STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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March 8, 2017

Kevin Stormans
Stormans, Inc.
1932 East 4th Ave.
Olympia, Washington 98506

Re: Further Action at the following Site:

- **Site Name:** Eastside Laundry Allisons Norge Village
- **Site Address:** 120 NE Turner Street, Olympia, Thurston County
- **Cleanup Site No.:** 852
- **Facility/Site No.:** 14214153
- **VCP Project No.:** SW0804

Dear Mr. Stormans:

The Washington State Department of Ecology (Ecology) received your request for an opinion regarding a proposed interim remedial action as part of your independent cleanup of the Eastside Laundry Allisons Norge Village facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Issue Presented and Opinion

Is further remedial action necessary to clean up contamination at the Site?

YES. Ecology has determined that further remedial action is necessary to clean up contamination at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

Description of the Site

This opinion applies only to the Site described below. This opinion does not apply to any other sites that may affect the Property. Any such sites, if known, are identified separately below. **Enclosure A** includes pertinent figures and tables from the work plan for the Site, as currently known to Ecology (Figure 1). For a complete Site description, please refer to Farallon Consulting, LLC's (Farallon) *Cleanup Action Progress Report*, dated August 21, 2012.

Please note the parcel(s) of real property associated with this Site are also located within the projected boundaries of the Tacoma Smelter Plume facility (FSID #24971643). At this time, Ecology has no information that those parcel(s) are actually affected. This opinion does not apply to any contamination associated with the Tacoma Smelter Plume facility.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. Farallon Consulting, *Proposed In-Situ Chemical Oxidation Remediation of Tetrachloroethene in Groundwater*, dated November 16, 2016.

2. Farallon Consulting, *Cleanup Action Progress Report March 2011 to May 2012*, dated August 21, 2012.

Those documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

Ecology has concluded that **further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

> This opinion letter provides comments on Farallon's technical memorandum entitled, *Proposed In-Situ Chemical Oxidation Remediation of Tetrachloroethene in Groundwater,* dated November 16, 2016.

The technical memorandum proposes one or two chemical injection events at monitoring wells MW-2 and MW-5 in order to reduce concentrations of tetrachloroethene (aka tetrachloroethylene; PCE) and associated degradation products in groundwater to less than MTCA Method A groundwater cleanup levels. To the same end, potassium permanganate candles are proposed for placement in monitoring well MW-7 and potentially monitoring wells MW-2 and MW-5 post-injection.

This work plan proposes to reduce residual concentrations of halogenated volatile organic compounds (HVOCs) in groundwater, specifically the chlorinated solvent tetrachloroethylene (PCE) and its degradation products. As applicable, additional contaminants of concern (COCs) or Site media contaminated by PCE and associated degradation products identified for the Site still may require cleanup or concentrations of non-chlorinated Site COCs may be coincidentally reduced by this treatment; however, this work plan focuses on treatment of the aforementioned chlorinated volatile organic compounds (VOCs) in groundwater only.

Comments:

1) Overall, Ecology concurs with the proposal of in-situ oxidation using sodium and potassium permanganate to reduce PCE concentrations in shallow groundwater (Figures 2 and 3).

2) Ecology has the following comments. These comments may slightly alter the final version of the workplan, but should not alter any field operations. Field work for the proposed in situ chemical oxidation can proceed upon receipt of this opinion letter.

    a. Ecology concurs with the proposed performance groundwater monitoring, noting that performance groundwater monitoring may continue longer than anticipated if sodium permanganate does not dissipate as quickly as predicted.

    b. Ecology recommends identifying the specific PCE degradation products to be analyzed for and reported by USEPA Method 8260B.

    c. As described in the technical memorandum, register the Site with Ecology's Underground Injection Control (UIC) division. The injection points proposed in the work plan are considered Class V injection wells under WAC 173-218-040(5)(x). The online registration form is located here:
        i. http://www.ecy.wa.gov/programs/Wq/grndwtr/uic/UIConlineregis.html

d. As a reminder, per WAC 173-218-080, the nonendangerment standard for groundwater must be met. Based on the proposed application, the oxidants to be used for injection are not anticipated to result in exceedances of groundwater cleanup levels.

e. As they are part of the proposed remediation and/or performance monitoring, please add the boring logs for monitoring wells MW-7, MW-9, MW-10, MW-11, and MW-12 to the technical memorandum.

f. During the performance groundwater monitoring, field colorimetric analysis is proposed to be conducted to evaluate potential increases in manganese concentrations exceeding the background level. Identify which monitoring well (or wells) will be used to establish background concentrations.

