2015 ANNUAL REPORT

Remedy Implementation, Crownhill Elementary School Site

Prepared for: Bremerton School District

Project No. 100094-003-03 • January 14, 2016

Aspect CONSULTING

earth + water

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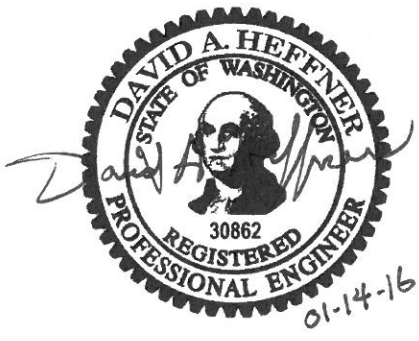

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1 Introduction

1.1 General

Historical landfill activities at the Bremerton School District (BSD) Crownhill Elementary School Site (Site) have resulted in soil and groundwater contamination, including the presence of light non-aqueous-phase liquid (LNAPL) floating on the water table. The Washington State Department of Ecology (Ecology) and BSD entered into two Agreed Orders (AOs) to provide for remedial action at the Site. The first AO (No. DE7916) required BSD to conduct a Remedial Investigation (RI) and Feasibility Study (FS) in accordance with the Washington State Model Toxics Control Act (MTCA) Cleanup Regulation (WAC 173-340). Upon completion of those activities in 2014, Ecology selected a cleanup remedy and prepared a Cleanup Action Plan (CAP) for the Site (Ecology, 2014). As documented in the CAP, requirements of the selected remedy include the following:

- periodic monitoring of groundwater quality and LNAPL layer thickness;
- periodic removal and offsite recycling/disposal of LNAPL from existing wells;
- periodic inspection and maintenance of the existing cover system to prevent direct contact exposures to landfilled materials and impacted soils;
- a requirement to run the HVAC system in the main school building continuously during the school day (to address the soil vapor intrusion pathway);
- periodic sub-slab soil vapor and/or indoor air sampling to reconfirm that vapor intrusion is not a concern; and
- requirements for performing invasive work in soil.

The second AO (No. DE11107) required BSD to develop Site-specific work plans addressing the above requirements, and then to implement the cleanup remedy in accordance with the work plans. The following remedy implementation work plans were prepared by BSD and approved by Ecology in 2015:

- *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015c);
- *LNAPL Removal Work Plan* (Aspect, 2015d); and
- *Cover System Inspection and Maintenance Plan* (Aspect, 2015e).

This report documents remedy implementation activities completed by BSD in 2015.

1.2 Project Background

Located in Bremerton, Washington (Figure 1), the Site includes both the Crownhill Elementary School (School) property at 1500 Rocky Point Road and the northern portion of the Bremerton United Methodist Church (Church) property at 1150 Marine Drive. A Site Plan is provided as Figure 2. The Site was used for sand and gravel mining up to the 1930s,

and the mined area was backfilled with municipal and industrial wastes in the 1930s and 1940s. The original school building was constructed in 1956, and partially burned down in 1993. A series of environmental investigations were conducted during the period between that fire and construction of the current school building, which was completed in 1996. Additional investigations were conducted beginning in 2009, culminating in preparation of the *Remedial Investigation Report* (Aspect, 2014a; herein referred to as the RI report).

The purpose of the RI was to collect data necessary to adequately characterize the nature and extent of Site contamination. Using multiple lines of evidence (e.g., historical photographs, site assessment activity, construction observations), the RI identified two generalized areas of landfill accumulation, designated the 'north' and 'south' landfill areas. Figure 2 shows the interpreted boundaries of these two areas. Landfilled materials were found at up to 40-foot depth in the north landfill area, and at up to 20-foot depth in the south landfill area. Extensive sampling identified the following constituents of potential concern (COPCs) in Site soils:

- total petroleum hydrocarbon (TPH) in the diesel and motor oil ranges;
- trichloroethene (TCE);
- carcinogenic polycyclic aromatic hydrocarbons (cPAHs); and
- the metals/metalloids antimony, arsenic, chromium III, copper, lead, and zinc.

Three monitoring wells (MW-1 through MW-3) were installed at the Site in December 1994/January 1995, and another 13 (MW-4 through MW-16) during the RI (between March 2011 and October 2012). (Refer to Figure 2 for well locations.) This network of 2-inch-diameter wells was used to periodically monitor groundwater, which is encountered beneath the Site at roughly 110-foot depth, for a wide range of contaminants. Monitoring identified TPH in the diesel and motor oil ranges, TCE, arsenic, and lead as COPCs dissolved in groundwater in the northern portion of the Site.

In addition to dissolved contaminants, separate-phase oil was observed floating on the groundwater table (as LNAPL) in well MW-8, installed in the north landfill area. The primary reason for installing the last five RI monitoring wells (MW-12 through MW-16) was to investigate the areal extent and thickness of the LNAPL accumulation. LNAPL was observed in three of these wells (MW-13, MW-14, and MW-16).

Site cleanup alternatives were developed and comparatively evaluated with respect to MTCA-specified criteria in the *Feasibility Study* report (Aspect, 2014b). Based on the information provided in the RI report and on the FS evaluation, the CAP (Ecology, 2014) then established Site-specific cleanup levels for constituents of concern (COCs) in Site soil, groundwater, and air, and selected a cleanup remedy for implementation. Figure 2 shows the estimated TPH, TCE, and arsenic plumes[1] (i.e., areas where concentrations in groundwater exceed the respective groundwater cleanup levels) as depicted in the CAP. Refer to the CAP for a full description of the selected cleanup remedy for the Site.

[1] Lead is also a COC in groundwater. However, as discussed in the *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015c), compliance with the groundwater cleanup level for lead has been demonstrated. Therefore, lead is not included in the groundwater monitoring program.

2 Activities Completed in 2015

This section documents cleanup-related activities completed by BSD during the 2015 calendar year. Periodic monitoring of groundwater, LNAPL thickness, and soil vapor is documented in Section 2.1, LNAPL removal in Section 2.2, Site inspection in Section 2.3, and other activities in Section 2.4.

2.1 Periodic Monitoring Activities

2.1.1 Groundwater Monitoring

Semiannual groundwater monitoring was conducted (in April and October) in general accordance with the requirements of the *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015c)[2]. Well locations are shown on Figure 2[3]. Table 1 identifies which Site wells are included in the monitoring program, which of those wells contain LNAPL, and the specific COCs analyzed in groundwater samples collected from the wells that do not contain LNAPL. Monitoring results for the non-LNAPL wells are summarized in Table 2. Results going back to December 2013 are included in Table 2; refer to the RI report (Aspect, 2014a) for results prior to December 2013 and for information on Site wells not included in the monitoring program. Laboratory reports for groundwater samples submitted for analysis in 2015 are provided in Appendix D.

Groundwater cleanup levels are 500 micrograms per liter (µg/L) for diesel- and motor-oil-range TPH, and 5 µg/L for TCE and total arsenic. Well MW-10 is the conditional point of compliance for achieving these cleanup levels. This well has been sampled on 13 occasions through October 2015, and arsenic is the only COC detected in any of those sampling rounds. Well MW-6, the only well with arsenic cleanup level exceedances since early 2012[4], is located approximately 130 feet upgradient of MW-10 and serves as a sentinel well for dissolved contaminant plume migration. The *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015c) specifies contingency actions that will be taken if arsenic is detected above 40 µg/L at MW-6 or above 4.5 µg/L at MW-10. Figure 3 shows arsenic concentration trends in these two wells since they were installed. Neither of the above concentration limits was exceeded in 2015.

Well MW-9 is the only well with TCE cleanup level exceedances. TCE concentrations detected in MW-9 in 2015 are consistent with previous detections.

Well MW-15 is located immediately downgradient of the LNAPL area and serves as a sentinel well for TPH plume migration[5]. Neither diesel-range nor motor-oil-range TPH was

[2] The two rounds of groundwater/LNAPL monitoring completed in 2015 occurred prior to finalization of the *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015c). The work was completed in general accordance with the draft plan that was under review by Ecology at the time.
[3] In addition to the RI monitoring wells noted in Section 1.2, extraction well EW-17 was installed in 2015 for the express purpose of LNAPL removal; refer to Section 2.4.
[4] As shown on Figure 3, the arsenic cleanup level was also exceeded at MW-10 the first two times it was sampled following its installation in December 2011. Arsenic at MW-10 has been consistently below its cleanup level in the last 11 monitoring rounds.
[5] Well MW-15 is also the conditional point of compliance for LNAPL migration.

detected at MW-15 in 2015, which is consistent with previous monitoring rounds. TPH concentrations detected in wells MW-5 and MW-12 in 2015 are within the range of previous detections in those wells.

The McKinney domestic well was sampled on three occasions in 2015, twice by Kitsap Public Health District (KPHD) and once by BSD. The KPHD samples were analyzed for a wide range of constituents, including TPH, TCE, and arsenic, whereas BSD's sample was analyzed for TCE only. As shown in Table 2, arsenic was detected at very low concentrations (more than an order of magnitude below its cleanup level) in the KPHD samples. TPH and TCE were not detected in any of the water samples collected from the McKinney well.

2.1.2 LNAPL Thickness Monitoring

LNAPL thickness monitoring was conducted concurrent with groundwater monitoring. LNAPL was detected in five wells (MW-8, MW-13, MW-14, MW-16, and EW-17). Table 3 summarizes LNAPL thicknesses measured in these wells since they were installed. Thicknesses measured in 2015 ranged from 0.23 feet in MW-14 (April round) to 4.15 feet in MW-13 (October round).

2.1.3 Soil Vapor Monitoring

Soil vapor monitoring was conducted on November 11, 2015, in general accordance with the requirements of the July 2010 *Soil Vapor Intrusion Assessment Work Plan*, (Aspect, 2010) which is included as Appendix B of the *Cover System Inspection and Maintenance Plan* (Aspect, 2015e). The purpose of soil vapor monitoring is to evaluate whether the potential exists for the school's indoor air to be unacceptably impacted by vapor intrusion (VI). This represents the third round of sub-slab vapor sampling using six permanent sampling points (SSV-1 through SSV-6) installed in the floor slab of the main school building at the locations shown on Figure 4. Previous rounds were conducted in August and November 2010, as documented in the *Soil Vapor Intrusion Assessment Work Plan* (Aspect, 2010).

Table 4 lists the 16 compounds (15 volatile organic compounds [VOCs] and hydrogen sulfide) that were identified in 2010 as potential compounds of concern (PCOCs) in soil vapor at the Site. Laboratory-supplied evacuated 6-liter Summa canisters were used to collect 1-hour time-integrated samples for analysis of VOCs, and samples for hydrogen sulfide analysis were collected in 1-liter Tedlar® bags. The School's HVAC system is always operated during the school day (a CAP requirement), and was operated during the sampling period. Weather conditions on the day of sample collection are provided in Appendix B of this report. The filled canisters and Tedlar® bags were delivered to Friedman & Bruya, Inc., in Seattle, for analysis of the PCOCs using EPA Method TO-15. The laboratory report is provided as Appendix E.

