Technical Memorandum

To: Chris Maurer, Washington Department of Ecology

From: Janet Knox, Pacific Groundwater Group

Re: Scougal Rubber Remedial Action Update (Voluntary Cleanup Program (VCP) Site NW 1707)

Date: December 15, 2017

This technical memorandum summarizes the remedial actions conducted at Scougal Rubber between November 2016 and November 2017. Remedial action at the site focuses on the reduction of chlorinated solvent concentrations in soil and groundwater. Previous remedial actions at the site are described in other documents, including:

- *Scougal Rubber Final Remediation Plan (PGG, 2016)* and Addendum *(PGG, 2016b)*
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707)* (PGG, 2015)
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707)* (PGG, 2014)
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707)* (PGG, 2013)
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707)* (PGG, 2012)
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707)* (PGG, 2011)
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707)* (PGG, 2009)
- *Scougal Rubber Final Remedial Action Plan* (PGG, 2007)
- *Independent Remedial Action Report* (Retec, 2002)

The work was performed using generally accepted hydrogeologic practices at this time and in this vicinity, for exclusive application to the Scougal Rubber site and for the exclusive use of Scougal Rubber. This statement is in lieu of other warranties, express or implied.

INTRODUCTION

Scougal Rubber is located in the Georgetown neighborhood of Seattle, Washington at 6239 Corson Avenue (Figure 1). Remedial efforts have been underway at the site for over 20 years and have been successful in reducing contaminant concentrations (Table 1).

Source area groundwater concentrations have decreased, but concentrations in some locations were above the MTCA Method A cleanup levels during the most recent sampling events. In response, PGG proposed additional remedial actions to the Washington Department of Ecology (Ecology) in 2016 to address residual contamination in soil and groundwater.

HYDROGEOLOGIC SETTING

The Scougal property overlies fine to medium silty sands with scattered, discontinuous silt and gravel stringers. These soils are commonly observed throughout the lower Duwamish area. Depth to groundwater at the site is between 7 and 9 feet. The regional groundwater flow direction is to the southwest toward the Duwamish River, approximately 0.5 miles away (Retec, 2003). Soil cores collected in 2009 identified a 6- to 12-inch thick silt layer at approximately 16 feet below ground surface (bgs) that appears to be laterally continuous within at least the alleyway area of the site.

REMEDIATION HISTORY

Petroleum- and chlorinated solvent-impacted soil was identified on the Scougal property in the late 1980s. This discovery led to remedial action at the site including removal of underground storage tanks, hotspot excavation, hydraulic containment, and operation of an air sparging soil vapor extraction (SVE) system (Retec, 2002). The SVE system was designed to reduce contaminant concentrations in soil and groundwater behind the Scougal main plant and beneath the Machinists Inc. property to the west. The SVE system was operated intermittently from 1994 through 1999.

Operation of the SVE system reduced groundwater concentrations by approximately 90 percent and had some effectiveness in soil. In 1994, trichloroethene (TCE) (1,000 ug/L) and vinyl chloride (VC) (1,300 ug/L) concentrations at MW-14 exceeded cleanup levels. After the operation of the SVE system, concentrations of TCE and vinyl chloride had decreased, but groundwater concentrations rebounded each time the system was shut down. The SVE system was effective at reducing contaminant mass, but soil and groundwater concentrations remained above cleanup levels.

Scougal Rubber contacted Pacific Groundwater Group (PGG) in 2006 to develop a plan to further reduce contaminant concentrations to below cleanup levels. PGG performed additional site investigation in 2006 as the basis for further remediation and found concentrations as high as TCE (110 ug/L) and vinyl chloride (33 ug/L) in groundwater.

PGG developed a Final Remedial Action Plan to address residual contamination, submitted to Ecology in 2007. With that plan, Scougal Rubber entered the Washington Department of Ecology's Voluntary Cleanup Program (VCP) to receive Ecology's approval of the cleanup approach and to obtain a No Further Action (NFA) letter once the cleanup goals are achieved.

Upon review of the existing site documents and the Final Remedial Action Plan, Ecology provided approval of the plan on April 12, 2007. PGG then implemented the planned removal of shallow impacted soil, in-situ chemical oxidation with potassium permanganate (KMnO4), and confirmation sampling (PGG, 2009). All confirmation soil samples within the treatment area were non-detect for chlorinated solvents. Groundwater petroleum compound concentrations were reduced to below cleanup levels. Groundwater chlorinated ethene concentrations were reduced an additional 90 percent to approximately 1 percent of the pre-remediation (1993) levels. However, TCE and vinyl chloride concentrations remained above MTCA Method A groundwater cleanup values at the end of 2008.

In 2009, PGG developed and implemented a targeted ozone injection system to further reduce concentrations. The details of this system are described in previous annual updates (PGG 2015). Briefly, between 2,500 and 3,000 pounds of ozone were delivered to groundwater sparge points[1] during ozone operations through November 2015. Ozone treatment was discontinued in 2016. Table 1 provides a timeline of the remedial investigation and actions.

SOIL AND GROUNDWATER MONITORING

SUPPLEMENTAL SOIL AND GROUNDWATER CHARACTERIZATION

Based on previous detections of TCE in soil and residual concentrations in downgradient groundwater, PGG conducted a soil investigation in December 2016 to evaluate the extent of residual TCE contamination in the vadose zone underlying the north yard, including direct push sampling at points SR-57 to SR-71. Figure 2 shows TCE concentrations at these points juxtaposed with 2014 and 2015 TCE soil results. Soil samples were analyzed for chlorinated volatile organic compounds (cVOCs) by method SW8260C. In vadose zone soil samples, only TCE was detected above the method reporting limit. TCE was detected in 12 of 15 soil samples. The highest detected concentration was 0.97 milligrams per kilogram (mg/kg) in SR-69. In general, soils sampled from the southwest quadrant had higher TCE concentrations than soils sampled along the northern and eastern edges of the yard. (Figure 2, Table 2, with past soil analytical results shown in Table 4).

In December 2016, groundwater samples were collected from five monitoring wells located on the Scougal Rubber property and on the adjacent Machinists property (Figure 1): MW-17 is located on the western edge of the Scougal north yard; MW-14 is located on the property boundary south of the north yard; and MW-11, MW-13, and MW-12 are located on Machinists property, west of the Scougal property (Figure 1). In groundwater, TCE was detected in MW-17, MW-11, MW-13, and MW-14. The highest detected concentration of TCE was 170 ug/L from MW-17 (Table 3). TCE was not detected above the reporting limit (<1 ug/L) in the furthest downgradient well MW-12. Dichloroethene

[1] The ozone system had intermittent down time when oxygen was delivered to sparge points without ozone. For safety, when the cabinet detects a problem, ozone production to that point is discontinued.

(DCE) was detected only in MW-17 (30 ug/L) and Vinyl Chloride (VC) was detected in MW-14 (1 ug/L). (Table 3)

In August 2017, TCE was detected in groundwater from MW-11, MW-13, MW-14, and MW-17. The highest detected concentration of TCE was 69 ug/L in MW-17. During this sampling round, DCE (1 - 16 ug/L) and VC (0.57 - 1.3 ug/L) were also detected in MW-12, MW-13, MW-14, and MW-17. VC concentrations in groundwater collected at MW-12 have typically been below the reporting limit. However, VC was previously detected in groundwater collected at MW-12 in 2006 (0.7 ug/L) and in 2011 (0.9 ug/L) (Table 5). The absence of detectable TCE-daughter products in most of the 2016 vadose zone soil samples and the presence of TCE-daughter products in groundwater suggests biotic or abiotic dechlorination localized to the saturated zone.

EVALUATION OF REMEDIAL ALTERNATIVES

Previous remedial efforts to address past TCE contamination of soils and groundwater in the adjacent paint booth, south area, and west area at the Scougal Rubber facility have reduced the total amount of contaminant present in the subsurface. However, because groundwater monitoring data in the north yard showed TCE concentrations exceeding MTCA Method A cleanup levels for groundwater, further remedial options were evaluated. In 2017, north yard soil excavation was performed with overall groundwater treatment in 2017 through 2018.

REMEDIAL ACTIONS

This section describes remedial actions taken in 2017. Actions included planning and excavation of contaminated north yard vadose soil, installation of an oxidation groundwater infiltration system, and application of in-situ chemical oxidation.

Excavation of Contaminated Soils

From April 18, 2017, through April 25, 2017, Scougal Rubber excavated vadose zone soil in the north yard to remove residual TCE contamination. Soil was excavated to the depth of the water table, approximately 7-8 feet bgs. Approximately 450 cubic yards were removed and transported to a licensed subtitle D landfill. Soil was removed as close as possible to the paint room building and property boundaries while maintaining safe slopes. Confirmation samples SB1-SB17 were collected at 15-foot intervals from the mid-depth position along the boundaries of the excavation (3-4 feet bgs). SB-16 was taken from a silty-clay lens visible at the southeastern edge of the excavation area that may extend underneath the mix room building (Figure 3). Confirmation sampling results found:

- TCE concentrations in 12 of 17 soil sample were below the MTCA Method A levels (Table 2).

- Exceedances occurred in two soil samples SB8 (0.04 mg/kg), SB9 (0.12 mg/kg), SB10 (0.025 mg/kg) along the western edge of the excavation and in SB13 (0.04 mg/kg) at southeast corner of the excavation (Figure 3).
- An exceedance also occurred in SB16 (0.1 mg/kg) taken from the silty-clay lens at the southeastern corner of the excavation (Figure 3).
- Chlorinated volatile compounds other than TCE were not detected in any of the confirmation samples.

These results suggest that the excavation removed the accessible vadose zone soil contamination underlying the north yard. Soil exceedances along the edges of the excavation area are expected to be addressed by subsequent oxidant infiltration.