3) Based on the details from the technical memorandum, Ecology concurs that the anticipated radius of influence of the sodium permanganate injection in the vicinity of MW-2 and MW-5 is approximately 10-15 feet bgs. Based on the length of the monitoring well screens at MW-2 (80 to 105 feet below top of casing [TOC]) and MW-5 (85 to 100 feet below TOC), vertical influence is anticipated to be approximately 15-25 feet.

4) Depth to groundwater has fluctuated between 70 to 86 feet bgs in monitoring wells MW-2 and MW-5. Injection during the first or second quarter of the year should result in greatest distribution of the permanganate given the shallower groundwater levels.

5) Ecology suggests checking monitoring well MW-13 for signs of sodium permanganate as well, in case injections influence a greater radius than expected. However, this well should only be added to the performance groundwater monitoring if sodium permanganate is visually detected, as monitoring well MW-13 is located approximately 160 feet southwest of MW-2 and MW-5. Monitoring well MW-13 is located outside the anticipated radius of influence.

6) Though likely implied by the technical memorandum, Ecology recommends explicitly stating that depth to water measurements will also be collected prior to injection and during the performance groundwater monitoring events.

7) Ecology suggests identifying if any specific air monitoring is required during the injections over that typically completed as part of standard environmental investigations. If no additional air monitoring requirements are necessary, no revisions to the technical memorandum text are recommended.

8) Per WAC 173-340-840(2), please submit three copies of the final technical memorandum (one electronic and two hard copies) to Ecology. Proposed reporting of the in situ chemical oxidation and associated performance groundwater monitoring as part of the annual cleanup action progress report is consistent with previous submissions at this Site and is acceptable.

9) In accordance with WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840 (Data Submittal Requirements), data generated for Remedial Actions shall be submitted simultaneously in both a written and electronic format. For additional information regarding electronic format requirements, see the website http://www.ecy.wa.gov/eim. Be advised that according to the policy, any reports containing sampling data that are submitted for Ecology review are considered incomplete until the electronic data has been entered. Please ensure that data generated during on-site activities is submitted pursuant to this policy. **Data must be submitted to Ecology in this format for Ecology to issue a No Further Action determination; however Ecology highly recommends that this data be submitted concurrently with submittal of the environmental report.** Please be sure to submit all soil and groundwater data collected to date, as well as any future data, in this format. Be advised that Ecology requires up to two weeks to process the data once they are received.

10) Please note that this letter does not provide an opinion on the sufficiency of any other remedial actions planned for or conducted at the Site or whether further remedial action is necessary to characterize and address all contamination at the Site. To obtain such an opinion, you must submit an independent remedial action/cleanup action report to Ecology upon completion of the cleanup action for the Site and request such an opinion under the VCP.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

Contact Information

Thank you for choosing to clean up the Site under the Voluntary Cleanup Program (VCP). After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion, please contact me by phone at 360-407-6265 or e-mail at Tim.Mullin@ecy.wa.gov.

Sincerely,

Tim Mullin, LG
SWRO Toxics Cleanup Program

tcm: kb

Enclosures [1]: A – Selected Site Figures and Boring Logs

By Certified Mail: [91 7199 9991 7037 0221 7775]

cc: Donald Lance, L.G., L.H.G, Farallon Consulting
Nick Acklam, Ecology
Matt Alexander, Ecology

Enclosure A

Selected Site Figures and Boring Logs

1) Figure 1: Farallon's Property Plan Showing Soil Analytical Results
2) Figure 2: Farallon's Property Plan Showing Groundwater Analytical Results
3) Boring Logs for MW-2 and MW-5