One of the six sampling locations (SSV-6) was "leak tested" to ensure integrity of the vapor point seal and rule out the possibility of cross-contamination from indoor air. Sampling and leak testing were conducted in accordance with the *SOP for Installing and Sampling Permanent Sub-Slab Soil Vapor Monitoring Points (November 2015 Revision)*, which is provided in Appendix C of the *Cover System Inspection and Maintenance Plan* (Aspect, 2015e). The SSV-6 Tedlar® bag sample was analyzed for helium as well as hydrogen sulfide. Helium was not detected in the SSV-6 sample at a detection limit of 172 parts per million by volume (ppmv). This result indicates negligible leakage in the vapor point seal. Refer to

Appendices B and C of the *Cover System Inspection and Maintenance Plan* (Aspect, 2015e) for additional detail regarding sampling methodology and leak testing.

MTCA Method B air cleanup levels (for both carcinogens and non-carcinogens) and sub-slab screening levels for the PCOCs are listed in Table 4. Sampling results were compared against "current" sub-slab screening levels, which were obtained by dividing the most stringent current Method B cleanup levels by 0.03 to conservatively account for soil vapor attenuation across the floor slab in accordance with Ecology guidance. Table 4 also lists the sub-slab screening levels that sampling results were compared against in 2010. At that time, Ecology guidance specified that a cross-slab attenuation factor of 0.10 be used rather than 0.03, so screening levels were generally lower then. However, air cleanup levels for several of the PCOCs have also changed since 2010. For this reason, the sub-slab screening levels for three of the PCOCs (1,1-dichloroethane, 1,2-dichloroethane, and naphthalene) are lower in 2015 than they were in 2010.

Results for all three sub-slab soil vapor sampling events completed to date are summarized in Table 5. PCOC detections are bolded. None of the detections exceed the corresponding screening level. In addition, all laboratory reporting limits for PCOCs that were not detected are also below the corresponding screening levels.

As documented in *Soil Vapor Intrusion Assessment Work Plan* (Aspect, 2010), the HVAC system was not operated during the August 2010 sampling round, and several screening level exceedances were detected in that round (chloroform at SSV-5 and hydrogen sulfide at SSV-1 and SSV-6)[6]. Based on current screening levels, however, none of the three sampling rounds completed to date has indicated a potential for the school's indoor air to be unacceptably impacted by VI.

The next sub-slab soil vapor sampling round is scheduled for late 2020.

2.2 LNAPL Removal

Bottom-filling bailers are used to periodically remove LNAPL from Site wells. Table 3 provides a summary of volumes removed from each LNAPL-containing well since the wells were installed. In 2015, LNAPL removal was conducted concurrent with the two groundwater and LNAPL thickness monitoring rounds discussed above, in general accordance with the requirements of the *LNAPL Removal Work Plan* (Aspect, 2015d)[7]. LNAPL removal was attempted whenever an LNAPL layer thickness of at least 0.3 foot was measured in a well. LNAPL was removed from two wells (MW-13 and MW-16) in the April round, and from all five LNAPL-containing wells in the October round. The total volume of LNAPL removed in 2015 was 2.47 liters. This compares with a volume of 4.29 liters removed in prior years.

[6] As a result, the CAP includes a requirement that the HVAC system be operated continuously during the school day.

[7] LNAPL removal in 2015 occurred prior to finalization of the *LNAPL Removal Work Plan* (Aspect, 2015d). The work was completed in general accordance with the draft work plan that was under review by Ecology at the time.

2.3 Site Inspection

A Site inspection was conducted on December 23, 2015, in accordance with the requirements of the *Cover System Inspection and Maintenance Plan* (Aspect, 2015e). The completed inspection record is provided as Appendix A. The inspection did not identify any cover system deficiencies or other action items.

2.4 Other Activities

Other remedy implementation activities completed in 2015 include the following:

- Installation of a new portable classroom unit in summer 2015 required that subsurface utilities be installed in the north landfill area, where soils below 1-foot depth are potentially contaminated. In particular, sampling during the RI indicated elevated concentrations of lead in relatively shallow soils in this area. BSD contracted Aspect to prepare work plans, monitor utility trench excavation activities, collect soil samples for waste characterization purposes, and coordinate offsite disposal of excavated soil if needed. The work was conducted in accordance with the requirements specified in Appendix A of the *Cover System Inspection and Maintenance Plan* (Aspect, 2015e) for performing invasive work in soil. Soil monitoring and management activities, including disposal of excavated soil as hazardous waste based on an elevated TCLP lead result, were documented in a technical memorandum to Ecology (Aspect, 2015a).
- The 4-inch-diameter LNAPL extraction well EW-17 was installed in October 2015 at the recommendation of Ecology. Well drilling and installation, and the results of soil sampling and initial LNAPL monitoring, were documented in a technical memorandum to Ecology (Aspect, 2015b).
- Immediately following the drilling of well EW-17, drummed drill cuttings were profiled and disposed of along with TPH-impacted waste generated in prior groundwater/LNAPL monitoring and LNAPL removal rounds that had been stored in drums at the BSD bus maintenance facility. Twelve drums of solid waste and roughly 600 gallons of liquid waste were removed and properly disposed of as non-hazardous waste. Waste disposal documentation is provided in Appendix C.

3 Statement of Compliance

On behalf of BSD, Aspect certifies that the remedy implementation activities completed at the Site in 2015 complied with the requirements of the CAP, Agreed Order No. DE11107, and the remedy implementation work plans approved by Ecology.

4 Plans for 2016

The following remedy implementation activities are planned for 2016:

- Conduct semiannual rounds of groundwater/LNAPL monitoring and LNAPL removal (scheduled for April and October 2016);
- Since an LNAPL thickness greater than 4 feet was measured in well MW-13 in October 2015, conduct a follow-up LNAPL removal round (all LNAPL wells) 3 months later (January 2016)[8]; and
- Conduct semiannual Site inspections (scheduled for June and December 2016).

Other activities, as specified in the remedy implementation work plans, may also be required based on monitoring and/or inspection results.

5 References

Aspect Consulting, LLC, 2010, Soil Vapor Intrusion Assessment, November 2010 Sub-Slab Sampling, Crownhill Elementary School, Prepared for Bremerton School District, dated December 22, 2010.

Aspect Consulting, LLC, 2014a, Remedial Investigation, Crownhill Elementary School, Prepared for Bremerton School District, dated November 2014.

Aspect Consulting, LLC, 2014b, Feasibility Study, Crownhill Elementary School, Prepared for Bremerton School District, dated October 21, 2014.

Aspect Consulting, LLC, 2015a, Technical Memorandum to Washington State Department of Ecology (J. Cruz) Re: Soil Monitoring and Management, Portable Classroom Utility Trench, dated November 3, 2015.

Aspect Consulting, LLC, 2015b, Technical Memorandum to Washington State Department of Ecology (J. Cruz) Re: Installation and Initial Monitoring of Well EW-17, dated November 3, 2015.

Aspect Consulting, LLC, 2015c, Groundwater/LNAPL Monitoring and Contingency Plan, Crownhill Elementary School Site, Prepared for Bremerton School District, dated November 19, 2015.

Aspect Consulting, LLC, 2015d, LNAPL Removal Work Plan, Crownhill Elementary School Site, Prepared for Bremerton School District, dated November 19, 2015.

[8] If an LNAPL thickness greater than 4 feet is measured in the April monitoring round, an LNAPL removal round will also be required in July 2016.

Aspect Consulting, LLC, 2015e, Cover System Inspection and Maintenance Plan, Crownhill Elementary School Site, Prepared for Bremerton School District, dated December 17, 2015.

Kitsap Public Health District, 2015, Letter from Kitsap Public Health District (G. Holdcroft) to S. Mack et. al. Re: Sample Results from McKinney Well, dated October 6, 2015.

Washington State Department of Ecology, 2014, Cleanup Action Plan, Bremerton School District, Crownhill Elementary School Site, Washington State Department of Ecology, dated December 10, 2014.

6 Limitations

Work for this project was performed and this report prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Bremerton School District for specific application to the referenced property. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

TABLES

Table 1 - 2015 Well Monitoring Program Summary

Project No. 100094-003-03, Crownhill Elementary, Bremerton, Washington

Well Included in Monitoring Program[1]	LNAPL Present in Well[2]	Groundwater Samples Collected for Analysis of COCs[1]			Additional Notes
		TPH[3]	Total Arsenic[4]	TCE[5]	
MW-5		spring			
MW-6			spring/fall		6
MW-8	X				
MW-9				spring/fall	
MW-10		spring/fall	spring/fall	spring/fall	7
MW-12		fall			
MW-13	X				
MW-14	X				
MW-15		spring/fall			8
MW-16	X				
EW-17	X				
McKinney				fall	9,10

COC	constituent of concern
LNAPL	light non-aqueous-phase liquid
TCE	trichloroethene
TPH	total petroleum hydrocarbon

Notes

1) The *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015a) provides the rationale for including a well in the monitoring program, and for selecting well-specific COC analytes. Refer to Table 2 for

2) All wells except McKinney are monitored for LNAPL. If LNAPL is detected, its thickness is measured (refer to Table 3) and groundwater samples are not collected for analysis.

3) TPH is analyzed for using Method NWTPH-Dx. Both diesel-range TPH and motor-oil-range TPH are COCs.

4) Total arsenic is analyzed for using EPA Method 6010.

5) TCE is analyzed for using EPA Method 8260.

6) Well MW-6 provides early warning of potential arsenic migration.

7) Well MW-10 is the conditional point of compliance for achieving groundwater cleanup levels.

8) Well MW-15 is the conditional point of compliance for LNAPL migration.

9) The McKinney domestic well water sample is collected from the outdoor faucet on the north side of the residence at 1724 Dora Ave NW.

10) The Kitsap Public Health District also analyzed McKinney well water samples in 2015 (on two occasions); results are included in Table 2.