Infiltration System

Before replacing the excavated soil with clean fill, a subsurface oxidant infiltration system was installed (Figure 4). The system consists of:

- Four horizontal oxidant infiltration galleries running north to south across the yard at the water table surface (located 7-8 feet bgs).
- One oxidant infiltration gallery at 3-4 feet bgs at the western edge of the excavated area.
- Two oxidant infiltration trenches 7-8 feet bgs on the Machinists Inc. property to the west.
- Nine sumps (5-7 feet bgs) in areas behind the mix room building on the western property boundary.
- Three sumps installed on the northern edge of the mix room.
- Four sumps installed within the main building.

The infiltration trenches were constructed of 4-inch perforated PVC with non-perforated risers extending to the ground surface. The infiltration trenches were covered in clean pea-gravel and geotextile before the excavation was filled with clean soil. An underground injection control (UIC) well registration was submitted and approved by the UIC Coordinator in Ecology's Water Quality Program.

In Situ Contaminant Oxidation

Preliminary lab-scale soil oxidation tests were used to estimate the natural oxidation demand in native material in the saturated zone under the north yard. The cleanup action plan involves injecting more oxidant than the stoichiometric amount required to degrade the contaminants and natural oxidant demand in soil and groundwater, providing a long contact time for the oxidant to react with residual chlorothenes (i.e. TCE, DCE, and VC) in groundwater.

In October and November 2017, approximately 3000 gallons of 3% remediation grade KMnO4 were injected per event into the infiltration galleries and sumps. The remediation is designed to address the extent of groundwater contamination (see Figure 4). One month after the first injection, KMnO4 was recovered from MW-17 using low flow sampling, indicating the oxidant had successfully infiltrated to groundwater and created sustained oxidizing conditions beneath the infiltration gallery. A performance monitoring plan will consist of measuring oxidation-reduction potential in groundwater at MW-17, MW-13, MW-14, MW-12, MW-11 prior to, during, and after oxidant application.

NEXT STEPS

Further oxidant infiltration events are scheduled for January 2018 and spring 2018, as necessary. To assess the effectiveness of contaminant removal and compliance with MTCA toward a No Further Action Determination, groundwater cVOC concentrations will be monitored for the four quarters following the conclusion of the oxidant treatment period.

Attachments:

Figure 1.	Site Map
Figure 2.	Soil Sampling Locations and TCE Concentrations 2014-2016
Figure 3.	Excavation Area and Confirmation Sampling Locations
Figure 4.	In Situ Chemical Oxidation Trench and Sump Locations
Table 1.	Remedial Investigation and Action Timeline
Table 2.	Soil Sampling Results Summary
Table 3.	Groundwater Sampling Results Summary
Table 4.	Past Soil Sampling Results Summary
Table 5.	Past Groundwater Sampling Results Summary
Appendix A.	Analytical Lab Reports - November 2016-November 2017 Sampling Events

References:

Pacific Groundwater Group, 2007. *Final Remedial Action Plan, Scougal Rubber*. January 17, 2007.

Pacific Groundwater Group, 2009. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. January 22, 2009.

Pacific Groundwater Group, 2011. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. September 20, 2011.

Pacific Groundwater Group, 2012. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. December 3, 2012.

Pacific Groundwater Group, 2013. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. November 13, 2013.

Pacific Groundwater Group, 2014. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. December 15, 2014.

Pacific Groundwater Group, 2015. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. December 14, 2014.

Pacific Groundwater Group, 2016. *Scougal Rubber Final Remediation Plan*. November 2016.

Pacific Groundwater Group, 2016b. *Scougal Rubber Final Remediation Plan Addendum. Voluntary Cleanup Program. Terrestrial Ecological Evaluation Form.* December 2, 2016.

Retec, 2002. *Independent Remedial Action Report*. March 28, 2002. Retec Project Number SRC00-02417-400.

Washington Administrative Code (WAC), 2015. Chapter 173-160 WAC Minimum Standards for Construction and Maintenance of Wells.

cc: Rob Anderson, Scougal Rubber Corporation

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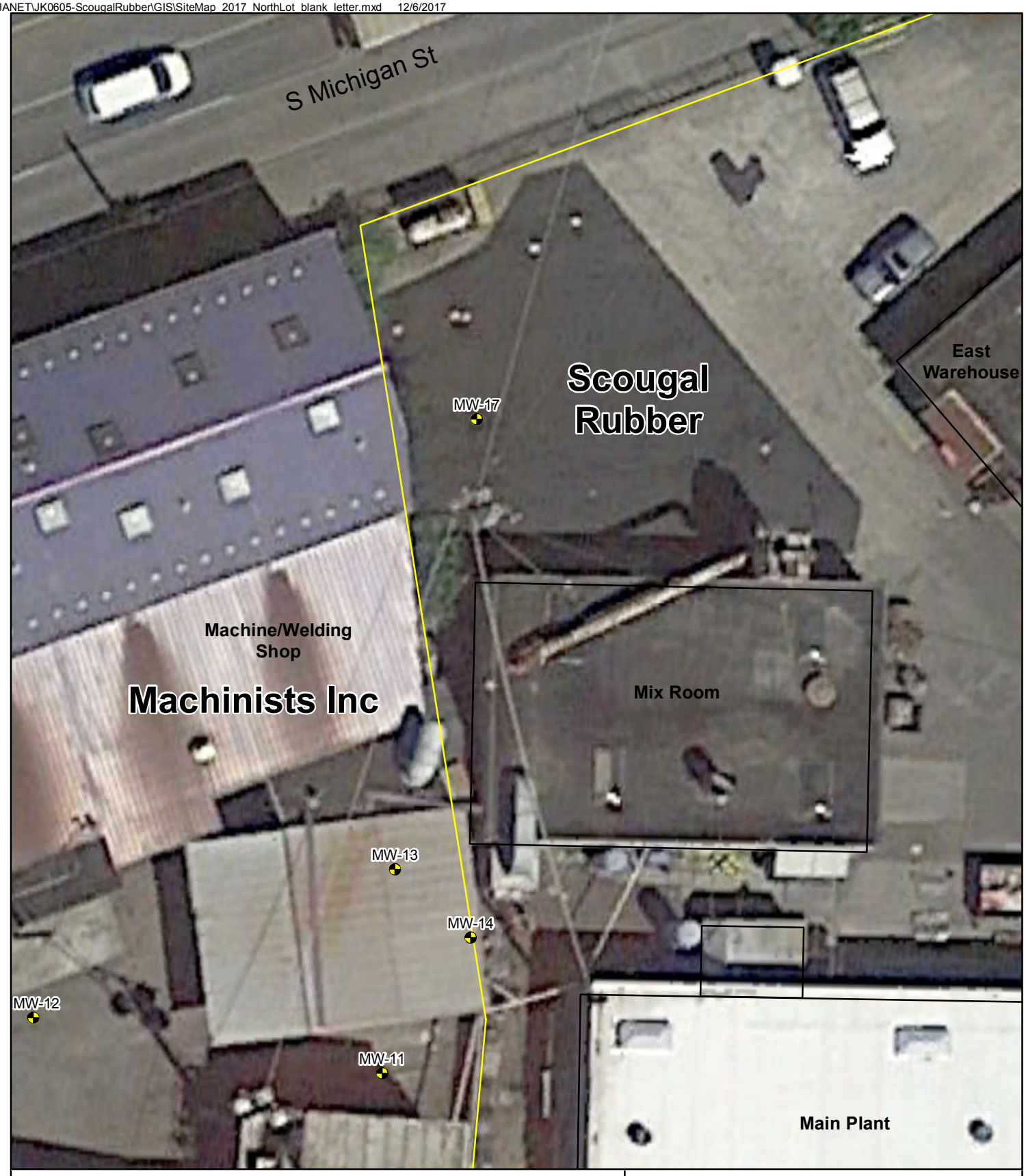

Building Outlines

Scougal Parcel

Monitoring Wells

N

0 Feet 20

Figure 1
Site Map

PgG

Figure 2.
Soil Sampling Locations and TCE Concentrations 2014-2016

PgG

S Michigan St

Former Eagles Building

Machine/Welding Shop

East Warehouse

Mix Room

Main Plant

SR-57 U 0.02
SR-62
SR-58
SR-67 U 0.02
0.099
U 0.02
SR-59
SR-68
SR-63
0.14
SR-60
0.27
0.11
SR-64
0.16
SR-69
SR-61
0.078
0.97
SR-65
0.08
SR-71
0.31
SR-66
SR-70 0.37
0.061
0.65
SR-32
SR-33
U 0.02
U 0.02
SR-34
SR-29
Mix Room
SR-30
SR-28
0.29
0.67
U 0.02
SR-35
U 0.03
SR-31
0.029
SR-27
U 0.03
0.23
SR-37
U 0.02
SR-36
SR-38
U 0.02
U 0.02

- Soil Sample
- Proposed Injection Area
- Building Outlines
- Scougal Parcel

3.9 Soil TCE Concentration (mg/kg)

0 Feet 30

N

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2017 Soil Confirmation Sample