Figure 1

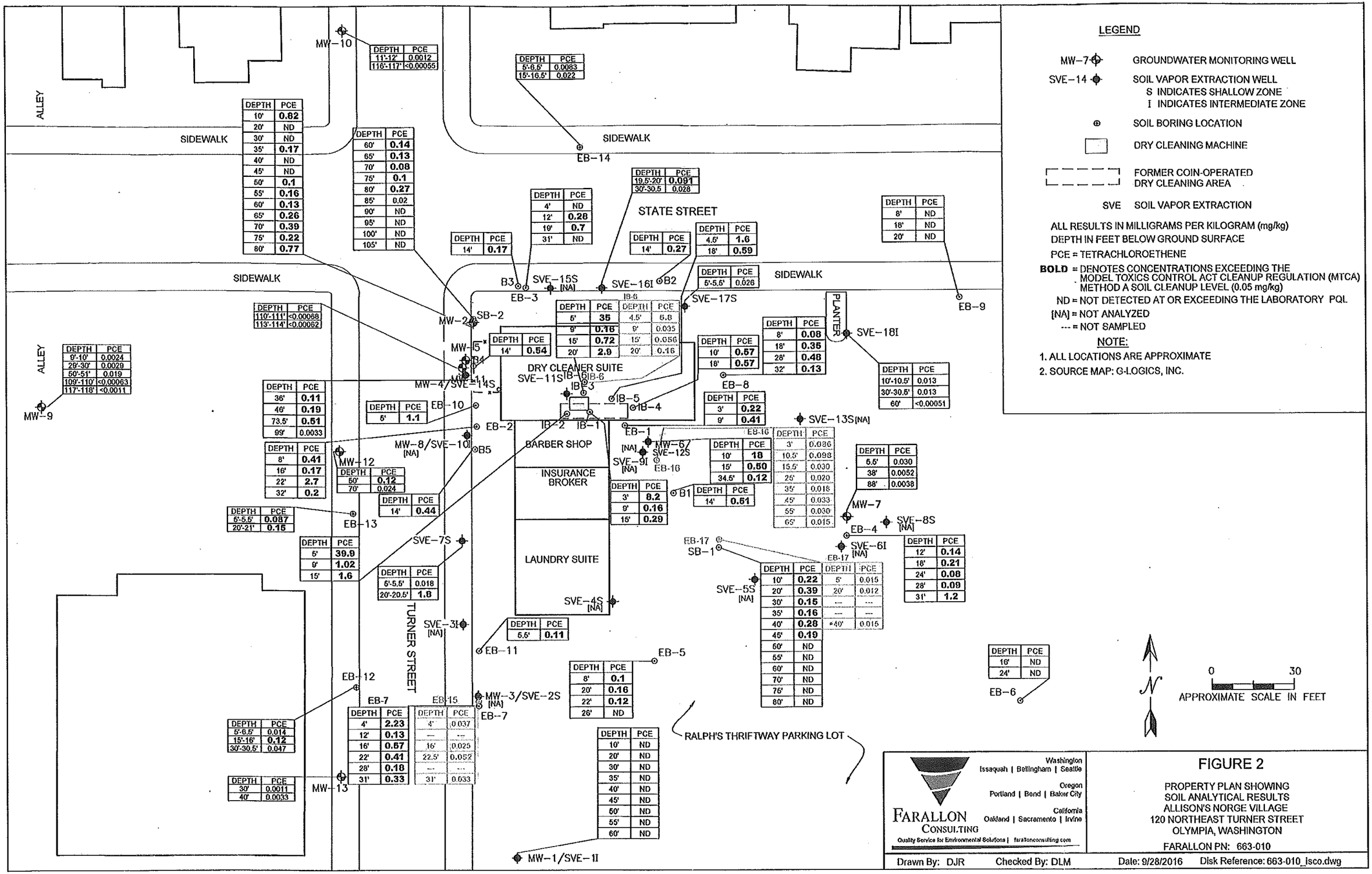
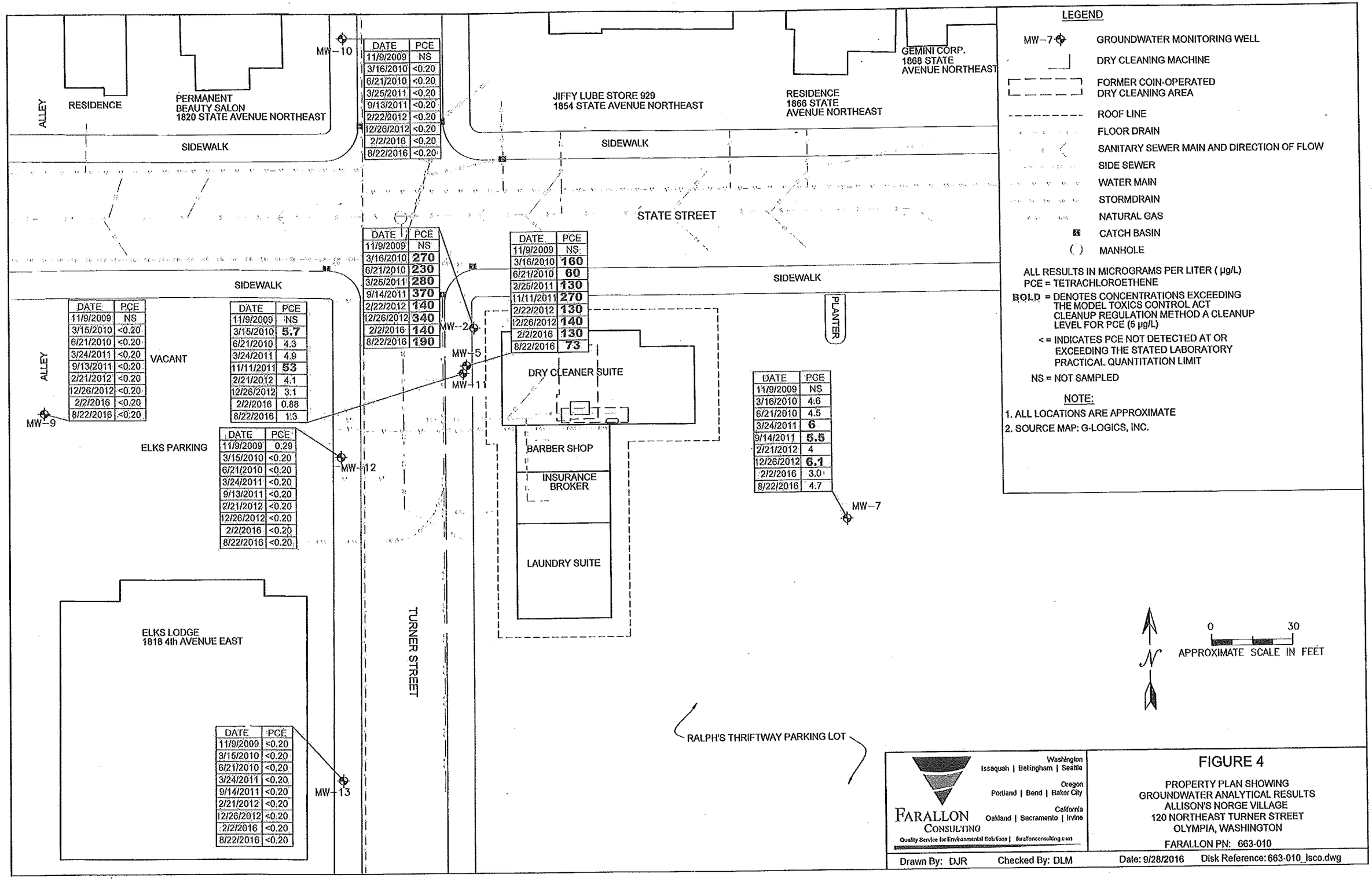