Table 2 - Groundwater Monitoring Data Summary

Project No. 100094-003-03, Crownhill Elementary, Bremerton, Washington

Well ID and Top-of-Casing Elevation[1,2]	Date	Depth to Water (feet below top-of-casing)	Groundwater Elevation (feet)[2]	Constituent of Concern/Concentration[3]			
				Diesel-Range TPH	Motor-Oil-Range TPH	TCE	Total Arsenic
MW-5 136.95 ft	12/18/13	117.36	19.59	**2,100 x**	**750 x**	1.8	1.0
	04/03/14	117.17	19.78	**2,400 x**	**770 x**	na	1.2
	07/01/14	116.23	20.72	**2,000 x**	490 x	na	1.0
	10/13/14	117.56	19.39	**1,300**	260 x	na	1.0
	04/07/15	116.49	20.46	**2,000**	430 x	na	na
MW-6 133.87 ft	12/18/13	124.36	9.51	50 U	250 U	1.0 U	**16.6**
	04/03/14	124.70	9.17	50 U	250 U	na	**20.5**
	07/01/14	124.40	9.47	50 U	250 U	na	**19.9**
	10/13/14	124.54	9.33	50 U	250 U	na	**20.4**
	04/07/15	124.61	9.26	na	na	na	**26.7**
	10/28/15	124.84	9.03	na	na	na	**22.8**
MW-9 134.39 ft	12/17/13	114.49	19.90	110 x	250 U	**11**	1.0 U
	04/03/14	114.35	20.04	210 x	280 x	**11**	1.0 U
	07/01/14	113.44	20.95	180 x	250 U	**12**	1.0 U
	10/13/14	114.71	19.68	180 x	250 U	**10**	1.0 U
	04/07/15	114.50	19.89	na	na	**11**	na
	10/28/15	115.30	19.09	na	na	**10**	na
MW-10 132.33 ft	12/18/13	120.87	11.46	50 U	250 U	1.0 U	3.3
	04/03/14	121.21	11.12	50 U	250 U	1.0 U	3.9
	07/01/14	120.55	11.78	50 U	250 U	1.0 U	3.0
	10/13/14	121.48	10.85	50 U	250 U	1.0 U	3.0
	04/07/15	120.60	11.73	50 U	250 U	1.0 U	2.8
	10/28/15	121.30	11.03	80 U	400 U	1.0 U	2.7
MW-12 133.87 ft	12/17/13	114.24	19.63	**2,000 x**	**800 x**	1.0 U	1.5
	04/03/14	114.11	19.76	**2,800 x**	**850 x**	na	1.4
	07/01/14	113.17	20.70	**1,800 x**	420 x	na	1.7
	10/13/14	114.45	19.42	**1,600**	250 U	na	1.7
	10/28/15	115.02	18.85	**2,400 x**	**620 x**	na	na
MW-15 133.37 ft	12/17/13	nm[4]	--	50 U	250 U	1.0 U	4.6
	04/03/14	nm[4]	--	50 U	250 U	na	1.2
	07/01/14	nm[4]	--	50 U	250 U	na	1.0 U
	10/13/14	nm[4]	--	50 U	250 U	na	1.1
	04/07/15	nm[4]	--	50 U	250 U	na	na
	10/28/15	nm[4]	--	50 U	250 U	na	na
McKinney (domestic well)	10/6/2014[5]	nm	--	100 U	200 U	0.2 U	0.4
	2/19/2015[5]	nm	--	100 U	200 U	0.2 U	0.4
	6/1/2015[5]	nm	--	100 U	200 U	0.2 U	0.3
	10/28/15	nm	--	na	na	1.0 U	na

na not analyzed
nm not measured
TCE trichloroethene
TPH total petroleum hydrocarbon
U analyte not detected at or above the reported result
x sample chromatographic pattern does not resemble the standard used for quantitation

Notes

1) Only wells included in the current monitoring program that do not contain LNAPL are shown in this table. Refer to Table 3 for wells containing LNAPL. Refer to the *Remedial Investigation Report* (Aspect, 2014a) for data prior to December 2013 and for information on other wells.

2) Elevations are based on NAVD88 vertical datum.

3) All concentrations are in micrograms per liter (µg/L). Cleanup levels are 500 µg/L for diesel- and motor-oil-range TPH, and 5 µg/L for TCE and total arsenic. Cleanup level exceedances are bolded.

4) Water level was below top of pump and could not be measured.

5) Sample was collected for analysis by the Kitsap Public Health District and analyzed by Analytical Resources, Inc.

Table 3 - LNAPL Thickness Measurements and Removal Summary

Project No. 100094-003-03, Crownhill Elementary, Bremerton, Washington

Well ID	Date	Initial Thickness in ft[(1)]	LNAPL Removal in Liters	Notes
MW-8	10/26/12	0.20		Well installed on 12/20/11.
	11/21/12	nm		
	01/31/13	0.10		
	05/03/13	0.03		
	08/07/13	0.23		
	12/17/13	0.86		
	04/02/14	0.39	0.18	
	05/23/14	0.38	0.11	
	07/01/14	0.23		
	10/13/14	0.28		
	04/07/15	0.27		Not bailed because initial thickness was <0.3 feet.
	10/28/15	0.90	0.36	
	Cumulative LNAPL Removal		0.65	
MW-13	11/01/12	1.46		Well installed on 10/25/12.
	11/21/12	0.99	0.90	
	01/31/13	0.10		
	05/03/13	0.31		
	08/07/13	0.49		
	12/17/13	4.90		
	04/02/14	1.35	0.02	Water detected above LNAPL.
	05/23/14	2.08	0.18	Water detected above LNAPL.
	07/01/14	0.84		
	10/13/14	3.39		
	04/07/15	1.00	0.17	
	10/28/15	4.15	0.02	
	Cumulative LNAPL Removal		1.28	
MW-14	11/01/12	nd		Well installed on 10/26/12.
	01/31/13	nd		
	05/03/13	nd		
	08/07/13	0.12		
	12/17/13	0.10		
	04/02/14	0.08		Not bailed because initial thickness was <0.1 feet.
	05/23/14	0.09		Not bailed because initial thickness was <0.1 feet.
	07/01/14	0.46		
	10/13/14	0.71		
	04/07/15	0.23		Not bailed because initial thickness was <0.3 feet.
	10/28/15	1.48	0.35	
	Cumulative LNAPL Removal		0.35	
MW-16	11/01/12	nd		Well installed on 10/26/12.
	01/31/13	0.50		
	05/03/13	0.48		
	08/07/13	2.61		
	12/17/13	2.83		
	04/02/14	3.02	0.85	(Note 3)
	05/23/14	4.25	2.06	(Note 3)
	07/01/14	3.79		
	10/13/14	3.25		
	04/07/15	2.64	1.19	(Note 3)
	10/28/15	2.18	0.35	
	Cumulative LNAPL Removal		4.45	
EW-17	10/28/15	0.45	0.03	Well installed on 10/13/15.
	Cumulative LNAPL Removal		0.03	
	TOTAL LNAPL REMOVED		**6.76**	**(ALL WELLS)**

LNAPL light non-aqueous-phase liquid nd no detectable LNAPL thickness nm not measured

Notes

1) The viscous, sticky nature of the LNAPL results in inconsistent readings of the interface probe (used to measure depth-to-LNAPL and depth-to-water). Therefore, the reported LNAPL thicknesses can only be regarded as estimates.

2) Well EW-17 (4-inch ID) has a unit volume of approx. 2.5 liters per vertical foot of well casing. All other wells are 2-inch ID and have unit volumes of approx. 0.62 liter per vertical foot of well casing.

3) Bailing was stopped because bailer would no longer go down well due to LNAPL buildup on inside well casing.

Table 4 - Cleanup Levels and Screening Levels for Vapor-Phase PCOCs

Project No. 100094-003-03, Crownhill Elementary School, Bremerton, Washington

Potential Compound of Concern (PCOC)	Current (November 2015) MTCA Method B Air Cleanup Levels[2]		Previous Sub-Slab Screening Level[3]	Current (November 2015) Sub-Slab Screening Level[4]
	Non-Carcinogen	Carcinogen		
Freon 12	45.7	--	800	1,520
Vinyl chloride	45.7	0.28	2.8	9.33
1,1-Dichloroethene	91.4	--	910	3,050
trans-1,2-Dichloroethene[5]	--	--	320	--
1,1-Dichloroethane	--	1.56	3,200	52
cis-1,2-Dichloroethene[5]	--	--	160	--
Chloroform	44.8	0.109	1.1	3.63
Benzene	13.7	0.321	3.2	10.7
1,2-Dichloroethane	3.2	0.0962	22	3.21
Trichloroethene	0.914	0.37	1.0	12.3
Tetrachloroethene	18.3	9.62	4.2	321
Ethylbenzene	457	--	4,600	15,200
Xylenes (total)	45.7	--	460	1,520
1,2,4-Trimethylbenzene	3.2	--	27	107
Naphthalene	1.37	0.0735	14	2.45
Hydrogen sulfide	0.914	--	4.6	30.5

Notes

1) All concentrations are in units of micrograms per cubic meter (ug/m ^{3}).

2) Current (November 2015) MTCA Method B air cleanup levels were obtained from the CLARC Master Table on 11/3/15.

3) When sub-slab sampling was conducted in August and November 2010, results were compared to the sub-slab screening levels in this column.

4) Current (November 2015) sub-slab screening levels were obtained by dividing the most stringent MTCA Method B air cleanup level by 0.03, to conservatively account for soil vapor attenuation across the floor slab in accordance with Ecology guidance .

5) Chemical has been removed from Ecology's vapor intrusion (VI) list because toxicity values are no longer available in CLARC.

Table 5 - Summary of Sub-Slab Vapor Sampling Results

Project No. 100094-003-03, Crownhill Elementary School, Bremerton, Washington

Potential Compound of Concern (PCOC)	Current Screening Level [3]	Sub-Slab Vapor Sampling Location[2]																	
		SSV-1			SSV-2			SSV-3			SSV-4			SSV-5			SSV-6		
		08/19/10	11/17/10	11/11/15	08/19/10	11/17/10	11/11/15	08/19/10	11/17/10	11/11/15	08/19/10	11/17/10	11/11/15	08/19/10	11/17/10	11/11/15	08/19/10	11/17/10	11/11/15
Freon 12	1,520	**2.8**	**3.5**	**3.5**	**3.0**	**2.9**	**3.6**	**2.4**	**2.3**	**3.5**	**2.8**	**2.9**	**3.6**	**3.6**	**3.2**	**4.8**	**2.4**	**3.3**	**3.3**
Vinyl chloride	9.33	0.42 U	0.47 U	0.51 U	0.40 U	0.46 U	0.51 U	0.39 U	0.47 U	0.51 U	0.39 U	0.47 U	0.51 U	0.48 U	0.47 U	0.51 U	0.43 U	0.43 U	0.51 U
1,1-Dichloroethene	3,050	0.65 U	0.72 U	0.79 U	0.61 U	0.71 U	0.79 U	0.60 U	0.72 U	0.79 U	0.60 U	0.72 U	0.79 U	0.74 U	0.72 U	0.79 U	0.67 U	0.67 U	0.79 U
trans-1,2-Dichloroethene	--	0.65 U	0.72 U	0.79 U	0.61 U	0.71 U	0.79 U	0.60 U	0.72 U	0.79 U	0.60 U	0.72 U	0.79 U	0.74 U	0.72 U	0.79 U	0.67 U	0.67 U	0.79 U
1,1-Dichloroethane	52	0.66 U	0.74 U	0.81 U	0.63 U	0.72 U	0.81 U	0.62 U	0.74 U	0.81 U	0.62 U	0.74 U	0.81 U	0.76 U	0.74 U	0.81 U	0.68 U	0.68 U	0.81 U
cis-1,2-Dichloroethene	--	0.65 U	0.72 U	0.79 U	0.61 U	0.71 U	0.79 U	0.60 U	0.72 U	0.79 U	0.60 U	0.72 U	0.79 U	0.74 U	0.72 U	0.79 U	0.67 U	0.67 U	0.79 U
Chloroform	3.63	0.80 U	0.89 U	0.98 U	**1.1**	0.87 U	0.98 U	0.74 U	0.89 U	0.98 U	0.74 U	0.89 U	0.98 U	**1.5**	0.89 U	0.98 U	**0.97**	0.82 U	0.98 U
Benzene	10.7	0.52 U	0.58 U	0.64 U	0.50 U	0.57 U	**0.67**	0.48 U	0.58 U	0.64 U	**0.56**	0.58 U	0.64 U	**0.76**	0.58 U	0.64 U	0.54 U	**0.86**	**0.73**
1,2-Dichloroethane	3.21	0.66 U	0.74 U	0.81 U	0.63 U	0.72 U	0.81 U	0.62 U	0.74 U	0.81 U	0.62 U	0.74 U	0.81 U	0.76 U	0.74 U	0.81 U	0.68 U	0.68 U	0.81 U
Trichloroethene	12.3	0.88 U	0.98 U	1.1 U	0.83 U	0.96 U	1.1 U	0.82 U	0.98 U	1.1 U	0.82 U	0.98 U	1.1 U	1.0 U	0.98 U	1.1 U	0.90 U	0.90 U	1.1 U
Tetrachloroethene	321	1.1 U	1.2 U	1.4 U	**1.5**	**2.5**	**3.7**	1.0 U	1.2 U	**1.7**	**1.5**	**3.0**	**3.9**	1.3 U	**1.4**	**1.8**	1.1 U	**1.5**	1.4 U
Ethylbenzene	15,200	0.71 U	**0.93**	**0.87**	0.67 U	**1.4**	0.87 U	0.66 U	**2.6**	0.87 U	**0.71**	**0.89**	0.87 U	0.81 U	**11**	**1.0**	0.73 U	**1.2**	**8.2**
Xylenes (total)	1,520	**1.4**	**3.5**	**4.1**	**1.2**	**6.2**	2.6 U	**1.3**	**9.2**	2.6 U	**2.7**	**4.7**	2.6 U	**3.7**	**52**	**5.0**	**2.2**	**5.8**	**32**
1,2,4-Trimethylbenzene	107	0.81 U	0.90 U	**2.7**	0.76 U	**1.6**	**1.1**	0.75 U	0.90 U	**1.4**	0.75 U	0.90 U	**1.7**	0.92 U	**1.5**	**4.3**	0.82 U	**1.7**	**2.8**
Naphthalene	2.45	4.3 U	4.8 U	1.0 U	4.1 U	4.7 U	1.0 U	4.0 U	4.8 U	1.0 U	4.0 U	4.8 U	1.0 U	4.9 U	4.8 U	1.0 U	4.4 U	4.4 U	1.0 U
Hydrogen sulfide	30.5	**17**	5.7 U	7.0 U	5.7 U	5.7 U	7.0 U	5.7 U	5.7 U	7.0 U	5.7 U	5.7 U	7.0 U	5.7 U	5.7 U	7.0 U	**6.7**	5.7 U	7.0 U

