen	DATE RECEIVED:	04/17/2014
CLIENT PROJECT:	1001.22	COLLECTION DATE:	4/16/2014 4:40:00 PM
CLIENT SAMPLE ID	Baker Tank	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Chlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
m,p-Xylene	EPA-8260	**9.2**	4.0	1	UG/L	04/17/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	04/17/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/17/2014	GAP

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	EPA-8260	**107**	04/17/2014	GAP
Toluene-d8	EPA-8260	**101**	04/17/2014	GAP
4-Bromofluorobenzene	EPA-8260	**104**	04/17/2014	GAP

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

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS SDG#:	EV14040092
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY BLANK RESULTS

MB-041514W - Batch 80784 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Chloromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Vinyl Chloride	EPA-8260	U	0.20	1	UG/L	04/15/2014	GAP
Bromomethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Chloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Carbon Tetrachloride	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Trichlorofluoromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Carbon Disulfide	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Acetone	EPA-8260	U	25	1	UG/L	04/15/2014	GAP
1,1-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Methylene Chloride	EPA-8260	U	5.0	1	UG/L	04/15/2014	GAP
Acrylonitrile	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
Methyl T-Butyl Ether	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Trans-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1-Dichloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
2-Butanone	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
Cis-1,2-Dichloroethene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
2,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Bromochloromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Chloroform	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1,1-Trichloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dichloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Benzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Trichloroethene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Dibromomethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Bromodichloromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Trans-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
4-Methyl-2-Pentanone	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
Toluene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Cis-1,3-Dichloropropene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1,2-Trichloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
2-Hexanone	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
1,3-Dichloropropane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Tetrachloroethylene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Dibromochloromethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dibromoethane	EPA-8260	U	0.010	1	UG/L	04/15/2014	GAP

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS SDG#:	EV14040092
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY BLANK RESULTS

MB-041514W - Batch 80784 - Water by EPA-8260

Chlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1,1,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	04/15/2014	GAP
Styrene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
o-Xylene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Bromoform	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Isopropylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,1,2,2-Tetrachloroethane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2,3-Trichloropropane	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Bromobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
N-Propyl Benzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
2-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,3,5-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
4-Chlorotoluene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
T-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2,4-Trimethylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
S-Butyl Benzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
P-Isopropyltoluene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,3 Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,4-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
N-Butylbenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2-Dibromo 3-Chloropropane	EPA-8260	U	10	1	UG/L	04/15/2014	GAP
1,2,4-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Hexachlorobutadiene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
Naphthalene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP
1,2,3-Trichlorobenzene	EPA-8260	U	2.0	1	UG/L	04/15/2014	GAP

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

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Zipper Geo Associates 19023 - 36th Ave W., Suite D Lynnwood, WA 98036-	DATE:	4/18/2014
		ALS SDG#:	EV14040092
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Jon Einarsen		
CLIENT PROJECT:	1001.22		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 80784 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	EPA-8260	**96.2**			04/15/2014	GAP
1,1-Dichloroethene - BSD	EPA-8260	**95.2**	**1**		04/15/2014	GAP
Benzene - BS	EPA-8260	**85.6**			04/15/2014	GAP
Benzene - BSD	EPA-8260	**84.9**	**1**		04/15/2014	GAP
Trichloroethene - BS	EPA-8260	**94.2**			04/15/2014	GAP
Trichloroethene - BSD	EPA-8260	**93.8**	**0**		04/15/2014	GAP
Toluene - BS	EPA-8260	**93.4**			04/15/2014	GAP
Toluene - BSD	EPA-8260	**92.7**	**1**		04/15/2014	GAP
Chlorobenzene - BS	EPA-8260	**93.0**			04/15/2014	GAP
Chlorobenzene - BSD	EPA-8260	**92.9**	**0**		04/15/2014	GAP

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

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

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV1404092

Date 4/17/14 Page 1 Of 1

PROJECT ID:	1001.22
REPORT TO COMPANY:	ZGA
PROJECT MANAGER:	Jon Einarsen
ADDRESS:	19023 36th Ave W Suite D Lynnwood wa 98036
PHONE:	425-582-9928 FAX:
P.O. #:	1001.22 E-MAIL: jeinarsen@zippergeo.com
INVOICE TO COMPANY:	ZGA
ATTENTION:	Jon Einarsen
ADDRESS:	

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. BAKER TANK	4/16/14	1640	H_2O	1							X									3	
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

LABORATORY COPY

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Logan Schumacher / ZGA / 4-17-14 / 11:55
   Received By: Shawn Robinson ALS 4/17/14 11:55
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 Standard | 5 | X | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER: Specify:

* Turnaround request less than standard may incur Rush Charges