LEGEND
MW-7 GROUNDWATER MONITORING WELL
SVE-14 SOIL VAPOR EXTRACTION WELL
S INDICATES SHALLOW ZONE
I INDICATES INTERMEDIATE ZONE
SOIL BORING LOCATION
DRY CLEANING MACHINE
FORMER COIN-OPERATED DRY CLEANING AREA
SVE SOIL VAPOR EXTRACTION
ALL RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)
DEPTH IN FEET BELOW GROUND SURFACE
PCE = TETRACHLOROETHENE
BOLD = DENOTES CONCENTRATIONS EXCEEDING THE MODEL TOXICS CONTROL ACT CLEANUP REGULATION (MTCA) METHOD A SOIL CLEANUP LEVEL (0.05 mg/kg)
ND = NOT DETECTED AT OR EXCEEDING THE LABORATORY PQL
[NA] = NOT ANALYZED
--- = NOT SAMPLED
NOTE:
1. ALL LOCATIONS ARE APPROXIMATE
2. SOURCE MAP: G-LOGICS, INC.
ALLEY
SIDEWALK
STATE STREET
TURNER STREET
DRY CLEANER SUITE
BARBER SHOP
INSURANCE BROKER
LAUNDRY SUITE
PLANTER
RALPH'S THRIFTWAY PARKING LOT
MW-1/SVE-1I
MW-2
MW-3/SVE-2S
MW-4/SVE-14S
MW-5
MW-6
MW-7
MW-8/SVE-10I
MW-9
MW-10
MW-11
MW-12
MW-13
MW-67
SVE-3I
SVE-4S
SVE-5S
SVE-6I
SVE-7S
SVE-8S
SVE-9I
SVE-11S
SVE-12S
SVE-13S
SVE-15S
SVE-16I
SVE-17S
SVE-18I
EB-1
EB-2
EB-3
EB-4
EB-5
EB-6
EB-7
EB-8
EB-9
EB-10
EB-11
EB-12
EB-13
EB-14
EB-15
EB-16
EB-17
SB-1
SB-2
B1
B2
B3
B4
B5
IB-1
IB-2
IB-3
IB-4
IB-5
IB-6
0
30
APPROXIMATE SCALE IN FEET
FIGURE 2
PROPERTY PLAN SHOWING
SOIL ANALYTICAL RESULTS
ALLISON'S NORGE VILLAGE
120 NORTHEAST TURNER STREET
OLYMPIA, WASHINGTON
FARALLON PN: 663-010
FARALLON CONSULTING
Washington
Issaquah | Bellingham | Seattle
Oregon
Portland | Bend | Baker City
California
Oakland | Sacramento | Irvine
Quality Service for Environmental Solutions | farallonconsulting.com
Drawn By: DJR
Checked By: DLM
Date: 9/28/2016
Disk Reference: 663-010_isco.dwg