U analyte not detected at or above the reported result

Notes

1) All concentrations are in units of micrograms per cubic meter (ug/m^3).

2) Refer to Figure 4 for sub-slab vapor sampling locations.

3) Refer to Table 4 for derivation of current (November 2015) sub-slab screening levels.

4) Analyte detections are bolded. None of the detections exceed the current screening levels.

FIGURES

Vicinity Map

2015 Annual Report

Crownhill Elementary, Bremerton, Washington

Aspect CONSULTING	JAN-2016	BY: PPW	FIGURE NO. 1
	PROJECT NO. 100094	REV BY: SCC	

GIS Path: T:\projects_8\CrownHillElementary\Delivered\Annual Report 2015\01_VicinityMap.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 12/22/2015 || User: soudd || Print Date: 12/22/2015

1724 Dora Avenue NW (Note 2)

North Landfill Area

MW-2

Estimated Extent of TPH Cleanup Level Exceedance

MW-9

Estimated Extent of TCE Cleanup Level Exceedance

BERTHA AVE NW

ROCKY POINT RD

MW-16 (Note 1) MW-14

EW-17 MW-13

MW-12

MW-8

MW-5

MW-15

Estimated Extent of Arsenic Cleanup Level Exceedance

PORTABLE CLASSROOM BUILDING

MW-4

MW-6

MAIN SCHOOL BUILDING

MW-3

MW-10

South Landfill Area

MW-1

MW-7

MW-11

MARINE DR

DORA AVE

0 100 200

Feet

Well Locations:

- Extraction Well Included in Monitoring Program
- Monitoring Well Included in Monitoring Program
- Monitoring Well Not Included in Monitoring Program
- McKinney Domestic Well (Note 2)

Note:

(1) LNAPL has been observed in Wells EW-17, MW-8, MW-13, MW-14, and MW-16.
(2) The McKinney well water sample is collected from the outdoor faucet on the north side of the residence at 1724 Dora Avenue NW.

Other Site Features and Interpretation:

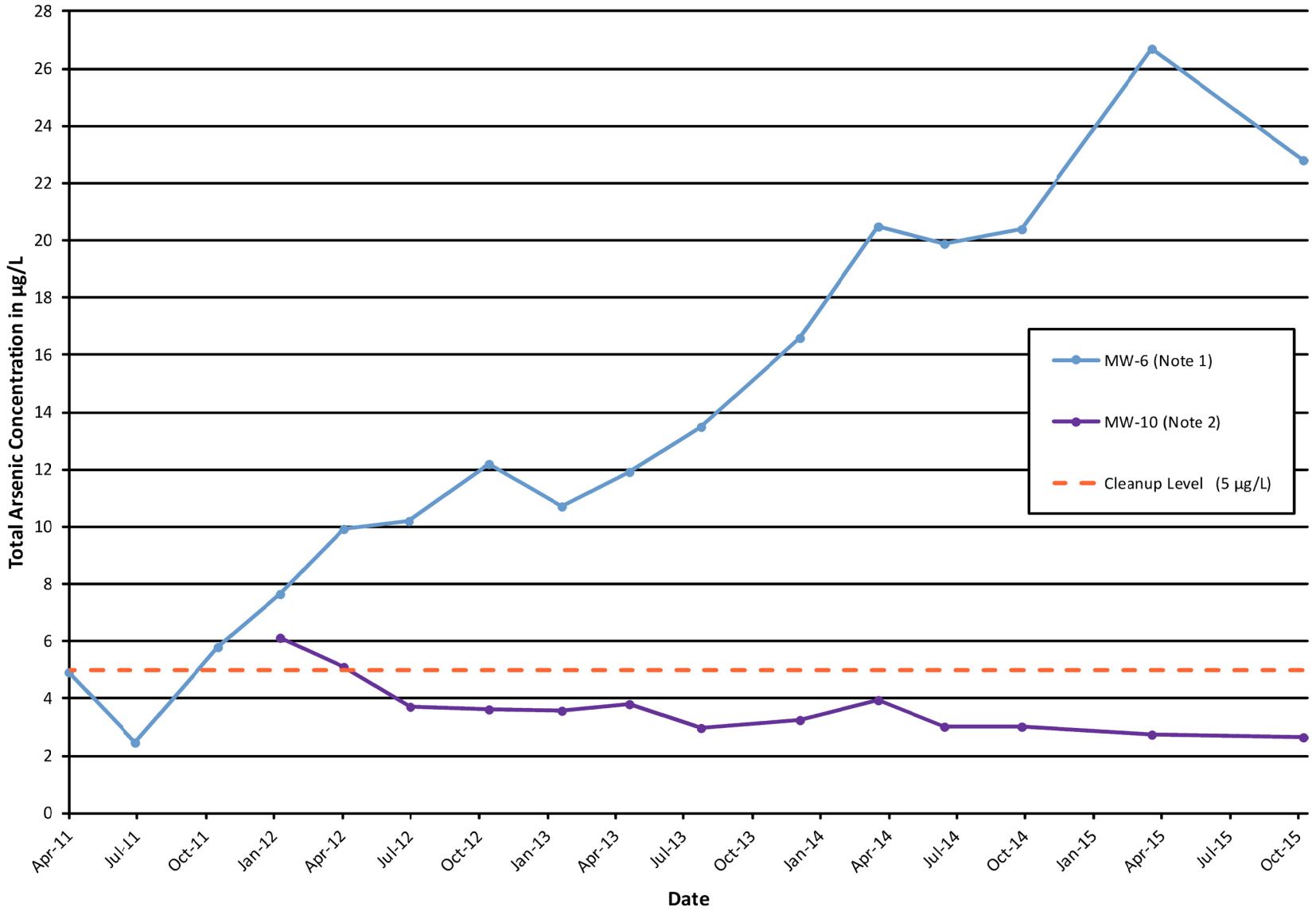
- Interpreted Extent of Landfill Activity
- Estimated Extent of Groundwater Cleanup Level Exceedances
- Bremerton School District Property Boundary
- Bremerton United Methodist Church Property Boundary
- Inferred Direction of Groundwater Flow

Site Plan

2015 Annual Report
Crownhill Elementary, Bremerton, Washington

Aspect CONSULTING	JAN-2016	BY: DLH / PPW	FIGURE NO. 2
	PROJECT NO. 100094	REVISED BY: SCC	

GIS Path: T:\projects_8\CrownHillElementary\Delivered\Annual Report 2015\02_Site Plan.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 12/31/2015 || User: rpapin || Print Date: 12/31/2015



Notes:

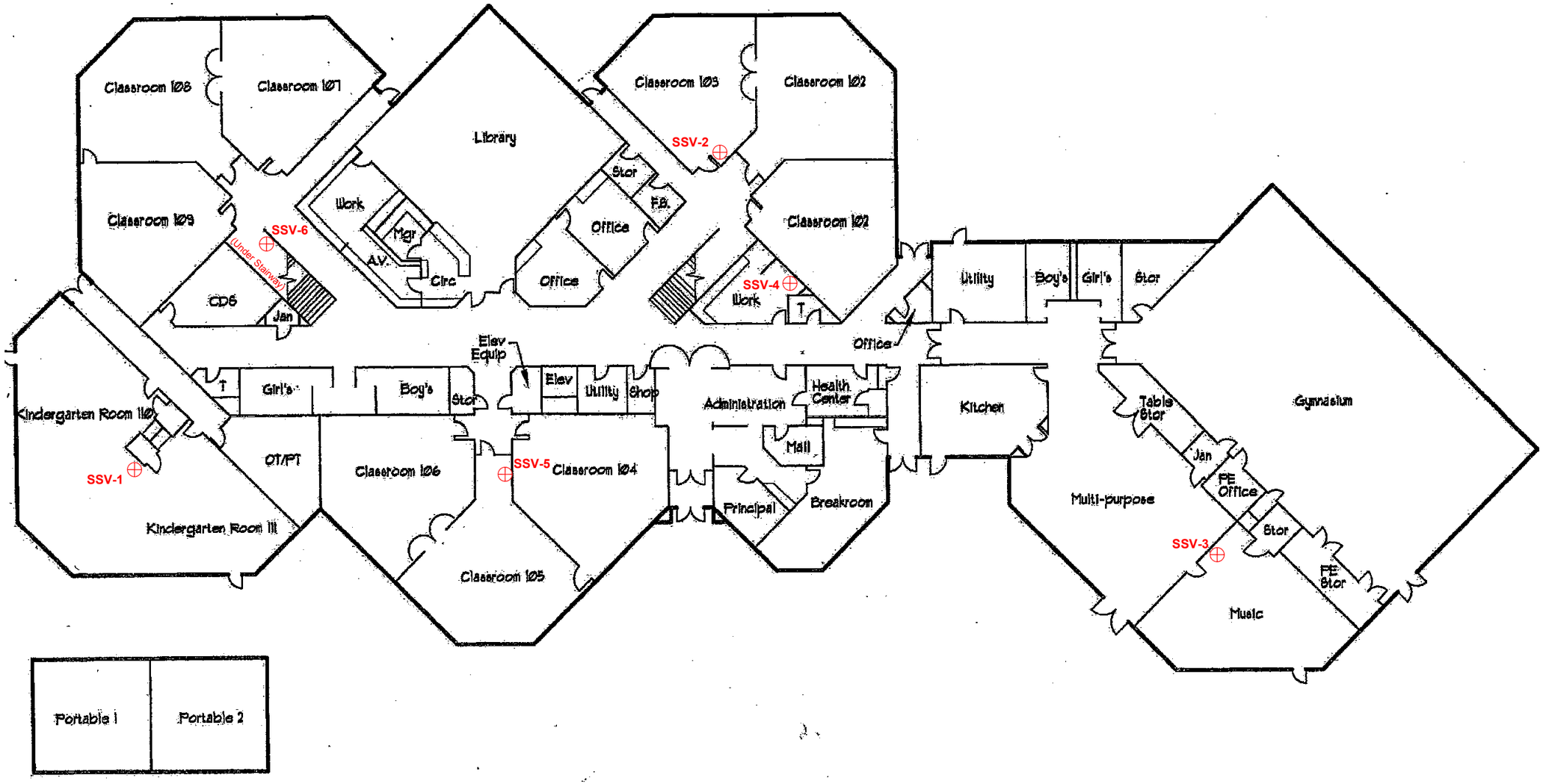
1. Well MW-6 provides early warning of potential arsenic migration.
2. Well MW-10 is the conditional point of compliance for achieving groundwater cleanup levels.