Approximate Excavation Area 2017

Building Outlines

Scougal Parcel

Sewer/Drainage Mainlines

Side Sewers/Laterals

N

0 Feet 10

Figure 3.
Excavation Area and Confirmation Sampling Locations

PgG

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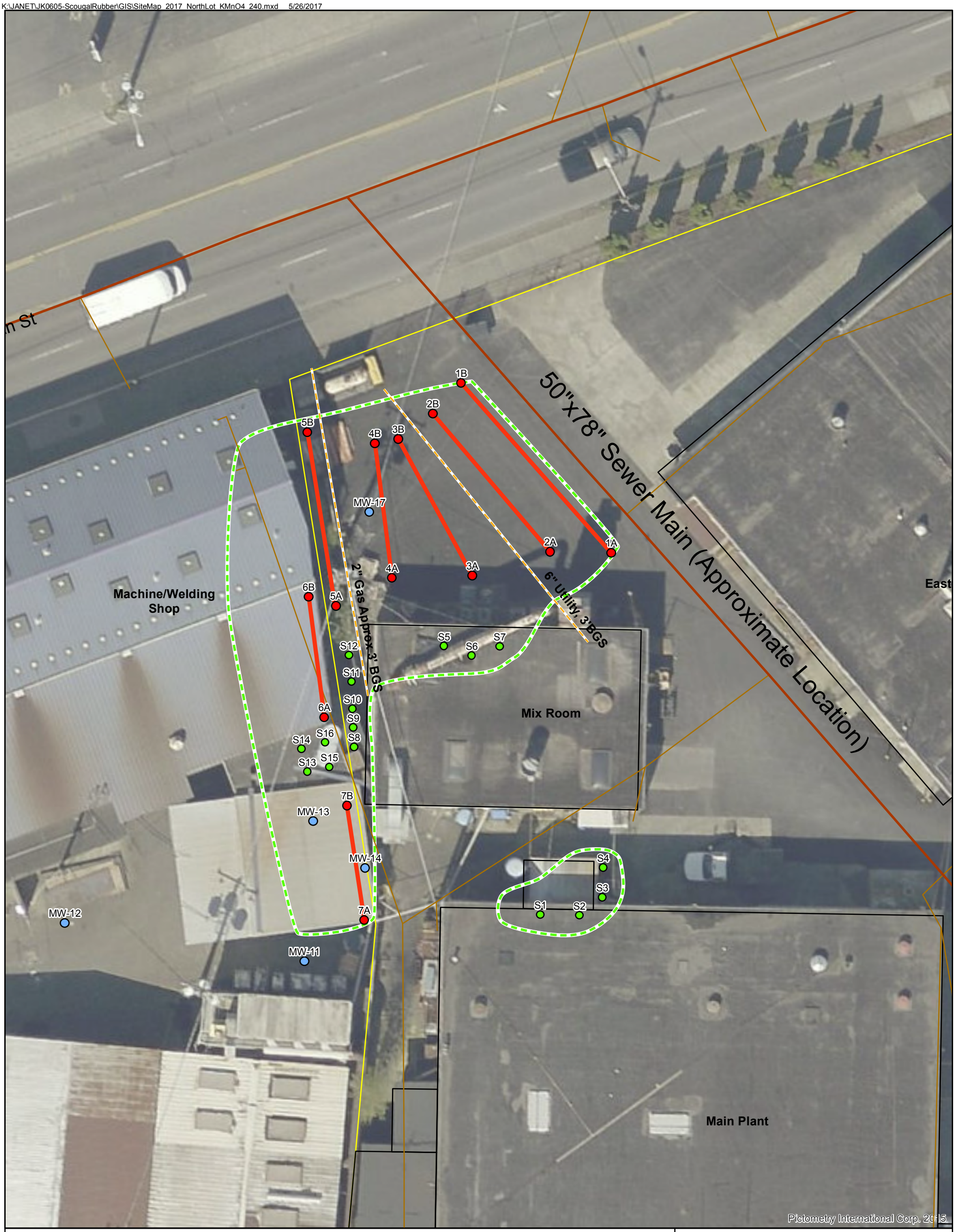

Approximate Sump Locations
Trench Injection Points
Approximate ISCO Pipe Locations
Approximate Active Oxidation Zone
Building Outlines
Scougal Parcel
2016 Groundwater Sample
Sewer/Drainage Mainlines
Side Sewers/Laterals
Other Utilities

N

0 Feet 20

Figure 4.
In Situ Chemical Oxidation Trench and Sump Locations

PgG

Table 1. Remedial Investigation and Action Timeline

Scougal Rubber Corporation, Seattle, Washington

Date	Location*	Event	Result	Reference
1980s	AW EW	Contamination identified on site	Contamination recognized; finding initiated a remedial investigation and cleanup process	Retec (2002)
1992	AW	UST removal, hotspot excavation	Bulk of contaminant mass removed; soil and groundwater impacts remained	Retec (2002)
1994-1999	AW	Air sparge and soil vapor extraction	Reduced contaminant mass; soil and groundwater remained above cleanup levels	Retec (2002)
2006	AW	Soil and groundwater sampling	Contamination in alleyway area delineated; provided a baseline for remedial action	PGG (2006)
2007	AW	Soil hotspot excavation and permanganate application	Reduced soil VOC concentrations to non-detect; groundwater concentrations reduced by approximately 90%	PGG (2009)
2008	AW	Confirmation groundwater sampling	Groundwater concentration rebound noted at MW-14 to above cleanup levels	PGG (2009)
2009-2012	AW	Ozone injection in two phases	Reduced groundwater VOC concentrations to near cleanup levels (ongoing)	PGG (2015)
2009	EW	Soil and groundwater sampling	Identified remaining soil hotspot; groundwater concentrations at EW and downgradient below cleanup levels	PGG (2011)
2010	EW	Permanganate application	Reduced soil VOC concentrations to non-detect	PGG (2011)
2010-2015	EW PB NY MI	Soil and groundwater sampling	Monitored VOC concentrations	PGG (2015)
2016	NY	Soil and groundwater sampling	Identified extent of remaining VOC concentrations in excess of MTCA Method A Groundwater Cleanup Levels	PGG (2017)
2017	NY	Soil excavation	Removed NY soils to the water table	Figure 3
2017	NY	Excavation confirmation soil sampling	Measured soil VOC concentrations at edge of excavated area	Table 2
2017	NY MI	ISCO via infiltration trenches and sumps	Created oxidizing conditions in saturated zone beneath excavated soils	Figure 4

* Location Abbreviations: AW Alleyway; EW East Warehouse; PB Paint Booth Area; NY North Yard; MI Machinists Inc. Property

Table 2. Soil Sampling Results Summary

Scougal Rubber Corporation, Seattle, Washington

December 2016 Soil Extent Investigation

Sample	Sample Date	Depth	PCE	TCE	DCE	VC
		feet bgs	mg/kg	mg/kg	mg/kg	mg/kg
SR-57	12/14/2016	0.1 - 7	U 0.025	U 0.02	U 0.05	U 0.05
SR-58	12/14/2016	0.1 - 7	U 0.025	**0.099**	U 0.05	U 0.05
SR-59	12/14/2016	0.1 - 7	U 0.025	**0.14**	U 0.05	U 0.05
SR-60	12/14/2016	0.1 - 7	U 0.025	**0.16**	U 0.05	U 0.05
SR-61	12/14/2016	0.1 - 7	U 0.025	**0.08**	U 0.05	U 0.05
SR-62	12/14/2016	0.1 - 7	U 0.025	U 0.02	U 0.05	U 0.05
SR-63	12/14/2016	0.1 - 7	U 0.025	**0.11**	U 0.05	U 0.05
SR-64	12/14/2016	0.1 - 7	U 0.025	**0.078**	U 0.05	U 0.05
SR-65	12/14/2016	0.1 - 7	U 0.025	**0.31**	U 0.05	U 0.05
SR-66	12/14/2016	0.1 - 7	U 0.025	**0.061**	U 0.05	U 0.05
SR-67	12/14/2016	0.1 - 7	U 0.025	U 0.02	U 0.05	U 0.05
SR-68	12/14/2016	0.1 - 7	U 0.025	**0.27**	U 0.05	U 0.05
SR-69	12/14/2016	0.1 - 7	U 0.025	**0.97**	0.055	U 0.05
SR-70	12/14/2016	0.1 - 7	U 0.025	**0.65**	0.062	U 0.05
SR-71	12/14/2016	0.1 - 7	U 0.025	**0.37**	U 0.05	U 0.05

April 2017 Soil Confirmation Samples

Sample	Sample Date	Depth	PCE	TCE	DCE	VC
		feet bgs	mg/kg	mg/kg	mg/kg	mg/kg
SB1	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB2	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB3	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB4	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB5	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB6	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB7	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB8	4/19/2017	3-4	U 0.025	**0.04**	U 0.05	U 0.05
SB9	4/19/2017	3-4	U 0.025	**0.12**	U 0.05	U 0.05
SB10	4/19/2017	3-4	U 0.025	**0.025**	U 0.05	U 0.05
SB11	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB12	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB13	4/19/2017	3-4	U 0.025	**0.039**	U 0.05	U 0.05
SB14	4/24/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB15	4/24/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB16	4/24/2017	3-4	U 0.025	**0.10**	U 0.05	U 0.05
SB17	4/24/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
MTCA Method A Cleanup Levels			0.05	0.02	8000	0.67

1. **Bold** indicates an exceedance of MTCA Method A Cleanup Levels.

2. U indicates a non-detect at the shown reporting limit.

3. The chlorinated VOCs trans-1,2-DCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, 1,2-DCA (EDC), chloroethane, and methylene chloride were not detected above reporting limits.

4. 2016 extent sampling are composite samples taken from 4 locations along a direct push core from 1 to 7 feet below ground surface. Samples were analyzed by Friedman and Bruya Inc. via method SW8260C.

5. 2017 soil confirmation samples were collected at the pit edges 3-4 feet below ground surface and analyzed by Friedman and Bruya Inc. via method SW8260C.

Table 3. Groundwater Sampling Results Summary

Scougal Rubber Corporation, Seattle, Washington

December 2016 Groundwater Sampling

Sample	Sample Date	PCE	TCE	DCE	VC
		ug/L	ug/L	ug/L	ug/L
MW-11	12/15/2016	U 1	**9.4**	U 1	U 0.2
MW-12	12/15/2016	U 1	U 1	U 1	U 0.2
MW-13	12/15/2016	U 1	**26**	U 1	U 0.2
MW-14	12/15/2016	U 1	**21**	U 1	**1**
MW-17	12/15/2016	U 1	**170**	33	U 0.2

August 2017 Groundwater Sampling

Sample	Sample Date	PCE	TCE	DCE	VC
		ug/L	ug/L	ug/L	ug/L
MW-11	8/30/2017	U 1	**9.5**	U 1	U 0.2
MW-12	8/30/2017	U 1	U 1	2.1	**1.3**
MW-13	8/30/2017	U 1	**9**	4.7	**1.3**
MW-14	8/30/2017	U 1	**13**	1.1	**2.8**
MW-17	8/30/2017	U 1	**69**	16	**0.57**

October 2017 Groundwater Sampling

Sample	Sample Date	PCE	TCE	DCE	VC
		ug/L	ug/L	ug/L	ug/L
MW-12	10/13/2017	U 1	U 1	2.5	**1.1**
MW-13	10/13/2017	U 1	**8.4**	6.4	**1.5**
MW-14	10/13/2017	U 1	**9.4**	1.6	**3.7**
MTCA Method A Cleanup Levels		5	5	80	0.2

1. **Bold** indicates an exceedance of MTCA Method A Cleanup Level.
2. U indicates a non-detect at the shown reporting limit.
3. The chlorinated VOCs trans-1,2-DCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, 1,2-DCA (EDC), chloroethane, and methylene chloride were not detected above reporting limits.
4. During the October 2017 sampling event, MW-11 was not accessible due to construction activities on the Machinists Property and MW-17 was within the treatment zone.