Figure 2



FARALLON CONSULTING
Quality Service for Environmental Solutions | farallonconsulting.com
Washington: Issaquah | Bellingham | Seattle
Oregon: Portland | Bend | Baker City
California: Oakland | Sacramento | Irvine

FIGURE 4

PROPERTY PLAN SHOWING
GROUNDWATER ANALYTICAL RESULTS
ALLISON'S NORGE VILLAGE
120 NORTHEAST TURNER STREET
OLYMPIA, WASHINGTON

FARALLON PN: 663-010

Drawn By: DJR | Checked By: DLM | Date: 9/28/2016 | Disk Reference: 663-010_lsco.dwg

01-016t-c-mw2_pg1.vsd

Depth in feet	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0				Surface: Asphalt Asphalt pavement (two inches) and subbase gravel.		ML		8" Boring Well Box Well Cap Concrete Seal
5								2" PVC Blank Bentonite Seal
10								
15								
20								
25								
30								

Drilling Method: Hollow Auger	Date: 8-22-2001	Other Information: This boring was located 4 ft. from SB-2. Drilled down to 60 ft. before sampling. See SB-2 log for soils information.
Drilling Company: Cascade Drilling	Weather: Rain	
Boring Diameter: Eight Inches	Page 1 of 1	
Logged By: Rob Yates		

g-logics

Boring/Well Log
Eastside Laundry
116 North Turner St.
Olympia, Washington

MW-2

01-0161-c-mw2_pg2.vsd

Depth in feet	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
30								8" Boring
35								Bentonite Seal; 2" PVC Blank
40								
45								
50								Grout
55								
60								

Drilling Method: Hollow Auger	Date: 8-22-2001	Other Information: See page 1.
Drilling Company: Cascade Drilling	Weather: Rain	
Boring Diameter: Eight Inches	Page 2 of 4	
Logged By: Rob Yates		

g-logics

Boring/Well Log
Eastside Laundry
116 North Turner St.
Olympia, Washington

MW-2

01-0161-c-mw2_pg3.ved

Depth in feet	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
60	50 for 6		- 60	Clayey Gravel, olive-brown, wet, very dense, little to no silty sand.	30	GC		8" Boring
65	50 for 6		- 65	Same	40			2" PVC Blank
70	50 for 6		- 70	Silty sandy gravel with clay, olive-brown, moist, very dense	40	GM		Grout
75	50 for 6		- 75	Same	75			Bentonite Seal
80	26/ 50 for 6		- 80	Fine to medium silty sand, brown, moist, very dense Silty sandy gravel, olive-brown, moist, very dense	50	SP GM		2" PVC Screen
85	45/ 50 for 6		- 85	Same sandy gravel, wet, very dense encountered groundwater at 86ft.	75	GW		
90								