Arsenic Concentration Trends in Wells MW-6 and MW-10

2015 Annual Report

Crownhill Elementary, Bremerton, Washington

Aspect Consulting	JAN-2016	BY: DAH/SCC	FIGURE NO. 3
	PROJECT NO. 100094	REVISED BY: -	



⊕ Sub-Slab Vapor Sampling Location

0 25 50

Approximate Scale in Feet

Sub-Slab Vapor Sampling Locations

2015 Annual Report

Crownhill Elementary, Bremerton, Washington

Aspect CONSULTING	JAN-2016	BY: DLH/SCC	FIGURE NO. 4
	PROJECT NO. 100094	REV BY: SCC	

APPENDIX A

December 2015 Inspection Record

Aspect CONSULTING

Project Name: **Crownhill Elementary School**

Project No.: _____

Date: 12/23/15

Inspector's Name: Ron Carpenter

Inspector's Signature: Ron Carpenter

Weather Conditions: 41°F partly cloudy/sun

Inspector's Title/Affiliation: Fac. Supervisor Bremerton SD

FORM 1 - INSPECTION RECORD

INSPECTION ITEM	YES	NO	COMMENTS/NOTES
1. North Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Pavement deterioration/damage along Bertha Ave NW?[1]		X	Condition is the Same
c. Evidence of soil disturbance?	X		See utility trench to new Portable Aspect Memo Oct 20th 2015
d. Geotextile fabric visible in interim action area?		X	
2. South Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Evidence of soil disturbance?		X	
c. Geotextile fabric visible in interim action areas?		X	
3. Other Inspection Items			
a. Are all wells (MW-1 through EW-17) accessible?	X		
b. Evidence of well monument damage/tampering?		X	
c. HVAC system operates continuously during school day?[2]	X		Check computer controls to verify

Deficient Action Items & Other Comments:

See Photos of Bertha parking area and New portable impact on site

Notes

1. Item 1b refers to the paved parking area described in Section 1.3.
2. The inspector should describe under COMMENTS/NOTES how the determination is made regarding HVAC system operation.

Bertha Av.

Parking

area

12/23/15

New Portable utility trench Area. All cover is stable

12/23/15

New Portable
small area of
Paving for
access
Less than 6"
disturbance

12/23/15

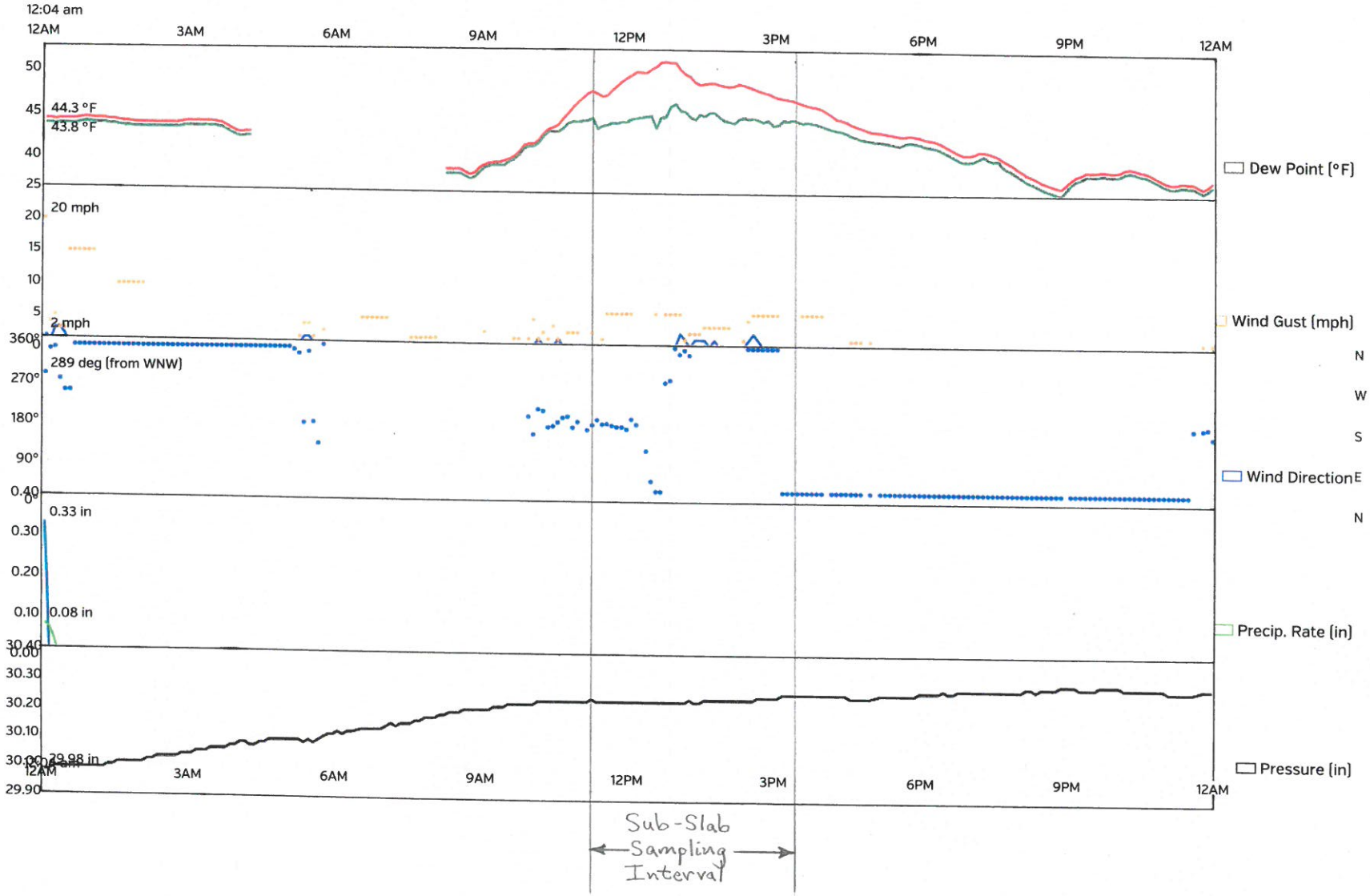
APPENDIX B

Weather Conditions during Sub-Slab Vapor Sampling

Weather Conditions during Sub-Slab Vapor Sampling on November 11, 2015

Weather History Graph
November 11, 2015

Bridletree Station, Bremerton (KWABREME21)



WEATHER UNDERGROUND

Aspect Consulting, LLC

APPENDIX C

October 2015 Waste Disposal Documentation

443537

Please print or type. (Form designed for use on elite (12-pitch) typewriter)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number

2. Page 1 of 1

3. Emergency Response Phone: 800-337-7455

4. Manifest Tracking Number: 015121019 JJK

5. Generator's Name and Mailing Address
Bremerton School District
200 Bruenn Ave
Bremerton WA 98312
Attn: Ron Carpenter
Generator's Phone: 206 780-7729

Generator's Site Address (if different than mailing address)
Crownhill Elementary
100 Bremerton Ave
Bremerton WA 98312

6. Transporter 1 Company Name
OH Environmental Inc.
U.S. EPA ID Number: WAH000047217

7. Transporter 2 Company Name
Chemical Waste Management
U.S. EPA ID Number: ORD089452353

8. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC
17629 CEDAR SPRINGS LANE
ARLINGTON OR 97812
Facility's Phone: 541 454-2643
U.S. EPA ID Number: ORD089452353

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. MATERIAL NOT REGULATED BY DOT (IDW-SOIL)	012	DM	6000	P	NONE
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) OR328384
WMXU 970710

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Ron Carpenter Fire Sup BSD
Signature: Ron Carpenter
Month: 10 Day: 13 Year: 15

INTL
16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: Date leaving U.S.:
Transporter signature (for exports only):

TRANSPORTER
17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Travis Forslund
Signature:
Month: 10 Day: 13 Year: 15
Transporter 2 Printed/Typed Name: Amanda Payne
Signature:
Month: 10 Day: 13 Year: 15

DESIGNATED FACILITY
18. Discrepancy
18a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19 Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Tina Weiser
Signature:
Month: 10 Day: 28 Year: 15

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

443537

CWMI

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: EXEMPT

22. Page 2 of 2

23. Manifest Tracking Number: 015121010JJK

24. Generator's Name: CROWNHILL ELEMENTARY
100 BREMERTON AVENUE
BREMERTON WA 98312

25. Transporter 3 Company Name: UNION PACIFIC RAILROAD — U.S. EPA ID Number: NED001792910

26. Transporter 4 Company Name: COLUMBIA RIDGE LANDFILL — U.S. EPA ID Number: ORD987173457

27a HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		
	6.							
	7.							
	8.							
	9.							
	10.							
	11.							
	12.							
	13.							
	14.							

32. Special Handling Instructions and Additional Information

WMXU 970710

GENERATOR

TRANSPORTER

33. Transporter ___ Acknowledgment of Receipt of Materials
Printed/Typed Name: Sathe — Signature: Sathe — Month/Day/Year: 10/9/15

34. Transporter 4 Acknowledgment of Receipt of Materials
Printed/Typed Name: Bonnie Shaw — Signature: B Shaw — Month/Day/Year: 10/21/15

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

This Memorandum is an acknowledgment that a Bill of Lading has been issued and is not Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper No. ________

Carrier No. ________

Page 1 of 1

MARINE VACUUM SERVICES (Name of carrier) (SCAC)

Date 10/13/15

On Collect on Delivery shipments, the letters "COD" must appear before consignee's name or as otherwise provided in Item 430, Sec.1.