Table 4. Past Soil Sampling Results Summary

Scougal Rubber Corporation, Seattle, Washington

Sample	Date	Depth	PCE	TCE	cis-1,2-DCE	VC
		feet	mg/kg	mg/kg	mg/kg	mg/kg
Paint Booth Investigation						
SR-27	5/13/2013	5.1	U 0.025	U 0.03	U 0.05	U 0.05
SR-28	5/13/2013	5.5	U 0.025	U 0.03	U 0.05	U 0.05
SR-29	5/13/2013	2.5	U 0.025	0.29	U 0.05	U 0.05
SR-30	5/13/2013	2.7	0.05	0.67	U 0.05	U 0.05
SR-31	5/13/2013	5.1	0.081	0.23	U 0.05	U 0.05
2015 Extent Investigation						
SR-32	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-33	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-34	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-35	3/6/2015	5	U 0.025	0.029	U 0.05	U 0.05
SR-36	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-37	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-38	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-38	3/6/2015	7	U 0.025	U 0.02	U 0.05	U 0.05
MTCA Method A Cleanup Levels			0.05	0.03	8000	0.67

1. **Bold** indicates an exceedance of MTCA Method A Cleanup Level.

2. U indicates a non-detect at the shown reporting limit.

Table 5. Past Groundwater Sampling Results Summary

Scougal Rubber Corporation, Seattle, Washington

Sample	Date	PCE ug/L	TCE ug/L	cis-1,2-DCE ug/L	VC ug/L
Pre-Permanganate Concentrations					
MW-11	8/3/2006	0.3	9.4	8.7	U 0.2
MW-12	8/3/2006	U 1	0.2	0.4	0.7
MW-13	8/3/2006	U 1	46	11	2.6
MW-14	8/3/2006	4.1	110	26	33
MW-4	8/3/2006	0.2	3.3	U 1	U 0.2
OW-10	8/3/2006	U 1	9.6	18	3.5
Post-Permanganate Concentrations					
MW-11	6/10/2008	U 1	10	3.7	U 0.2
MW-12	6/10/2008	U 1	U 1	U 1	U 0.2
MW-14	6/10/2008	U 1	13	3.7	15
MW-11	9/5/2008	U 1	13	2.9	U 0.2
MW-12	9/5/2008	U 1	U 1	U 1	1
MW-14	9/5/2008	U 1	14	3.4	25
Ozone Install Reconnaissance Samples					
OP-10	6/29/2010	U 1	U 1	U 1	U 0.2
OP-11	6/29/2010	U 1	U 1	U 1	0.51
OP-9	6/29/2010	U 1	U 1	U 1	0.7
Ozone Operational Data					
MW-11	1/23/2009	U 1	12	U 1	U 0.2
MW-12	1/23/2009	U 1	U 1	U 1	U 0.2
MW-14	1/23/2009	1.6	41	1.3	13
MW-14	7/20/2009	0.8	19	5.8	9.2
MW-14	9/23/2009	U 0.2	4	1.7	1.9
MW-14	12/4/2009	0.3	3.7	1.3	0.5
MW-14	1/22/2010	0	1.4	1.8	1
MW-14	3/10/2010	0	2.3	2.3	5.7
MW-14	4/22/2010	U 1	1.6	U 1	U 0.2
MW-11	5/24/2010	U 1	U 1	U 1	U 0.2
MW-12	5/24/2010	U 1	U 1	U 1	U 0.2
MW-14	5/24/2010	U 1	3.1	U 1	1.5
MW-14	9/15/2010	U 1	U 1	U 1	U 0.2
MW-14	10/14/2010	U 1	0.89 J	U 1	1.1
MW-14	3/9/2011	0.39 J	1.6	0.12 J	0.08 J
MW-14	5/6/2011	0.18 J	1.9	0.34 J	0.15 J
MW-14	7/15/2011	U 0.11	0.49 J	U 1	0.1 UJ
MW-11	9/16/2011	U 0.5	2.6	U 1	U 0.2
MW-12	9/16/2011	U 0.5	U 0.5	U 1	0.89
MW-14	9/16/2011	U 0.5	2.8	U 1	0.69
MW-11	11/23/2011	U 0.12	2.5	U 1	U 0.2
MW-12	11/23/2011	U 0.12	0.22 J	U 1	0.32
MW-13	11/23/2011	0.24 J	8.4	3.3	0.6
MW-14	11/23/2011	0.3 J	4.2	1.5	2.1
MW-11	6/14/2013	U 1	6.8	U 1	U 0.2
MW-12	6/14/2013	U 1	U 1	U 1	U 0.2
MW-13	6/14/2013	U 1	11	U 1	0.32
MW-14	6/14/2013	U 1	5	U 1	0.44

Table 5. Past Groundwater Sampling Results Summary

Scougal Rubber Corporation, Seattle, Washington

Sample	Date	PCE	TCE	cis-1,2-DCE	VC
		ug/L	ug/L	ug/L	ug/L
MW-11	11/25/2014	U 1	U 1	U 1	U 0.2
MW-12	11/25/2014	U 1	U 1	U 1	U 0.2
MW-13	11/25/2014	U 1	6.2	2.8	0.29
MW-14	11/25/2014	U 1	3.9	U 1	U 0.2
East Warehouse Reconnaissance Samples					
SR-18	5/1/2009	U 1	U 1	U 1	U 0.2
SR-19	5/1/2009	U 1	U 1	U 1	U 0.2
SR-20	5/1/2009	U 1	U 1	U 1	U 0.2
SR-21	5/1/2009	U 1	1.1	U 1	U 0.2
SR-22	5/1/2009	U 1	1.1	U 1	U 0.2
SR-23	5/1/2009	U 1	U 1	1.4	U 0.2
Paint Booth Building Reconnaissance Samples					
SR-27	5/14/2013	U 1	2.7	U 1	U 0.2
SR-28	5/14/2013	U 1	5.9	U 1	U 0.2
SR-31	5/14/2013	U 1	3.5	U 1	U 0.2
2015 Extent Investigations					
SR-32	3/6/2015	U 1	6.7	U 1	U 0.2
SR-33	3/6/2015	U 1	1.9	1.9	U 0.2
SR-34	--	--	--	--	--
SR-35	3/6/2015	U 1	2.3	U 1	U 0.2
SR-36	3/6/2015	U 1	2.9	U 1	U 0.2
SR-37	3/6/2015	U 1	5.4	1.1	U 0.2
SR-38	3/6/2015	U 1	1.2	1.1	U 0.2
MTCA Method A Cleanup Levels		5	5	80	0.2

1. **Bold** indicates an exceedance of MTCA Method A Cleanup Level.

2. U indicates a non-detect at the shown reporting limit.

APPENDIX A

ANALYTICAL LAB REPORTS – NOVEMBER 2016-NOVEMBER 2017 SAMPLING EVENTS

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.

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December 22, 2016

Glen Wallace, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Mr Wallace:

Included are the results from the testing of material submitted on December 15, 2016 from the Scougal PO JK0605.01, F&BI 612243 project. There are 27 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 should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
PGG1222R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 15, 2016 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal PO JK0605.01, F&BI 612243 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Pacific Groundwater Group
612243 -01	SR-71
612243 -02	SR-70
612243 -03	SR-69
612243 -04	SR-68
612243 -05	SR-67
612243 -06	SR-66
612243 -07	SR-65
612243 -08	SR-64
612243 -09	SR-63
612243 -10	SR-62
612243 -11	SR-61
612243 -12	SR-60
612243 -13	SR-59
612243 -14	SR-58
612243 -15	SR-57
612243 -16	MW-14
612243 -17	MW-17
612243 -18	MW-13
612243 -19	MW-11
612243 -20	MW-12

The 8260C tetrachloroethene matrix spike and matrix spike duplicate relative percent difference did not pass the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results are due to matrix effect.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-16
Date Analyzed:	12/16/16	Data File:	121620.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	85	117
Toluene-d8	102	91	108
4-Bromofluorobenzene	98	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.0
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	21
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-17	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-17
Date Analyzed:	12/16/16	Data File:	121621.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	85	117
Toluene-d8	101	91	108
4-Bromofluorobenzene	98	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	1.2
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	33
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	160 ve
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-17	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-17 1/10
Date Analyzed:	12/19/16	Data File:	121915.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	101	91	108
4-Bromofluorobenzene	99	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<2
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	37
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	170
Tetrachloroethene	<10

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-18
Date Analyzed:	12/16/16	Data File:	121622.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	85	117
Toluene-d8	101	91	108
4-Bromofluorobenzene	97	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	26
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-19
Date Analyzed:	12/16/16	Data File:	121623.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	85	117
Toluene-d8	102	91	108
4-Bromofluorobenzene	99	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	9.4
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-20
Date Analyzed:	12/16/16	Data File:	121624.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	85	117
Toluene-d8	101	91	108
4-Bromofluorobenzene	95	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	06-2585 mb
Date Analyzed:	12/16/16	Data File:	121607.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	101	91	108
4-Bromofluorobenzene	99	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-71	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-01
Date Analyzed:	12/16/16	Data File:	121609.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.37
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-70	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-02
Date Analyzed:	12/16/16	Data File:	121610.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	93	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.062
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.65
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-69	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-03
Date Analyzed:	12/16/16	Data File:	121611.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	93	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.055
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.97
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-68	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-04
Date Analyzed:	12/16/16	Data File:	121612.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	93	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.27
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-67	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-05
Date Analyzed:	12/16/16	Data File:	121613.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	93	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-66	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-06
Date Analyzed:	12/16/16	Data File:	121614.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