Drilling Method: Hollow Auger	Date: 8-22-2001	Other Information: Stopped drilling for 15 minutes at 70 ft. to check for potential groundwater; no water present in open boring. Repeated process at 80 ft., same result.
Drilling Company: Cascade Drilling	Weather: Rain	
Boring Diameter: Eight Inches	Page 3 of 4	
Logged By: Rob Yates		

g-logics

Boring/Well Log
Eastside Laundry
116 North Turner St.
Olympia, Washington

MW-2

01-0181-c-mw2_pg4.vsd

Depth in feet	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
90	50 for 6		- 90	Well-graded medium to coarse gravel, wet, very dense, little to no fine sands	100	GW		8" Boring; Sand
95	50 for 6		- 95	Same	50			2" PVC Screen
100	38/ 50 for 6		- 100	Same	75			
105	18 26 48		- 105	Poorly graded fine sandy silt, gray, moist, very dense Stopped drilling at 105ft.	100	ML		

Drilling Method: Hollow Auger	Date: 8-22-2001	Other Information: Bentonite used from 47 ft. to 75 ft. (30% solids, per manufacturing specification)
Drilling Company: Cascade Drilling	Weather: Rain	
Boring Diameter: Eight inches	Page 4 of 4	
Logged By: Rob Yates		

g-logics

Boring/Well Log
Eastside Laundry
116 North Turner St.
Olympia, Washington

MW-2

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

Log of Boring: MW-5

Client: Wilbur Allison
Project: Allison's Norge Village
Location: Olympia, Washington

Farallon PN: 663-010

Logged By: Greg Lish

Date/Time Started:	12/9/04 0825	Sampler Type:	D&M SS 18"x2"
Date/Time Completed:	12/10/04 1450	Drive Hammer (lbs.):	300
Equipment:	CME 75	Depth of Water ATD (ft bgs):	NA
Drilling Company:	Cascade Drilling	Total Boring Depth (ft bgs):	100.0
Drilling Foreman:	Steve Choate	Total Well Depth (ft bgs):	100
Drilling Method:	Hollow Stem Auger		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 3/3/3	PID (units)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		No samples collected from 0-20' below ground surface. See EB-10 boring log for lithology.								Cap; Concrete
5										
10										Bentonite Chips
15										Blank Casing
20		Poorly-graded SAND (05% sand, 5% silt), fine sand, light grey-brown, medium dense, moist, no odor.	SP		05	14-17 -24	66.6	MW6-21		
		SILT (100%), light brown with red-brown mottling, hard, moist, no odor.	ML GM		60	37- 50/3"	110			
25		Silty GRAVEL with sand (60% gravel, 30% silt, 20% sand), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor.			40	50/6"	92.3			

Well Construction Information

Monument Type:	Flush-Mount	Filter Pack:	#2/12 medium sand
Casing Diameter (inches):	2	Surface Seal:	Concrete
Screen Slot Size (inches):	0.010	Annular Seal:	Bentonite Chips
Screened Interval (ft bgs):	85-100	Ground Surface Elevation (ft):	200.12
		Top of Casing Elevation (ft):	199.77
		Boring Abandonment:	NA
		Surveyed Location:	X: NA Y: NA

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975 5th Avenue Northwest
Issaquah, WA 98027