TO:
Consignee MARINE VACUUM SERVICES
Street 1516 S GRAHAM STREET
City SEATTLE State WA Zip Code 98108

FROM:
Shipper BREMERTON SCHOOL DIST - CROWNHILL ELE
Street 5520 BURWELL STREET
City BREMERTON State WA Zip Code 98312

24 hr. Emergency Contact Tel. No. ________

Route ________ Vehicle Number 223

No. of Units & Container Type	HM	BASIC DESCRIPTION UN or NA Number, Proper Shipping Name, Hazard Class, Packing Group	TOTAL QUANTITY (Weight, Volume, Gallons, etc.)	WEIGHT (Subject to Correction)	RATE	CHARGES (For Carrier Use Only)
1 TT		MATERIAL NOT REGULATED BY DOT	600	GAL		
		(NON-REGULATED WATER W/ DIESEL)				
		CUSTOMER DH ENVIRONMENTAL				
		PROFILE # DH100T15				
		PO #				

PLACARDS TENDERED: YES ☐ NO ☐

Note — (1) Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property, as follows: "The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ________ per ________."
(2) Where the applicable tariff provisions specify a limitation of the carrier's liability absent a release or a value declaration by the shipper and the shipper does not release the carrier's liability or declare a value, the carrier's liability shall be limited to the extent provided by such provisions. See NMFC Item 172.
(3) Commodities requiring special or additional care or attention in handling or stowing must be so marked and packaged as to ensure safe transportation. See Section 2(e) of item 360, Bills of Lading, Freight Bills and Statements of Charges and Section 1(a) of the Contract Terms and Conditions for a list of such articles.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

________ Signature

REMIT C.O.D. TO: ADDRESS

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

TOTAL CHARGES $

FREIGHT CHARGES
FREIGHT PREPAID except when box at right is checked ☐ Check box if charges are to be collect

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of, said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.
Shipper hereby certifies that he is familiar with all the lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER [signature]
PER Bremerton School District

CARRIER Carl [signature]
PER
DATE

4

Permanent post-office address of shipper.

APPENDIX D

Laboratory Reports, Groundwater Sampling

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

April 17, 2015

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

Dear Mr. Heffner:

Included are the results from the testing of material submitted on April 8, 2015 from the Crown Hill, PO 100094, F&BI 504138 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: data@aspectconsulting.com, Parker Wittman
ASP0417R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 8, 2015 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crown Hill, PO 100094, F&BI 504138 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
504138 -01	MW-6-040715
504138 -02	MW-10-040715
504138 -03	MW-5-040715
504138 -04	MW-15-040715
504138 -05	MW-9-040715

All quality control requirements were acceptable.

Date of Report: 04/17/15
Date Received: 04/08/15
Project: Crown Hill, PO 100094, F&BI 504138
Date Extracted: 04/09/15
Date Analyzed: 04/09/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW-10-040715 504138-02	<50	<250	86
MW-5-040715 504138-03	2,000	430 x	90
MW-15-040715 504138-04	<50	<250	86
Method Blank 05-726 MB2	<50	<250	83

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-6-040715	Client:	Aspect Consulting, LLC
Date Received:	04/08/15	Project:	Crown Hill, PO 100094, F&BI 504138
Date Extracted:	04/13/15	Lab ID:	504138-01
Date Analyzed:	04/14/15	Data File:	504138-01.039
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Indium	80	60	125

Analyte:	Concentration ug/L (ppb)
Arsenic	26.7

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-10-040715	Client:	Aspect Consulting, LLC
Date Received:	04/08/15	Project:	Crown Hill, PO 100094, F&BI 504138
Date Extracted:	04/13/15	Lab ID:	504138-02
Date Analyzed:	04/14/15	Data File:	504138-02.040
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Indium	79	60	125

Analyte:	Concentration ug/L (ppb)
Arsenic	2.76

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crown Hill, PO 100094, F&BI 504138
Date Extracted:	04/13/15	Lab ID:	I5-219 mb
Date Analyzed:	04/14/15	Data File:	I5-219 mb.019
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Indium	84	60	125

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-10-040715	Client:	Aspect Consulting, LLC
Date Received:	04/08/15	Project:	Crown Hill, PO 100094, F&BI 504138
Date Extracted:	04/10/15	Lab ID:	504138-02
Date Analyzed:	04/10/15	Data File:	041009.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-9-040715	Client:	Aspect Consulting, LLC
Date Received:	04/08/15	Project:	Crown Hill, PO 100094, F&BI 504138
Date Extracted:	04/10/15	Lab ID:	504138-05
Date Analyzed:	04/10/15	Data File:	041010.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	11

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crown Hill, PO 100094, F&BI 504138
Date Extracted:	04/10/15	Lab ID:	05-0715 mb
Date Analyzed:	04/10/15	Data File:	041007.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	99	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Date of Report: 04/17/15
Date Received: 04/08/15
Project: Crown Hill, PO 100094, F&BI 504138

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	101	92	63-142	9

Date of Report: 04/17/15
Date Received: 04/08/15
Project: Crown Hill, PO 100094, F&BI 504138

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 504193-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	98	98	60-150	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	95	80-111

Date of Report: 04/17/15
Date Received: 04/08/15
Project: Crown Hill, PO 100094, F&BI 504138

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

Laboratory Code: 504138-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	50	<1	100	66-135

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	50	103	99	80-120	4

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

504138

SAMPLE CHAIN OF CUSTODY

ME 04/08/15

1 AI2 / 1 COC / V2

Page # 1 of 1

Send Report To Dave Heffner
Company Aspect Consulting
Address 401 2nd Ave S, Suite 201
City, State, ZIP Seattle, WA 98104
Phone # _____ Fax # _____

SAMPLERS (signature)

PROJECT NAME/NO. Crown Hill

PO# 100094

REMARKS
TCE = trichloroethene

TURNAROUND TIME
☑ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel (8/1)	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	total As	TCE					Notes
MW-6-040715	01	04/07/15	0940	water	1							X						
MW-10-040715	02 A-F		1000		6	X						X	X					
MW-5-040715	03		1040		1	X												
MW-15-040715	04		1045		1	X												
MW-9-040715	05 A-D		1130		4								X					
												Samples received at 2 °C						

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Amy Tice	Aspect	4/8/15	
Received by:	Nhan Phan	FEBT	4/8/15	1130
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

November 10, 2015

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

Dear Mr. Heffner:

Included are the results from the testing of material submitted on October 29, 2015 from the Crown Hill Elementary 100054, F&BI 510444 project. There are 14 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: data@aspectconsulting.com, Parker Wittman
ASP1110R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 29, 2015 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crown Hill Elementary 100054, F&BI 510444 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
510444 -01	MW-9-102815
510444 -02	MW-12-102815
510444 -03	MW-15-102815
510444 -04	MW-6-102815
510444 -05	MW-10-102815
510444 -06	Mack-102815

All quality control requirements were acceptable.

Date of Report: 11/10/15
Date Received: 10/29/15
Project: Crown Hill Elementary 100054, F&BI 510444
Date Extracted: 10/29/15 and 11/06/15
Date Analyzed: 10/29/15 and 11/06/15

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
MW-12-102815 510444-02	2,400 x	620 x	107
MW-15-102815 510444-03	<50	<250	112
MW-10-102815 510444-05 1/1.6	<80	<400	63
Method Blank 05-2210 MB2	<50	<250	95
Method Blank 05-2277 MB	<50	<250	79

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-6-102815	Client:	Aspect Consulting, LLC
Date Received:	10/29/15	Project:	Crown Hill Elementary 100054
Date Extracted:	10/30/15	Lab ID:	510444-04
Date Analyzed:	11/02/15	Data File:	510444-04.026
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Indium	84	60	125

Analyte:	Concentration ug/L (ppb)
Arsenic	22.8

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-10-102815	Client:	Aspect Consulting, LLC
Date Received:	10/29/15	Project:	Crown Hill Elementary 100054
Date Extracted:	10/30/15	Lab ID:	510444-05
Date Analyzed:	11/02/15	Data File:	510444-05.027
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Indium	89	60	125

Analyte:	Concentration ug/L (ppb)
Arsenic	2.65

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crown Hill Elementary 100054
Date Extracted:	10/30/15	Lab ID:	I5-614 mb
Date Analyzed:	10/30/15	Data File:	10-3
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Indium	110	60	125

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-9-102815	Client:	Aspect Consulting, LLC
Date Received:	10/29/15	Project:	Crown Hill Elementary 100054
Date Extracted:	10/29/15	Lab ID:	510444-01
Date Analyzed:	10/29/15	Data File:	102908.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	85	117
Toluene-d8	100	91	108
4-Bromofluorobenzene	101	76	126

Compounds:	Concentration ug/L (ppb)
Trichloroethene	10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-10-102815	Client:	Aspect Consulting, LLC
Date Received:	10/29/15	Project:	Crown Hill Elementary 100054
Date Extracted:	10/29/15	Lab ID:	510444-05
Date Analyzed:	10/29/15	Data File:	102909.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	99	91	108
4-Bromofluorobenzene	101	76	126

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Mack-102815	Client:	Aspect Consulting, LLC
Date Received:	10/29/15	Project:	Crown Hill Elementary 100054
Date Extracted:	10/29/15	Lab ID:	510444-06
Date Analyzed:	10/29/15	Data File:	102910.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	98	91	108
4-Bromofluorobenzene	101	76	126

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crown Hill Elementary 100054
Date Extracted:	10/29/15	Lab ID:	05-2162 mb
Date Analyzed:	10/29/15	Data File:	102907.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	99	91	108
4-Bromofluorobenzene	100	76	126

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Date of Report: 11/10/15
Date Received: 10/29/15
Project: Crown Hill Elementary 100054, F&BI 510444

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	104	114	63-142	9

Date of Report: 11/10/15
Date Received: 10/29/15
Project: Crown Hill Elementary 100054, F&BI 510444

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	86	88	63-142	2

Date of Report: 11/10/15
Date Received: 10/29/15
Project: Crown Hill Elementary 100054, F&BI 510444

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 510382-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	4.21	106	106	70-130	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	99	85-115

Date of Report: 11/10/15
Date Received: 10/29/15
Project: Crown Hill Elementary 100054, F&BI 510444

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

Laboratory Code: 510444-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	50	10	94	75-109

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	50	97	97	77-108	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

510744

SAMPLE CHAIN OF CUSTODY

ME 10/29/15 V1 A14

Send Report To Dave Heffner
Company Aspect Consulting
Address 401 2nd Ave S. #201
City, State, ZIP Seattle WA 98104
Phone # _____ Fax # _____

SAMPLERS *(signature)*

PROJECT NAME/NO. Creosote Elements 104

PO#

REMARKS

TURNAROUND TIME
☑ Standard (2 Weeks)
☐ RUSH _____
Rush charges authorized by _____

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	Total Arsenic	TCE					Notes
MW-9-102815	01 A D	10/28/15	1040	WATER	4								X					* per DIT
MW-12-102815	02		1225	WATER	1	X												10/5/15 MS
MW-15-102815	03		1355	WATER	1	X												
MW-6-102815	04		1525	WATER	1							X						
MW-10-102815	05 A D		1630	WATER	4	*							X					
↓	05 E		↓	WATER	1							X						
MCK-102815	06 A D		1030	water	4								X					

Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Simon Butler	ASpect	10/29/15	0715
Received by:		Fedex	10/29	1103
Relinquished by:				
Received by:	Nhan phan	FEBI	10/29/15	1130

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

APPENDIX E

Laboratory Report, Sub-Slab Soil Vapor Sampling

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

November 23, 2015

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

Dear Mr. Heffner:

Included are the results from the testing of material submitted on November 11, 2015 from the Crown Hill Elementary, F&BI 511157 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: data@aspectconsulting.com, Parker Wittman
ASP1123R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 11, 2015 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crown Hill Elementary, F&BI 511157 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
511157 -01	SSV-1-111115
511157 -02	SSV-2-111115
511157 -03	SSV-3-111115
511157 -04	SSV-4-111115
511157 -05	SSV-5-111115
511157 -06	SSV-6-111115

The samples were sent to Fremont Analytical for hydrogen sulfide analysis. Review of the enclosed report indicates that all quality assurance were acceptable.