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

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.061
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-65	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-07
Date Analyzed:	12/16/16	Data File:	121615.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.31
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-64	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-08
Date Analyzed:	12/16/16	Data File:	121616.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	91	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.078
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-63	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-09
Date Analyzed:	12/16/16	Data File:	121617.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	95	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.11
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-62	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-10
Date Analyzed:	12/16/16	Data File:	121618.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

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

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-61	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-11
Date Analyzed:	12/16/16	Data File:	121619.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

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

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.080
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-60	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-12
Date Analyzed:	12/16/16	Data File:	121620.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.16
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-59	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-13
Date Analyzed:	12/16/16	Data File:	121621.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.14
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-58	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-14
Date Analyzed:	12/16/16	Data File:	121622.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	92	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.099
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SR-57	Client:	Pacific Groundwater Group
Date Received:	12/15/16	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	612243-15
Date Analyzed:	12/16/16	Data File:	121623.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal PO JK0605.01, F&BI 612243
Date Extracted:	12/16/16	Lab ID:	06-2586 mb
Date Analyzed:	12/16/16	Data File:	121608.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	93	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 12/22/16
Date Received: 12/15/16
Project: Scougal PO JK0605.01, F&BI 612243

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

Laboratory Code: 612250-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	<0.2	111	61-139
Chloroethane	ug/L (ppb)	50	<1	110	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	101	71-123
Methylene chloride	ug/L (ppb)	50	<5	106	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	109	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	109	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	108	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	102	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	110	75-121
Trichloroethene	ug/L (ppb)	50	<1	105	75-109
Tetrachloroethene	ug/L (ppb)	50	<1	100	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	112	113	70-119	1
Chloroethane	ug/L (ppb)	50	111	111	66-149	0
1,1-Dichloroethene	ug/L (ppb)	50	102	101	75-119	1
Methylene chloride	ug/L (ppb)	50	104	103	63-132	1
trans-1,2-Dichloroethene	ug/L (ppb)	50	109	109	76-118	0
1,1-Dichloroethane	ug/L (ppb)	50	109	109	80-116	0
cis-1,2-Dichloroethene	ug/L (ppb)	50	109	108	80-112	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	99	98	79-109	1
1,1,1-Trichloroethane	ug/L (ppb)	50	111	108	80-116	3
Trichloroethene	ug/L (ppb)	50	102	102	77-108	0
Tetrachloroethene	ug/L (ppb)	50	101	103	78-109	2

Date of Report: 12/22/16
Date Received: 12/15/16
Project: Scougal PO JK0605.01, F&BI 612243

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

Laboratory Code: 612247-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	37	43	10-138	15
Chloroethane	mg/kg (ppm)	2.5	<0.5	58	61	10-176	5
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	54	53	10-160	2
Methylene chloride	mg/kg (ppm)	2.5	1.6	66 b	73 b	10-156	10 b
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	65	64	14-137	2
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	66	67	19-140	2
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	75	75	25-135	0
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	71	73	12-160	3
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	66	61	10-156	8
Trichloroethene	mg/kg (ppm)	2.5	<0.02	63	59	21-139	7
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	44	35	20-133	23 vo

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	86	22-139
Chloroethane	mg/kg (ppm)	2.5	94	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	92	47-128
Methylene chloride	mg/kg (ppm)	2.5	103	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	99	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	99	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	106	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	99	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	102	62-131
Trichloroethene	mg/kg (ppm)	2.5	101	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	101	72-114

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.

612243

SAMPLE CHAIN OF CUSTODY

MG 12/15/16

VW4/VS3

Send Report To: Glen Wallace
Company: Pacific Groundwater Group
Address: 2377 Eastlake Ave. E
City, State, ZIP: Seattle, WA 98102
Phone #: 206.329.0141 Fax #: 206.329.6988

SAMPLERS (signature): Koshlan Mayer Blackwell
PROJECT NAME: Scougal
PO #: JK0605.01
REMARKS: Method Name on all labels should be VOC 5035, an error occurred during autopopulation

Page # 1 of 2

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

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

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOC's by 8260	SVOC's by 8270	RCRA-8 Metals	VOC 5035 (CVOCs Only)	CVOCs Only	Notes
SR-71			01	12/14/16	12:45	Soil	4							X		chloroethanes
SR-70			02	12/14/16	12:30	Soil	4							X		
SR-69			03	12/14/16	12:15	Soil	4							X		
SR-68			04	12/14/16	12:00	Soil	4							X		
SR-67			05	12/14/16	11:50	Soil	4							X		
SR-66			06	12/14/16	11:30	Soil	4							X		
SR-65			07	12/14/16	11:00	Soil	4							X		
SR-64			08	12/14/16	10:50	Soil	4							X		
SR-63			09	12/14/16	10:40	Soil	4							X		
SR-62			10	12/14/16	10:20	Soil	4							X		
SR-61			11	12/14/16	9:50	Soil	4							X		
SR-60			12	12/14/16	9:40	Soil	4							X		
SR-59			13	12/14/16	9:20	Soil	4							X		

Note for both VOC 5035 and VOC 8260 only CVOCs need to be analyzed. (glen@pgrp.com)

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:	Koshlan Mayer Blackwell	Koshlan Mayer Blackwell	PGG	12/15/16	5:56PM
Received by:		Jon Shimazu	FB&T	12/15/16	5:56PM
Relinquished by:					
Received by:					

Samples received at 2 °C

FORMS\COC\SESGEMSR1.DOC (Revision 1)

612243

SAMPLE CHAIN OF CUSTODY

ME 12/13/16

UW4/VS3

Page # 2 of 2

Send Report To: Glen Wallace
Company: Pacific Groundwater Group
Address: 2377 Eastlake Ave E
City, State, ZIP: Seattle, WA 98102
Phone # 206.329.0141 Fax # 206-329-6968

SAMPLERS (signature): Kathleen Mayer Blackwell
PROJECT NAME/NO.: Scoggal
PO #: JKO605-01
REMARKS: The method name on all labels should be VOC 5035; however the label printing shows the wrong #

TURNAROUND TIME
- Standard (2 Weeks)
- RUSH
- Rush charges authorized by:

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

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	cVOCs only VOC's by 8260	SVOC's by 8270	RCRA-8 Metals	cVOCs only VOC 5035		Notes
SR-58			14 A-D	12/14/16	9:05	Soil	4							X		
SR-57			15	12/14/16	8:50	Soil	4							X		
MW-14			16	12/15/16	16:30	GW	4				X					
MW-17			17	12/15/16	15:00	GW	4				X					
MW-13			18	12/15/16	13:45	GW	4				X					
MW-11			19	12/15/16	13:00	GW	4				X					
MW-12			20	12/15/16	10:20	GW	4				X					

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:	Kathleen Mayer Blackwell	Kathleen Mayer Blackwell	PGG	12/15/16	5:56 PM
Received by:	Jon Shimazu	Jon Shimazu	FB&T	12/15/16	1
Relinquished by:					
Received by:				Samples received at 2 °C	

FORMS\COC\SESGEMSR1.DOC (Revision 1)

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 28, 2017

Glen Wallace, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Mr Wallace:

Included are the results from the testing of material submitted on April 20, 2017 from the Scougal, PO JK1504.07, F&BI 704335 project. There are 17 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 should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
PGG0428R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 20, 2017 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal, PO JK1504.07, F&BI 704335 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Pacific Groundwater Group
704335 -01	SB1
704335 -02	SB2
704335 -03	SB3
704335 -04	SB4
704335 -05	SB5
704335 -06	SB6
704335 -07	SB7
704335 -08	SB8
704335 -09	SB9
704335 -10	SB10
704335 -11	SB11
704335 -12	SB12
704335 -13	SB13

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB1	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-01
Date Analyzed:	04/25/17	Data File:	042515.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB2	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-02
Date Analyzed:	04/25/17	Data File:	042516.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB3	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-03
Date Analyzed:	04/25/17	Data File:	042517.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB4	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-04
Date Analyzed:	04/25/17	Data File:	042525.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB5	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-05
Date Analyzed:	04/25/17	Data File:	042526.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB6	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-06
Date Analyzed:	04/25/17	Data File:	042527.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

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

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB7	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-07
Date Analyzed:	04/25/17	Data File:	042528.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB8	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-08
Date Analyzed:	04/25/17	Data File:	042529.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.038
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB9	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-09
Date Analyzed:	04/25/17	Data File:	042530.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.12
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB10	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-10
Date Analyzed:	04/25/17	Data File:	042531.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.025
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB11	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-11
Date Analyzed:	04/25/17	Data File:	042532.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB12	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-12
Date Analyzed:	04/25/17	Data File:	042533.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

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

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.020
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB13	Client:	Pacific Groundwater Group
Date Received:	04/20/17	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	704335-13
Date Analyzed:	04/25/17	Data File:	042534.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.039
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal, PO JK1504.07, F&BI 704335
Date Extracted:	04/25/17	Lab ID:	07-864 mb
Date Analyzed:	04/25/17	Data File:	042514.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 04/28/17
Date Received: 04/20/17
Project: Scougal, PO JK1504.07, F&BI 704335

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

Laboratory Code: 704337-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	61	62	10-138	2
Chloroethane	mg/kg (ppm)	2.5	<0.5	73	76	10-176	4
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	81	86	10-160	6
Methylene chloride	mg/kg (ppm)	2.5	<0.5	86	91	10-156	6
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	90	97	14-137	7
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	95	99	19-140	4
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	96	101	25-135	5
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	92	95	12-160	3
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	94	98	10-156	4
Trichloroethene	mg/kg (ppm)	2.5	<0.02	90	91	21-139	1
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	93	94	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	83	22-139
Chloroethane	mg/kg (ppm)	2.5	87	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	103	47-128
Methylene chloride	mg/kg (ppm)	2.5	97	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	109	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	108	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	107	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	102	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	107	62-131
Trichloroethene	mg/kg (ppm)	2.5	100	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	102	72-114

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.