Log of Boring: MW-5

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 3/6/6	PID (ppm)	Sample ID	Sample Analyzed	Well Construction Details
25		Silty GRAVEL with sand (50% gravel, 30% silt, 20% sand), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor, cobbles.	GM		20	50/6"	99.1			
		Poorly-graded SAND with gravel (55% sand, 40% gravel, 5% silt), fine to coarse sand, fine to coarse gravel, brown, very dense, moist, no odor.	SP		35	50/6"	84.6			
		Silty GRAVEL with sand (65% gravel, 25% silt, 20% sand), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor.	GM		50	32-50/6"	102			
30		Silty GRAVEL with sand (60% gravel, 20% sand, 20% silt), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor.	GM		10	50/6"	106			Bentonite Chips
		Silty GRAVEL with sand (45% gravel, 35% silt, 20% sand), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor.	GM		20	65/6"	86.6			
		Silty GRAVEL with sand (50% gravel, 25% sand, 25% silt), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor.	GM		25	50/6"	63.3			
35		Poorly-graded SAND with gravel (70% sand, 25% gravel, 5% silt), fine sand, coarse gravel, brown, very dense, moist, no odor.	SP		30	55/6"	79.6			
		Sandy SILT with gravel (40% silt, 30% gravel, 30% sand), fine to coarse gravel, fine to medium sand, light brown, hard, moist, no odor.	ML GP		20	60/6"	64.4	MW5-36		Blank Casing
		Poorly-graded GRAVEL with sand (60% gravel, 35% sand, 5% silt), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor.	GM		20	55/6"	36.3			
40		Silty GRAVEL with sand (60% gravel, 20% sand, 20% silt), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor.	GM		20	38-50/6"	31.2			
		Silty SAND with gravel (50% sand, 30% gravel, 20% silt), fine to coarse sand, fine gravel, brown, very dense, moist, no odor.	SM		5	50/6"	33.1			
		No recovery.			0	50/6"				
		Poorly-graded SAND with gravel (85% sand, 15% gravel), fine to medium sand, fine gravel, dark brown, very dense, moist, no odor, broken cobble in sampler.	SP		30	50/6"	25.6	MW5-43		
45		Poorly-graded GRAVEL with silt and sand (50% gravel, 40% sand, 10% silt), fine to coarse gravel, medium to coarse sand, light brown, very dense, wet, no odor.	GP-GM		35	50/6"	8.1			
		Silty GRAVEL with sand (70% gravel, 15% silt, 15% sand), fine to coarse gravel, brown, very dense, wet, no odor, cobbles.	GM		35	50/6"	8.8	MW5-46		
50					35	50/6"	8.4			
					25	50/6"	8.4			
					30	50/6"	9.3			Bentonite Chips
		Poorly-graded GRAVEL with silt and sand (50% gravel, 40% sand, 10% silt), fine to coarse gravel, medium to coarse sand, brown, very dense, wet, no odor.	GP-GM		35	70/6"	9.9			
					35	50/6"	9.3			
55		Silty GRAVEL with sand (45% gravel, 35% sand, 20% silt), fine to coarse gravel, medium to coarse sand, brown, very dense, wet, no	GM		40	50/6"	9.8			Blank

Well Construction Information

Monument Type: Flush-Mount
Casing Diameter (inches): 2
Screen Slot Size (inches): 0.010
Screened Interval (ft bgs): 85-100

Filter Pack: #2/12 medium sand
Surface Seal: Concrete
Annular Seal: Bentonite Chips

Ground Surface Elevation (ft): 200.12
Top of Casing Elevation (ft): 199.77
Boring Abandonment: NA
Surveyed Location: X: NA Y: NA