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-1-111115	Client:	Aspect Consulting, LLC
Date Received:	11/11/15	Project:	Crown Hill Elementary, F&BI 511157
Date Collected:	11/17/15	Lab ID:	511157-01
Date Analyzed:	11/17/15	Data File:	111706.D
Matrix:	Air	Instrument:	GCMS7
Units:	ppbv ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	104	70	130

Compounds:	Concentration ppbv	Concentration ug/m3
Dichlorodifluoromethane	0.70	3.5
Vinyl chloride	<0.2	<0.51
1,1-Dichloroethene	<0.2	<0.79
trans-1,2-Dichloroethene	<0.2	<0.79
1,1-Dichloroethane	<0.2	<0.81
cis-1,2-Dichloroethene	<0.2	<0.79
Chloroform	<0.2	<0.98
Benzene	<0.2	<0.64
1,2-Dichloroethane (EDC)	<0.2	<0.81
Trichloroethene	<0.2	<1.1
Tetrachloroethene	<0.2	<1.4
Ethylbenzene	0.20	0.87
m,p-Xylene	0.66	2.9
o-Xylene	0.28	1.2
1,2,4-Trimethylbenzene	0.55	2.7
Naphthalene	<0.2	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-2-111115	Client:	Aspect Consulting, LLC
Date Received:	11/11/15	Project:	Crown Hill Elementary, F&BI 511157
Date Collected:	11/11/15	Lab ID:	511157-02
Date Analyzed:	11/17/15	Data File:	111707.D
Matrix:	Air	Instrument:	GCMS7
Units:	ppbv ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ppbv	Concentration ug/m3
Dichlorodifluoromethane	0.73	3.6
Vinyl chloride	<0.2	<0.51
1,1-Dichloroethene	<0.2	<0.79
trans-1,2-Dichloroethene	<0.2	<0.79
1,1-Dichloroethane	<0.2	<0.81
cis-1,2-Dichloroethene	<0.2	<0.79
Chloroform	<0.2	<0.98
Benzene	0.21	0.67
1,2-Dichloroethane (EDC)	<0.2	<0.81
Trichloroethene	<0.2	<1.1
Tetrachloroethene	0.54	3.7
Ethylbenzene	<0.2	<0.87
m,p-Xylene	<0.4	<1.7
o-Xylene	<0.2	<0.87
1,2,4-Trimethylbenzene	0.23	1.1
Naphthalene	<0.2	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-3-111115	Client:	Aspect Consulting, LLC
Date Received:	11/11/15	Project:	Crown Hill Elementary, F&BI 511157
Date Collected:	11/11/15	Lab ID:	511157-03
Date Analyzed:	11/17/15	Data File:	111708.D
Matrix:	Air	Instrument:	GCMS7
Units:	ppbv ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ppbv	ug/m3
Dichlorodifluoromethane	0.71	3.5
Vinyl chloride	<0.2	<0.51
1,1-Dichloroethene	<0.2	<0.79
trans-1,2-Dichloroethene	<0.2	<0.79
1,1-Dichloroethane	<0.2	<0.81
cis-1,2-Dichloroethene	<0.2	<0.79
Chloroform	<0.2	<0.98
Benzene	<0.2	<0.64
1,2-Dichloroethane (EDC)	<0.2	<0.81
Trichloroethene	<0.2	<1.1
Tetrachloroethene	0.25	1.7
Ethylbenzene	<0.2	<0.87
m,p-Xylene	<0.4	<1.7
o-Xylene	<0.2	<0.87
1,2,4-Trimethylbenzene	0.29	1.4
Naphthalene	<0.2	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-4-111115	Client:	Aspect Consulting, LLC
Date Received:	11/11/15	Project:	Crown Hill Elementary, F&BI 511157
Date Collected:	11/11/15	Lab ID:	511157-04
Date Analyzed:	11/17/15	Data File:	111709.D
Matrix:	Air	Instrument:	GCMS7
Units:	ppbv ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	103	70	130

Compounds:	Concentration ppbv	Concentration ug/m3
Dichlorodifluoromethane	0.73	3.6
Vinyl chloride	<0.2	<0.51
1,1-Dichloroethene	<0.2	<0.79
trans-1,2-Dichloroethene	<0.2	<0.79
1,1-Dichloroethane	<0.2	<0.81
cis-1,2-Dichloroethene	<0.2	<0.79
Chloroform	<0.2	<0.98
Benzene	<0.2	<0.64
1,2-Dichloroethane (EDC)	<0.2	<0.81
Trichloroethene	<0.2	<1.1
Tetrachloroethene	0.57	3.9
Ethylbenzene	<0.2	<0.87
m,p-Xylene	<0.4	<1.7
o-Xylene	<0.2	<0.87
1,2,4-Trimethylbenzene	0.35	1.7
Naphthalene	<0.2	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-5-111115	Client:	Aspect Consulting, LLC
Date Received:	11/11/15	Project:	Crown Hill Elementary, F&BI 511157
Date Collected:	11/11/15	Lab ID:	511157-05
Date Analyzed:	11/17/15	Data File:	111711.D
Matrix:	Air	Instrument:	GCMS7
Units:	ppbv ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ppbv	Concentration ug/m3
Dichlorodifluoromethane	0.98	4.8
Vinyl chloride	<0.2	<0.51
1,1-Dichloroethene	<0.2	<0.79
trans-1,2-Dichloroethene	<0.2	<0.79
1,1-Dichloroethane	<0.2	<0.81
cis-1,2-Dichloroethene	<0.2	<0.79
Chloroform	<0.2	<0.98
Benzene	<0.2	<0.64
1,2-Dichloroethane (EDC)	<0.2	<0.81
Trichloroethene	<0.2	<1.1
Tetrachloroethene	0.26	1.8
Ethylbenzene	0.23	1.0
m,p-Xylene	0.82	3.6
o-Xylene	0.32	1.4
1,2,4-Trimethylbenzene	0.88	4.3
Naphthalene	<0.2	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-6-111115	Client:	Aspect Consulting, LLC
Date Received:	11/11/15	Project:	Crown Hill Elementary, F&BI 511157
Date Collected:	11/11/15	Lab ID:	511157-06
Date Analyzed:	11/17/15	Data File:	111712.D
Matrix:	Air	Instrument:	GCMS7
Units:	ppbv ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ppbv	Concentration ug/m3
Dichlorodifluoromethane	0.66	3.3
Vinyl chloride	<0.2	<0.51
1,1-Dichloroethene	<0.2	<0.79
trans-1,2-Dichloroethene	<0.2	<0.79
1,1-Dichloroethane	<0.2	<0.81
cis-1,2-Dichloroethene	<0.2	<0.79
Chloroform	<0.2	<0.98
Benzene	0.23	0.73
1,2-Dichloroethane (EDC)	<0.2	<0.81
Trichloroethene	<0.2	<1.1
Tetrachloroethene	<0.2	<1.4
Ethylbenzene	1.9	8.2
m,p-Xylene	6.7	29
o-Xylene	0.79	3.4
1,2,4-Trimethylbenzene	0.56	2.8
Naphthalene	<0.2	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crown Hill Elementary, F&BI 511157
Date Collected:	Not Applicable	Lab ID:	05-2300 mb
Date Analyzed:	11/17/15	Data File:	111705.D
Matrix:	Air	Instrument:	GCMS7
Units:	ppbv ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ppbv	ug/m3
Dichlorodifluoromethane	<0.2	<0.99
Vinyl chloride	<0.2	<0.51
1,1-Dichloroethene	<0.2	<0.79
trans-1,2-Dichloroethene	<0.2	<0.79
1,1-Dichloroethane	<0.2	<0.81
cis-1,2-Dichloroethene	<0.2	<0.79
Chloroform	<0.2	<0.98
Benzene	<0.2	<0.64
1,2-Dichloroethane (EDC)	<0.2	<0.81
Trichloroethene	<0.2	<1.1
Tetrachloroethene	<0.2	<1.4
Ethylbenzene	<0.2	<0.87
m,p-Xylene	<0.4	<1.7
o-Xylene	<0.2	<0.87
1,2,4-Trimethylbenzene	<0.2	<0.98
Naphthalene	<0.2	<1

Date of Report: 11/23/15
Date Received: 11/11/15
Project: Crown Hill Elementary, F&BI 511157

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Dichlorodifluoromethane	ppbv	10	110	70-130
Vinyl chloride	ppbv	10	108	70-130
1,1-Dichloroethene	ppbv	10	114	70-130
trans-1,2-Dichloroethene	ppbv	10	115	70-130
1,1-Dichloroethane	ppbv	10	114	70-130
cis-1,2-Dichloroethene	ppbv	10	115	70-130
Chloroform	ppbv	10	114	70-130
1,2-Dichloroethane (EDC)	ppbv	10	113	70-130
Benzene	ppbv	10	113	70-130
Trichloroethene	ppbv	10	115	70-130
Tetrachloroethene	ppbv	10	117	70-130
Ethylbenzene	ppbv	10	116	70-130
m,p-Xylene	ppbv	20	116	70-130
o-Xylene	ppbv	10	116	70-130
1,2,4-Trimethylbenzene	ppbv	10	115	70-130
Naphthalene	ppbv	10	111	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 511157
Lab ID: 1511119

November 18, 2015

Attention Michael Erdahl:

Fremont Analytical, Inc. received 6 sample(s) on 11/11/2015 for the analyses presented in the following report.