704335

SAMPLE CHAIN OF CUSTODY

ME 04/20/17 V82

Page # 1 of 2

Report To Glen Wallace

Company Pacific Groundwater Group

Address 2377 Eastlake Avenue East

City, State, ZIP Seattle, WA 98102

Phone 206.329.0141 Email glen@pgwg.com kashlan@pgwg.com

SAMPLERS (*signature*): Kashlan Mayer Blackwell

PROJECT NAME: Seagal

PO #: JK1504.07

REMARKS

INVOICE TO

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

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	8260 CVOCs only				Notes
SB1	01 A-D	4/19/17	13:00	Soil	4								✓				
SB2	02	4/19/17	13:30		4								✓				
SB3	03	4/19/17	13:45		4								✓				
SB4	04	4/19/17	13:50		4								✓				
SB5	05	4/19/17	14:00		4								✓				
SB6	06	4/19/17	14:05		4								✓				
SB7	07	4/19/17	14:10		4								✓				
SB8	08	4/19/17	14:15		4								✓				
SB9	09	4/19/17	14:20		4								✓				
SB10	10	4/19/17	14:30		4								✓				

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Kashlan Mayer Blackwell	Kashlan Mayer Blackwell	Pacific Groundwater	4/20/17	3:05 PM
Received by: Nhan Phan	Nhan Phan	FEBT	4/20/17	3:05 pm
Relinquished by:				
Received by:				

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

704335

SAMPLE CHAIN OF CUSTODY

ME 04/20/17 VS2

Page # 2 of 2

Report To Glen Wallace

Company Pacific Groundwater Group

Address 2377 Eastlake Avenue East

City, State, ZIP Seattle, WA 98102

Phone 206-329-0141 Email glen@pgwg.com

SAMPLERS (signature) Kathleen Mayer Blackwell

PROJECT NAME Seougal

PO # JK1504.07

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ 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 Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	8260 cVOCs only				Notes
SB 11	11A-9	4/19/17	14:40	Soil	4								✓				
SB12	12	4/19/17	14:50	↓	4								✓				
SB13	13	4/19/17	14:55	↓	4								✓				
													Samples received at 3 °C				

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Kathleen Mayer Blackwell	Kathleen Mayer Blackwell	Pacific Groundwater	4/20/17	3:05 PM
Received by:	Nhan Pham	FEBT	4/20/17	3:05
Relinquished by:				
Received by:				

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

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

May 2, 2017

Glen Wallace, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Mr Wallace:

Included are the results from the testing of material submitted on April 24, 2017 from the Scougal Sample 2nd Set, F&BI 704383 project. There are 9 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 should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
PGG0502R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 24, 2017 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal Sample 2nd Set, F&BI 704383 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Pacific Groundwater Group
704383 -01	SB14
704383 -02	SB15
704383 -03	SB16-Clay
704383 -04	SB17

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB14	Client:	Pacific Groundwater Group
Date Received:	04/24/17	Project:	Scougal Sample 2nd Set, F&BI 704383
Date Extracted:	04/25/17	Lab ID:	704383-01
Date Analyzed:	04/25/17	Data File:	042535.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

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

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB15	Client:	Pacific Groundwater Group
Date Received:	04/24/17	Project:	Scougal Sample 2nd Set, F&BI 704383
Date Extracted:	04/25/17	Lab ID:	704383-02
Date Analyzed:	04/25/17	Data File:	042536.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

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

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB16-Clay	Client:	Pacific Groundwater Group
Date Received:	04/24/17	Project:	Scougal Sample 2nd Set, F&BI 704383
Date Extracted:	04/25/17	Lab ID:	704383-03
Date Analyzed:	04/25/17	Data File:	042537.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.10
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB17	Client:	Pacific Groundwater Group
Date Received:	04/24/17	Project:	Scougal Sample 2nd Set, F&BI 704383
Date Extracted:	04/25/17	Lab ID:	704383-04
Date Analyzed:	04/25/17	Data File:	042538.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

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

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Sample 2nd Set, F&BI 704383
Date Extracted:	04/25/17	Lab ID:	07-864 mb
Date Analyzed:	04/25/17	Data File:	042514.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 05/02/17
Date Received: 04/24/17
Project: Scougal Sample 2nd Set, F&BI 704383

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

Laboratory Code: 704337-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	61	62	10-138	2
Chloroethane	mg/kg (ppm)	2.5	<0.5	73	76	10-176	4
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	81	86	10-160	6
Methylene chloride	mg/kg (ppm)	2.5	<0.5	86	91	10-156	6
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	90	97	14-137	7
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	95	99	19-140	4
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	96	101	25-135	5
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	92	95	12-160	3
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	94	98	10-156	4
Trichloroethene	mg/kg (ppm)	2.5	<0.02	90	91	21-139	1
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	93	94	20-133	1

Date of Report: 05/02/17
Date Received: 04/24/17
Project: Scougal Sample 2nd Set, F&BI 704383

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	83	22-139
Chloroethane	mg/kg (ppm)	2.5	87	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	103	47-128
Methylene chloride	mg/kg (ppm)	2.5	97	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	109	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	108	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	107	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	102	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	107	62-131
Trichloroethene	mg/kg (ppm)	2.5	100	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	102	72-114

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.

704383

SAMPLE CHAIN OF CUSTODY

ME 04/24/17 VSI

Page # _____ of _____

Report To Glen Wallace

Company Pacific Groundwater Group

Address 2377 EASTLAKE Ave E

City, State, ZIP Seattle, WA 98102

Phone _____ Email glen@pgwg.com
kashlan@pgwg.com

SAMPLERS (signature) Kashlan Mgr Blackwell

PROJECT NAME Scougal (2nd Set) Sample

PO # see previous sample set.

REMARKS This is a second set of samples, samples were delivered previously 4/20/17

INVOICE TO

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

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	cVocs only 8260				Notes
SB14	01 A-D	4/24/17	13:15	4 soil	4								✓				
SB15	02	4/24/17	13:30	4 soil	4								✓				
SB16-Clay	03	4/24/17	13:40	4 soil	4								✓				
SB17	04	4/24/17	14:00	4 soil	4								✓				

Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Kashlan Mgr Blackwell	Kashlan Mayer Blackwell	Pacific Groundwater	4/24/17	16:20
Received by:	Matt Laughren	FB Env	4/24/17	1620
Relinquished by:				
Received by:				

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
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3012 16th Avenue West
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(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 14, 2017

Koshlan Mayer-Blackwell, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Ms Mayer-Blackwell:

Included are the results from the testing of material submitted on August 31, 2017 from the Scougal Pre-Treatment PO JK6050.04, F&BI 708577 project. There are 25 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 should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
PGG0914R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 31, 2017 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal Pre-Treatment PO JK6050.04, F&BI 708577 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Pacific Groundwater Group
708577 -01	MW-14
708577 -02	MW-17
708577 -03	MW-11
708577 -04	MW-12
708577 -05	MW-13

Samples were sent to Fremont Analytical for nitrate, sulfate, and chloride analysis. Review of the enclosed report indicates that all quality assurance was acceptable.

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-01
Date Analyzed:	09/07/17	Data File:	708577-01.053
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	1.96
Cadmium	<1
Chromium	5.15
Iron	51.8
Lead	<1
Manganese	39.6
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-17	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-02
Date Analyzed:	09/07/17	Data File:	708577-02.054
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Iron	55.7
Lead	<1
Manganese	6.65
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-03
Date Analyzed:	09/07/17	Data File:	708577-03.057
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	1.37
Cadmium	<1
Chromium	<1
Iron	129
Lead	<1
Manganese	13.6
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-04
Date Analyzed:	09/07/17	Data File:	708577-04.058
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	8.04
Barium	6.33
Cadmium	<1
Chromium	<1
Iron	15,400 ve
Lead	<1
Manganese	784
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-04 x10
Date Analyzed:	09/07/17	Data File:	708577-04 x10.096
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	19,500

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-05
Date Analyzed:	09/07/17	Data File:	708577-05.059
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	1.37
Cadmium	<1
Chromium	<1
Iron	7,460
Lead	<1
Manganese	114
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	I7-482 mb
Date Analyzed:	09/07/17	Data File:	I7-482 mb.051
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Iron	<50
Lead	<1
Manganese	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-01
Date Analyzed:	09/07/17	Data File:	708577-01.066
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	3.09
Cadmium	<1
Chromium	5.16
Iron	385
Lead	<1
Manganese	157
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-17	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-02
Date Analyzed:	09/07/17	Data File:	708577-02.067
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Iron	55.4
Lead	<1
Manganese	6.40
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-03
Date Analyzed:	09/07/17	Data File:	708577-03.070
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	1.42
Cadmium	<1
Chromium	<1
Iron	156
Lead	<1
Manganese	25.1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-04
Date Analyzed:	09/07/17	Data File:	708577-04.071
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	8.03
Barium	6.06
Cadmium	<1
Chromium	<1
Iron	15,800 ve
Lead	<1
Manganese	774
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-04 x10
Date Analyzed:	09/07/17	Data File:	708577-04 x10.097
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	20,100