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Issaquah, WA 98027

Log of Boring: MW-5

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 6"/6"	PID (ppm)	Sample ID	Sample Analyzed	Well Construction Details
		odor.								Casing
		No recovery, broken cobble in sampler.			5	70/6"	0.7			
		Poorly-graded GRAVEL with silt and sand (50% gravel, 40% sand, 10% silt), fine to coarse gravel, medium to coarse sand, brown, very dense, wet, no odor.	GP-GM		15	50/6"	0.7			
60		Silty GRAVEL with sand (45% gravel, 35% sand, 20% silt), fine to coarse gravel, medium to coarse sand, brown, very dense, wet, no odor.	GM		15	50/6"	7.4			
		Poorly-graded GRAVEL with silt and sand (50% gravel, 40% sand, 10% silt), fine to coarse gravel, medium to coarse sand,brown, very dense, wet, no odor.	GP-GM		25	50/6"	7.3			
		Silty GRAVEL with sand (45% gravel, 35% sand, 20% silt), fine to coarse gravel, medium to coarse sand, brown, very dense, wet, no odor.	GM		30	50/6"	8.7			
65		No recovery, broken cobble in sampler.			5	50/6"	8.3			
		Poorly-graded GRAVEL with silt and sand (50% gravel, 40% sand, 10% silt), fine to coarse gravel, medium to coarse sand, brown, very dense, wet, no odor, cobbles.	GP-GM		10	50/6"				
					15	50/6"	42.6			
					15	50/6"	45.2			
70					15	50/6"	34.3			Bentonite Chips
		Poorly-graded GRAVEL with sand (50% gravel, 45% sand, 5% silt), fine to coarse gravel, fine to medium sand, brown, very dense, moist, no odor.	GP		15	70/6"	133			
		Poorly-graded SAND with gravel (70% sand, 25% gravel, 5% silt), fine to medium sand, fine gravel, brown, very dense, moist, no odor.	SP		45	50/6"	101	MW5-73.5		
75		Poorly-graded GRAVEL with sand (70% gravel, 25% sand, 5% silt), fine to coarse gravel, fine to coarse sand, brown, very dense, moist, no odor.	GP		15	50/6"	0.4			Blank Casing
		76.0-79.0 GRAVEL with sand, minor silt (70% fine ot coarse gravel, 20% medium to coarse sand, 10% silt), brown, very dense, wet, no odor.	GP-GM		40	60/6"	10.7			
						70/6"	7.9			
80		79.0-80.5 SAND (100% fine sand), brown, very dense, wet, no odor.	SP			30-50/6"	12.9	MW5-79		
		80.5-82.0 SAND, trace gravel, trace silt (95% fine sand, <5% fine gravel, <5% silt), brown, very dense, moist, no odor.	SP		80	50/6"	12.2			Bentonite Chips
		82.0-82.6 Gravelly SAND, trace silt (55% fine sand, 40% fine to coarse grave, 5% silt), brown, very dense, moist, no odor.	SP		40	55/6"	11.9			Blank Casing
		82.6-83.5 Contact with GRAVEL, minor sand, minor silt (75% fine to coarse gravel, 15% fine to coarse sand, 10% silt), olive brown, very dense, moist, no odor.	GP-GM		15	50/6"	11.8			
85		83.5-86.5 GRAVEL with sand, minor silt (70% fine to coarse gravel,	GP-GM		25	50/6"	11.3			

Well Construction Information

Monument Type: Flush-Mount
Casing Diameter (inches): 2
Screen Slot Size (inches): 0.010
Screened Interval (ft bgs): 65-100

Filter Pack: #2/12 medium sand
Surface Seal: Concrete
Annular Seal: Bentonite Chips

Ground Surface Elevation (ft): 200.12
Top of Casing Elevation (ft): 199.77
Boring Abandonment: NA
Surveyed Location: X: NA Y: NA

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

Log of Boring: MW-5

Depth (feet bgs)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 6/6/6	PID (ppm)	Sample ID	Sample Analyzed	Well Construction Details
		20% fine to coarse sand, 10% silt), olive brown, very dense, moist, no odor.	GW		30	65/6"	12.0			
		86.5-88.0 GRAVEL with sand, trace silt (75% fine to coarse gravel, 20% medium to coarse sand, 5% silt), brown, very dense, wet, no odor.	GW		25	60/6"	12.5			
90		88.0-91.0 GRAVEL, minor sand, trace silt (90% fine to coarse gravel, 10% coarse sand, <5% silt), brown, very dense, wet, no odor.			35	60/6"	12.8			Screen
		91.0-92.5 GRAVEL with sand, trace silt (75% fine to coarse gravel, 20% medium to coarse sand, 5% silt), brown, very dense, wet, no odor.	GW		40	60/6"	10.7			
		92.5-100.0 GRAVEL, minor sand, trace silt (85% fine to coarse gravel, 15% medium to coarse sand, <5% silt), brown, very dense, wet, no odor.	GW		25	60/6"	11.7			
95					20	60/6"	10.6			Sand Pack
					30	60/6"	10.4			
					30	60/6"	10.7			
00					30	60/6"	11.0	MW5-99		

Well Construction Information

Monument Type: Flush-Mount
Casing Diameter (inches): 2
Screen Slot Size (inches): 0.010
Screened Interval (ft bgs): 85-100

Filter Pack: #2/12 medium sand
Surface Seal: Concrete
Annular Seal: Bentonite Chips

Ground Surface Elevation (ft): 200.12
Top of Casing Elevation (ft): 199.77
Boring Abandonment: NA
Surveyed Location: X: NA Y: NA