Sulfur Compounds by EPA Method TO-15

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
President

Date: *11/18/2015*

CLIENT: Friedman & Bruya
Project: 511157
Lab Order: 1511119

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1511119-001	SSV-1-111115	11/11/2015 12:00 PM	11/11/2015 6:01 PM
1511119-002	SSV-2-111115	11/11/2015 1:00 PM	11/11/2015 6:01 PM
1511119-003	SSV-3-111115	11/11/2015 2:15 PM	11/11/2015 6:01 PM
1511119-004	SSV-4-111115	11/11/2015 1:40 PM	11/11/2015 6:01 PM
1511119-005	SSV-5-111115	11/11/2015 12:35 PM	11/11/2015 6:01 PM
1511119-006	SSV-6-111115	11/11/2015 11:15 AM	11/11/2015 6:01 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **1511119**
Date: **11/18/2015**

CLIENT: Friedman & Bruya
Project: 511157

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms

WO#: **1511119**
Date Reported: **11/18/2015**

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: **Friedman & Bruya**
WorkOrder: 1511119
Project: 511157

Client Sample ID: SSV-1-111115
Lab ID: 1511119-001A
Sample Type:

Date Sampled: 11/11/2015
Date Received: 11/11/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Hydrogen Sulfide	<5.00	<6.95	5.00	6.95		EPA-TO-15	11/11/2015	JY
Surr: 4-Bromofluorobenzene	93.7 %Rec	--	70-130	--		EPA-TO-15	11/11/2015	JY

Client: **Friedman & Bruya**
WorkOrder: 1511119
Project: 511157

Client Sample ID: SSV-2-111115
Lab ID: 1511119-002A
Sample Type:

Date Sampled: 11/11/2015
Date Received: 11/11/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Hydrogen Sulfide	<5.00	<6.95	5.00	6.95		EPA-TO-15	11/11/2015	JY
Surr: 4-Bromofluorobenzene	94.0 %Rec	--	70-130	--		EPA-TO-15	11/11/2015	JY

Client: **Friedman & Bruya**
WorkOrder: 1511119
Project: 511157

Client Sample ID: SSV-3-111115
Lab ID: 1511119-003A
Sample Type:

Date Sampled: 11/11/2015
Date Received: 11/11/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Hydrogen Sulfide	<5.00	<6.95	5.00	6.95		EPA-TO-15	11/11/2015	JY
Surr: 4-Bromofluorobenzene	94.6 %Rec	--	70-130	--		EPA-TO-15	11/11/2015	JY

Client: **Friedman & Bruya**
WorkOrder: 1511119
Project: 511157

Client Sample ID: SSV-4-111115
Lab ID: 1511119-004A
Sample Type:

Date Sampled: 11/11/2015
Date Received: 11/11/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Hydrogen Sulfide	<5.00	<6.95	5.00	6.95		EPA-TO-15	11/11/2015	JY
Surr: 4-Bromofluorobenzene	97.3 %Rec	--	70-130	--		EPA-TO-15	11/11/2015	JY

Client: **Friedman & Bruya**
WorkOrder: 1511119
Project: 511157

Client Sample ID: SSV-5-111115
Lab ID: 1511119-005A
Sample Type:

Date Sampled: 11/11/2015
Date Received: 11/11/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Hydrogen Sulfide	<5.00	<6.95	5.00	6.95		EPA-TO-15	11/11/2015	JY
Surr: 4-Bromofluorobenzene	97.1 %Rec	--	70-130	--		EPA-TO-15	11/11/2015	JY

Client: **Friedman & Bruya**
WorkOrder: 1511119
Project: 511157

Client Sample ID: SSV-6-111115
Lab ID: 1511119-006A
Sample Type:

Date Sampled: 11/11/2015
Date Received: 11/11/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Hydrogen Sulfide	<5.00	<6.95	5.00	6.95		EPA-TO-15	11/11/2015	JY
Surr: 4-Bromofluorobenzene	98.7 %Rec	--	70-130	--		EPA-TO-15	11/11/2015	JY

Date: *11/18/2015*

Work Order: 1511119
CLIENT: Friedman & Bruya
Project: 511157

QC SUMMARY REPORT

Sulfur Compounds by EPA Method TO-15

Sample ID: **LCS-R26088**	SampType: **LCS**			Units: **ppbv**		Prep Date: **11/11/2015**		RunNo: **26088**			
Client ID: **LCSW**	Batch ID: **R26088**					Analysis Date: **11/11/2015**		SeqNo: **492788**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hydrogen Sulfide	715	5.00	1,000	0	71.5	70	130				
Surr: 4-Bromofluorobenzene	9.74		10.00		97.4	80	120				

Sample ID: **MB-R26088**	SampType: **MBLK**			Units: **ppbv**		Prep Date: **11/11/2015**		RunNo: **26088**			
Client ID: **MBLKW**	Batch ID: **R26088**					Analysis Date: **11/11/2015**		SeqNo: **492789**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hydrogen Sulfide	ND	5.00									
Surr: 4-Bromofluorobenzene	9.07		10.00		90.7	70	130				

Sample ID: **1511119-006AREP**	SampType: **REP**			Units: **ppbv**		Prep Date: **11/11/2015**		RunNo: **26088**			
Client ID: **SSV-6-111115**	Batch ID: **R26088**					Analysis Date: **11/11/2015**		SeqNo: **492787**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hydrogen Sulfide	ND	5.00						0		30	
Surr: 4-Bromofluorobenzene	9.32		10.00		93.2	70	130		0	0	

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**1511119**
Logged by:	**Clare Griggs**	Date Received:	**11/11/2015 6:01:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐
		Air Samples		
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SAMPLE CHAIN OF CUSTODY

151119

Report To Mike Erdahl
Company F&B
Address 3012 16th Ave W
City, State, ZIP Seattle, WA 98119
Phone _____ Email _____

SAMPLERS (signature)	
PROJECT NAME: 511149	PO #: D-733
REMARKS	INVOICE TO

Page # _____ of _____

TURNAROUND TIME
- [x] Standard (10 Business Days)
- [ ] RUSH _____
Rush charges authorized by: _____

SAMPLE DISPOSAL
- [ ] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other _____

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	HFS	Hydrogen Sulfide				Notes
SSV-1-111115		11/11/15	1200	Air	2							✓				
SSV-2-111115		11/11/15	1300	Air	2							✓				
SSV-3-111115		11/11/15	1415	Air	2							✓				
SSV-4-111115		11/11/15	1340	Air	2							✓				
SSV-5-111115		11/11/15	1235	Air	2							✓				
SSV-6-111115		11/11/15	1115	Air	2							✓				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Eric Young	F&B	11/11/15	1801
Received by:		Chelsea Ward	FAI	11/11/15	1801
Relinquished by:					
Received by:					

FORMS\COC\COC.DOC

Samples received at _____ °C

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 511157
Lab ID: 1512010

December 07, 2015

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 12/1/2015 for the analyses presented in the following report.

Helium by GC/TCD

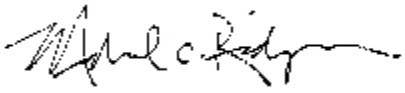
This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,



Mike Ridgeway
President

Date: *12/07/2015*

CLIENT: Friedman & Bruya
Project: 511157
Lab Order: 1512010

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1512010-001	SSV-6-111115	11/11/2015 11:20 AM	12/01/2015 3:00 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **1512010**
Date: **12/7/2015**

CLIENT: Friedman & Bruya
Project: 511157

WorkOrder Narrative:
I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppmv.

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

WO#: **1512010**
Date Reported: **12/7/2015**

CLIENT: Friedman & Bruya
Project: 511157

Lab ID: 1512010-001 **Collection Date:** 11/11/2015 11:20:00 AM
Client Sample ID: **SSV-6-111115** **Matrix:** Air

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Field Parameters				Batch ID:		Analyst:
AirVol	1			L		
MediaID	16					
Helium by GC/TCD				Batch ID: R26407		Analyst: JY
Helium	ND	172		ppmv	1	12/2/2015 2:18:00 PM

Date: *12/7/2015*

Work Order: 1512010
CLIENT: Friedman & Bruya
Project: 511157

QC SUMMARY REPORT

Helium by GC/TCD

Sample ID: **LCS-R26407**	SampType: **LCS**			Units: **ppmv**		Prep Date: **12/2/2015**		RunNo: **26407**		
Client ID: **LCSW**	Batch ID: **R26407**					Analysis Date: **12/2/2015**		SeqNo: **498467**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Helium	117,000	100	100,000	0	117	80	120				

Sample ID: **1512010-001AREP**	SampType: **REP**			Units: **ppmv**		Prep Date: **12/2/2015**		RunNo: **26407**		
Client ID: **SSV-6-111115**	Batch ID: **R26407**					Analysis Date: **12/2/2015**		SeqNo: **498466**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Helium	ND	172						0		30	

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**1512010**
Logged by:	**Erica Silva**	Date Received:	**12/1/2015 3:00:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☐	No ☑	Not Present ☐	
2.	How was the sample delivered?	FedEx			

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐	
		Air Sample			
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐		
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☑	Not Required ☐	
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑	
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑	
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐		
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐		
10.	Are samples properly preserved?	Yes ☑	No ☐		
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐	
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑	
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐		
14.	Does paperwork match bottle labels?	Yes ☑	No ☐		
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐		
16.	Is it clear what analyses were requested?	Yes ☑	No ☐		
17.	Were all holding times able to be met?	Yes ☑	No ☐		

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☑	No ☐	NA ☐	

Person Notified:	Michael Erdahl	Date:	12/1/2015
By Whom:	Erica Silva	Via:	☑ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Sample date		
Client Instructions:	Confirmed 11/11/15		

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SAMPLE CHAIN OF CUSTODY

1512010

Page # 1 of 1

Report To Mike Erdahl

Company FEBinc.

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) Fremont

PROJECT NAME: 511157

PO #: D-740

REMARKS

INVOICE TO

TURNAROUND TIME
- [x] Standard
- [ ] RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Controller ID	Sample Type	Field Initial Press. (Hg)	Field Initial Time	Field Final Press. (Hg)	Field Final Time	TO-15 Full Scan	TO-15 Chlorinated	TO-15 SIM	Helium	Notes
SSV-6-111115		18574		air	-30	1120	-3	1215				X	Final psi -5

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Michael Erdahl	FEBinc	12/1/15	1111 AM.
Received by:	Stephen Lee	FAI	12/1/15	1500
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

511157

ME 11-11-15

SAMPLE CHAIN OF CUSTODY

Report To Dave Heffner
Company Aspect Consulting
Address 401 2nd Ave S. #201
City, State, ZIP Seattle, WA 98104
Phone _____ Email _____

SAMPLERS (signature) [signature]
PROJECT NAME: Crown Hill Elementary
PO #: 100094-003-03
REMARKS
INVOICE TO

TURNAROUND TIME
(X) Standard
( ) RUSH _____
Rush charges authorized by: _____

SAMPLE DISPOSAL
(X) Dispose after 30 days
( ) Archive Samples
( ) Other _____

ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Controller ID	Sample Type	Field Initial Press. (Hg)	Field Initial Time	Field Final Press. (Hg)	Field Final Time	TO-15 Full Scan	TO-15 Calibrated	TO-15 SIM *	Helium	Notes (*project specific reporting list/limits)
SSV-1-111115	01	18576	7845	AIR	-30	1208	-2	1310			X		* per EG 11/30/15 MG.
SSV-2-111115	02	18572	7871	"	-30	1308	-3.5	1408			"		
SSV-3-111115	03	18563	7870	"	-29	1424	-3.5	1524			"		
SSV-4-111115	04	18571	7853	"	-29	1347	-3.5	1447			"		
SSV-5-111115	05	18570	7848	"	-30	1240	-3	1346			"		
SSV-6-111115	06	18574	07849	↓	-30	1120	-3	1215			↓	*	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Eric Geissinger	Aspect	11/11/15	1730
Received by: [signature]	Eric Young	FAB	11/11/15	1730
Relinquished by:				
Received by:				

Samples received at 19 °C