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	708577-05
Date Analyzed:	09/07/17	Data File:	708577-05.072
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	1.54
Cadmium	<1
Chromium	<1
Iron	9,240
Lead	<1
Manganese	135
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/07/17	Lab ID:	I7-483 mb
Date Analyzed:	09/07/17	Data File:	I7-483 mb.064
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Iron	<50
Lead	<1
Manganese	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/01/17	Lab ID:	708577-01
Date Analyzed:	09/01/17	Data File:	090140.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	100	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.8
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	13
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-17	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/01/17	Lab ID:	708577-02
Date Analyzed:	09/01/17	Data File:	090141.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	85	117
Toluene-d8	97	91	108
4-Bromofluorobenzene	101	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.57
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	16
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	69
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/01/17	Lab ID:	708577-03
Date Analyzed:	09/01/17	Data File:	090142.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	85	117
Toluene-d8	97	91	108
4-Bromofluorobenzene	100	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	9.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/01/17	Lab ID:	708577-04
Date Analyzed:	09/01/17	Data File:	090143.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	100	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.3
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	2.1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	08/31/17	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/01/17	Lab ID:	708577-05
Date Analyzed:	09/01/17	Data File:	090144.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	85	117
Toluene-d8	96	91	108
4-Bromofluorobenzene	99	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.3
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	4.7
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	9.0
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Pre-Treatment PO JK6050.04
Date Extracted:	09/01/17	Lab ID:	07-1896 mb
Date Analyzed:	09/01/17	Data File:	090107.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	103	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 09/14/17
Date Received: 08/31/17
Project: Scougal Pre-Treatment PO JK6050.04, F&BI 708577

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

Laboratory Code: 708577-02 (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	108	110	70-130	2
Barium	ug/L (ppb)	50	<1	109	112	70-130	3
Cadmium	ug/L (ppb)	5	<1	108	111	70-130	3
Chromium	ug/L (ppb)	20	<1	106	110	70-130	4
Iron	ug/L (ppb)	100	55.7	110	120	70-130	9
Lead	ug/L (ppb)	10	<1	103	105	70-130	2
Manganese	ug/L (ppb)	20	6.65	108	112	70-130	4
Mercury	ug/L (ppb)	5	<1	112	114	70-130	2
Selenium	ug/L (ppb)	5	<1	108	117	70-130	8
Silver	ug/L (ppb)	5	<1	105	109	70-130	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	101	85-115
Barium	ug/L (ppb)	50	108	85-115
Cadmium	ug/L (ppb)	5	108	85-115
Chromium	ug/L (ppb)	20	102	85-115
Iron	ug/L (ppb)	100	104	85-115
Lead	ug/L (ppb)	10	105	85-115
Manganese	ug/L (ppb)	20	102	85-115
Mercury	ug/L (ppb)	5	111	85-115
Selenium	ug/L (ppb)	5	106	85-115
Silver	ug/L (ppb)	5	103	85-115

Date of Report: 09/14/17
Date Received: 08/31/17
Project: Scougal Pre-Treatment PO JK6050.04, F&BI 708577

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

Laboratory Code: 708577-02 (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	102	105	70-130	3
Barium	ug/L (ppb)	50	<1	104	107	70-130	3
Cadmium	ug/L (ppb)	5	<1	105	107	70-130	2
Chromium	ug/L (ppb)	20	<1	100	105	70-130	5
Iron	ug/L (ppb)	100	55.4	99	107	70-130	8
Lead	ug/L (ppb)	10	<1	98	102	70-130	4
Manganese	ug/L (ppb)	20	6.40	100	105	70-130	5
Mercury	ug/L (ppb)	5	<1	105	113	70-130	7
Selenium	ug/L (ppb)	5	<1	109	111	70-130	2
Silver	ug/L (ppb)	5	<1	100	99	70-130	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	98	85-115
Barium	ug/L (ppb)	50	103	85-115
Cadmium	ug/L (ppb)	5	104	85-115
Chromium	ug/L (ppb)	20	99	85-115
Iron	ug/L (ppb)	100	98	85-115
Lead	ug/L (ppb)	10	102	85-115
Manganese	ug/L (ppb)	20	98	85-115
Mercury	ug/L (ppb)	5	108	85-115
Selenium	ug/L (ppb)	5	100	85-115
Silver	ug/L (ppb)	5	98	85-115

Date of Report: 09/14/17
Date Received: 08/31/17
Project: Scougal Pre-Treatment PO JK6050.04, F&BI 708577

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

Laboratory Code: 708577-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	0.57	104	61-139
Chloroethane	ug/L (ppb)	50	<1	119	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	108	71-123
Methylene chloride	ug/L (ppb)	50	<5	104	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	95	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	93	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	16	94 b	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	90	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	97	75-121
Trichloroethene	ug/L (ppb)	50	69	96 b	73-122
Tetrachloroethene	ug/L (ppb)	50	<1	90	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	94	97	50-154	3
Chloroethane	ug/L (ppb)	50	96	97	58-146	1
1,1-Dichloroethene	ug/L (ppb)	50	93	96	67-136	3
Methylene chloride	ug/L (ppb)	50	96	101	39-148	5
trans-1,2-Dichloroethene	ug/L (ppb)	50	92	97	68-128	5
1,1-Dichloroethane	ug/L (ppb)	50	92	102	79-121	10
cis-1,2-Dichloroethene	ug/L (ppb)	50	94	100	80-123	6
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	91	96	73-132	5
1,1,1-Trichloroethane	ug/L (ppb)	50	99	102	83-130	3
Trichloroethene	ug/L (ppb)	50	101	104	80-120	3
Tetrachloroethene	ug/L (ppb)	50	87	90	76-121	3

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: 708577
Work Order Number: 1708400

September 08, 2017

Attention Michael Erdahl:

Fremont Analytical, Inc. received 5 sample(s) on 8/31/2017 for the analyses presented in the following report.

Ion Chromatography by EPA Method 300.0

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
Laboratory Director

Fremont Analytical

Date: *09/08/2017*

CLIENT: Friedman & Bruya
Project: 708577
Work Order: 1708400

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1708400-001	MW-14	08/30/2017 3:30 PM	08/31/2017 4:16 PM
1708400-002	MW-17	08/30/2017 2:30 PM	08/31/2017 4:16 PM
1708400-003	MW-11	08/30/2017 11:00 AM	08/31/2017 4:16 PM
1708400-004	MW-12	08/30/2017 10:00 AM	08/31/2017 4:16 PM
1708400-005	MW-13	08/30/2017 12:15 PM	08/31/2017 4:16 PM

CLIENT: Friedman & Bruya
Project: 708577

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:

* - 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
Project: 708577

Lab ID: 1708400-001 **Collection Date:** 8/30/2017 3:30:00 PM
Client Sample ID: MW-14 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ion Chromatography by EPA Method 300.0				Batch ID: R38475		Analyst: KT
Chloride	4.72	0.500	D	mg/L	5	9/1/2017 10:03:00 AM
Nitrogen, Nitrate	0.495	0.500	JD	mg/L	5	9/1/2017 10:03:00 AM
Sulfate	11.9	1.50	D	mg/L	5	9/1/2017 10:03:00 AM

Lab ID: 1708400-002 **Collection Date:** 8/30/2017 2:30:00 PM
Client Sample ID: MW-17 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ion Chromatography by EPA Method 300.0				Batch ID: R38475		Analyst: KT
Chloride	3.27	0.200	D	mg/L	2	9/1/2017 12:51:00 PM
Nitrogen, Nitrate	1.04	0.100		mg/L	1	9/1/2017 10:24:00 AM
Sulfate	14.5	0.300		mg/L	1	9/1/2017 10:24:00 AM

Lab ID: 1708400-003 **Collection Date:** 8/30/2017 11:00:00 AM
Client Sample ID: MW-11 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ion Chromatography by EPA Method 300.0				Batch ID: R38475		Analyst: KT
Chloride	2.51	0.500	D	mg/L	5	9/1/2017 9:20:00 AM
Nitrogen, Nitrate	3.60	0.500	D	mg/L	5	9/1/2017 9:20:00 AM
Sulfate	15.7	1.50	D	mg/L	5	9/1/2017 9:20:00 AM

CLIENT: Friedman & Bruya
Project: 708577

Lab ID: 1708400-004
Client Sample ID: MW-12
Collection Date: 8/30/2017 10:00:00 AM
Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ion Chromatography by EPA Method 300.0				Batch ID: R38475		Analyst: KT
Chloride	8.20	0.500	D	mg/L	5	9/1/2017 8:17:00 AM
Nitrogen, Nitrate	ND	0.100		mg/L	1	9/1/2017 1:12:00 PM
Sulfate	8.10	0.300		mg/L	1	9/1/2017 1:12:00 PM

Lab ID: 1708400-005
Client Sample ID: MW-13
Collection Date: 8/30/2017 12:15:00 PM
Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ion Chromatography by EPA Method 300.0				Batch ID: R38475		Analyst: KT
Chloride	1.67	0.100		mg/L	1	9/1/2017 9:41:00 AM
Nitrogen, Nitrate	0.120	0.100		mg/L	1	9/1/2017 9:41:00 AM
Sulfate	5.93	0.300		mg/L	1	9/1/2017 9:41:00 AM

Fremont Analytical

Work Order: 1708400
CLIENT: Friedman & Bruya
Project: 708577

QC
Ion Chromatogr

Sample ID	MB-R38475	SampType:	MBLK			Units:	mg/L	Prep Date:	9/1/2017		
Client ID:	MBLKW	Batch ID:	R38475					Analysis Date:	9/1/2017		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val			
Chloride	ND	0.100									
Nitrogen, Nitrate	ND	0.100									
Sulfate	ND	0.300									

Sample ID	LCS-R38475	SampType:	LCS			Units:	mg/L	Prep Date:	9/1/2017		
Client ID:	LCSW	Batch ID:	R38475					Analysis Date:	9/1/2017		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val			
Chloride	0.699	0.100	0.7500	0	93.2	90	110				
Nitrogen, Nitrate	0.699	0.100	0.7500	0	93.2	90	110				
Sulfate	3.64	0.300	3.750	0	97.0	90	110				

Sample ID	1708400-004ADUP	SampType:	DUP			Units:	mg/L	Prep Date:	9/1/2017		
Client ID:	MW-12	Batch ID:	R38475					Analysis Date:	9/1/2017		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val			
Chloride	9.17	0.100						9.179			
Nitrogen, Nitrate	ND	0.100						0			
Sulfate	8.08	0.300						8.098			

Sample ID	1708400-004AMS	SampType:	MS			Units:	mg/L	Prep Date:	9/1/2017		
Client ID:	MW-12	Batch ID:	R38475					Analysis Date:	9/1/2017		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val			
Chloride	9.98	0.100	0.7500	9.179	107	80	120				
Nitrogen, Nitrate	0.727	0.100	0.7500	0	96.9	80	120				
Sulfate	11.8	0.300	3.750	8.098	98.5	80	120				

Fremont Analytical

Work Order: 1708400
CLIENT: Friedman & Bruya
Project: 708577

QC
Ion Chromatogr

Sample ID 1708400-005ADUP	SampType: DUP				Units: mg/L		Prep Date: 9/1/2017	
Client ID: MW-13	Batch ID: R38475						Analysis Date: 9/1/2017	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val
Chloride	1.69	0.100						1.669
Nitrogen, Nitrate	0.121	0.100						0.1200
Sulfate	6.04	0.300						5.927

Sample ID 1708400-005AMS	SampType: MS				Units: mg/L		Prep Date: 9/1/2017	
Client ID: MW-13	Batch ID: R38475						Analysis Date: 9/1/2017	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val
Chloride	2.49	0.100	0.7500	1.669	109	80	120	
Nitrogen, Nitrate	0.809	0.100	0.7500	0.1200	91.9	80	120	
Sulfate	9.93	0.300	3.750	5.927	107	80	120	

Sample ID 1708400-005AMSD	SampType: MSD				Units: mg/L		Prep Date: 9/1/2017	
Client ID: MW-13	Batch ID: R38475						Analysis Date: 9/1/2017	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val
Chloride	2.48	0.100	0.7500	1.669	109	80	120	2.490
Nitrogen, Nitrate	0.808	0.100	0.7500	0.1200	91.7	80	120	0.8090
Sulfate	9.89	0.300	3.750	5.927	106	80	120	9.933

Fremont Analytical

Sample Log-In Check List

Client Name:	FB	Work Order Number:	1708400
Logged by:	Clare Griggs	Date Received:	8/31/2017 4:16:00 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 ☐
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:

Sampling times pulled from bottle labels.

Item Information

Item #	Temp °C
Cooler	7.6
Sample	6.9

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY 1708480

Page # 1 of 1

Page 10 of 10

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 Fax # (206) 283-5044

SUBCONTRACTER Fremont

PROJECT NAME/NO. 708577

PO # F-14

REMARKS

Please Email Results Pdfs Deliverables

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	Matrix	# of jars	Dioxins/Furans	EPH	VPH	Nitrate +N	Sulfate	Chloride, Alkalinity	TOC-9060M				Notes
MW-M		5/30/17		water					X	X	X					
MW-17									X	X	X					
MW-11									X	X	X					
MW-12									X	X	X					
MW-13									X	X	X					

ANALYSES REQUESTED

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman and Bruya	5/31/17	15:00
Received by:				6/3/17	16:16
Relinquished by:					
Received by:					

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

708577

SAMPLE CHAIN OF CUSTODY

ME 08-31-17 AI2/VW2

Page # ____ of ____

Report To Koshlan Mayer-Blackwell

Company Pacific Groundwater Group

Address 2377 Eastlake Avenue E

City, State, ZIP Seattle, WA 98102

Phone 206.329.0141 Email ~~koshlan@gmail.com~~ koshlan@pgwg.com

SAMPLERS (signature) Koshlan Mayer Blackwell

PROJECT NAME: Scougal Pre-Treatment

PO #: JK6050.04

REMARKS: For metals analysis, RCRA 8 + Manganese (Pb, Cr, Cd, Hg, Se, Ag) + Mn Ba, As +Fe per EMS 8/31/17

INVOICE TO: Chris Keener chris@pgwg.com

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ 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 Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	cVOCs 8260C	Dissolved Metals	Total Metals	Chloride	Sulfate + Nitrate as N	Notes
MW-14	01 A-G	8/30/2017	15:30		7 1116								✓	✓	✓	✓	✓	
MW-17 * MS/MSD	02 A-U	8/30/2017	14:30		21								✓	✓	✓	✓	✓	
MW-11	03 A-G	8/30/2017	11:00		7								✓	✓	✓	✓	✓	
MW-12	04 T	8/30/2017	10:00		7								✓	✓	✓	✓	✓	
MW-13	05 T	8/30/2017	12:15		7								✓	✓	✓	✓	✓	
																		Samples received at 2 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Chris Keener	Chris Keener	PGG	8/31/17	1:12
Received by: Brian Paulsen	Brian Paulsen	FEDEX	8.31.17	1:12
Relinquished by:	"	"	"	2:17
Received by:	DJ VO	FEDEX	8-31-17	14.17

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

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

October 25, 2017

Koshlan Mayer-Blackwell, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Mr Mayer-Blackwell:

Included are the results from the testing of material submitted on October 13, 2017 from the Scougal Rubber, F&BI 710221 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 should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
PGG1025R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 13, 2017 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal Rubber, F&BI 710221 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Pacific Groundwater Group
710221 -01	MW-12
710221 -02	MW-13
710221 -03	MW-14

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020A

Client ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	10/13/17	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/17/17	Lab ID:	710221-01 x10
Date Analyzed:	10/17/17	Data File:	710221-01 x10.088
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	535

Analysis For Dissolved Metals By EPA Method 6020A

Client ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	10/13/17	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/17/17	Lab ID:	710221-02
Date Analyzed:	10/17/17	Data File:	710221-02.076
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	178

Analysis For Dissolved Metals By EPA Method 6020A

Client ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/17/17	Lab ID:	I7-571 mb
Date Analyzed:	10/17/17	Data File:	I7-571 mb.048
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 6020A

Client ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	10/13/17	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/20/17	Lab ID:	710221-03
Date Analyzed:	10/20/17	Data File:	710221-03.044
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	125

Analysis For Total Metals By EPA Method 6020A

Client ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/20/17	Lab ID:	I7-580 mb
Date Analyzed:	10/23/17	Data File:	I7-580 mb rr.022
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	10/13/17	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/18/17	Lab ID:	710221-01
Date Analyzed:	10/18/17	Data File:	101808.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	103	91	108
4-Bromofluorobenzene	104	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.1
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	2.5
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	10/13/17	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/18/17	Lab ID:	710221-02
Date Analyzed:	10/18/17	Data File:	101809.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	101	91	108
4-Bromofluorobenzene	99	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.5
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	6.4
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	8.4
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	10/13/17	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/18/17	Lab ID:	710221-03
Date Analyzed:	10/18/17	Data File:	101810.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	85	117
Toluene-d8	102	91	108
4-Bromofluorobenzene	102	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.7
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.6
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	9.4
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Rubber, F&BI 710221
Date Extracted:	10/18/17	Lab ID:	07-2289 mb
Date Analyzed:	10/18/17	Data File:	101807.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	85	117
Toluene-d8	101	91	108
4-Bromofluorobenzene	101	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 10/25/17
Date Received: 10/13/17
Project: Scougal Rubber, F&BI 710221

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020A

Laboratory Code: 710179-05 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Manganese	ug/L (ppb)	20	6,850	728 b	77 b	75-125	162 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Manganese	ug/L (ppb)	20	98	80-120

Date of Report: 10/25/17
Date Received: 10/13/17
Project: Scougal Rubber, F&BI 710221

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020A

Laboratory Code: 710290-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Manganese	ug/L (ppb)	20	29.5	95	95	75-125	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Manganese	ug/L (ppb)	20	110	80-120

Date of Report: 10/25/17
Date Received: 10/13/17
Project: Scougal Rubber, F&BI 710221

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

Laboratory Code: 710221-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	1.1	99	61-139
Chloroethane	ug/L (ppb)	50	<1	94	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	101	71-123
Methylene chloride	ug/L (ppb)	50	<5	108	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	101	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	101	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	2.5	102	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	94	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	107	75-121
Trichloroethene	ug/L (ppb)	50	<1	97	73-122
Tetrachloroethene	ug/L (ppb)	50	<1	96	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	96	99	70-128	3
Chloroethane	ug/L (ppb)	50	92	93	66-149	1
1,1-Dichloroethene	ug/L (ppb)	50	96	101	75-119	5
Methylene chloride	ug/L (ppb)	50	103	109	63-132	6
trans-1,2-Dichloroethene	ug/L (ppb)	50	96	101	76-118	5
1,1-Dichloroethane	ug/L (ppb)	50	98	101	77-119	3
cis-1,2-Dichloroethene	ug/L (ppb)	50	98	103	76-119	5
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	93	97	78-114	4
1,1,1-Trichloroethane	ug/L (ppb)	50	103	107	80-116	4
Trichloroethene	ug/L (ppb)	50	96	99	72-119	3
Tetrachloroethene	ug/L (ppb)	50	93	94	78-109	1

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.

710221

SAMPLE CHAIN OF CUSTODY

ME 10/13/17

VW2/AI2

Page # 1 of 1

Report To Koshlan Mayer-Blackwell

Company Pacific Groundwater Group

Address 2377 Eastlake Ave East

City, State, ZIP Seattle, WA 98102

Phone 206.329.0141 Email Koshlan@pgwg.com

SAMPLERS (*signature*): Koshlan Mayer Blackwell

PROJECT NAME: Scougal Rubber ~~Scougal Env. Investigation~~

PO #:

REMARKS: 8260 Chlorinated VOCs only

INVOICE TO: Chris Keener chris@pgwg

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ 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 Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	cVOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Dissolved Manganese	Total Manganese			Notes
						ANALYSES REQUESTED											
MW-12	01 (A-D)	10/13/17	10:30	GW	4					✓			✓				Dissolved Mn was 0.45 µm Field Filtered
MW-13	02	10/13/17	11:30	GW	4					✓			✓				Dissolved Mn 0.45 µM Field Filtered
MW-14	03	10/13/17	12:45	GW	4					✓				✓			Not Filtered

Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Koshlan Mayer Blackwell	Koshlan Mayer-Blackwell	PGG	10/13/2017	7:00 PM
Received by:	Jon Shimon	EBI	1	1
Relinquished by:				
Received by:				

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