

**GROUNDWATER MONITORING  
REPORT:  
Third Quarter**

*Performed at:*  
Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington 98422

***AEROTECH***  
*Environmental Consulting Inc.*

October 9, 2018

Anchorage   Seattle   Portland

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

[www.AerotechEnvironmental.com](http://www.AerotechEnvironmental.com)

# ***AEROTECH***

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***Environmental Consulting Inc.***

13925 Interurban Avenue South, Suite 210  
Seattle, Washington 98168  
(360) 710-5899

512 W. International Airport Road, Suite 201  
Anchorage, Alaska 99518  
(907) 575-6661

October 26, 2018

Mr. Carl Swindahl  
Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington 98422

**RE: Groundwater Monitoring Report – Third Quarter**

Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington 98422

Dear Mr. Swindahl,

As you are aware, Aerotech Environmental Consulting, Inc. (“Aerotech”) has been retained to collect quarterly groundwater samples from four groundwater monitoring wells previously installed at Swindahl Properties LLC in Tacoma, Washington. Aerotech conducted groundwater monitoring and sampling activities on October 9, 2018. Enclosed, please find the associated tabulated analytical results, site figures, laboratory analytical report, field data and standard operating procedure document.

**Total and Dissolved Arsenic and Lead were not detected above the MTCA Method A Cleanup Levels in samples collected from groundwater monitoring wells MW2, MW3 and MW4. Total Arsenic was detected at a concentration above the MTCA Method A Cleanup Level in the sample collected from MW1, however subsequent analysis for Dissolved Arsenic demonstrated that arsenic levels were compliant with MTCA standards. Samples collected from MW1, MW3, and MW4 were analyzed for Carcinogenic Polycyclic Aromatic Hydrocarbons (“cPAHs”) and the sample collected from groundwater monitoring well MW4 was additionally analyzed for Total Petroleum Hydrocarbons as Diesel (“TPHd”) and Total Petroleum Hydrocarbons as Motor Oil (“TPHo”). None were detected above the MTCA Method A Cleanup Levels or the Laboratory Minimum Reporting Limits. Aerotech recommends the continuation of quarterly groundwater monitoring and sampling.**

Please feel free to contact the Aerotech Geologist, Mr. Simon Payne, or the Aerotech Principal Environmental Scientist, Mr. Nicholas Gerkin at (206) 482-2287 if you have any questions regarding work completed at this Site.

Simon Payne  
State of Washington  
Licensed Geologist No. 2712



SIMON J. PAYNE

Sincerely,

Nick Gerkin  
Vice President  
Principal Environmental Scientist

## **APPENDIX**

- Tables & Figures
- Project Contract Documents
- Laboratory Analytical Report and Chain of Custody
- Standard Operating Procedure
- Field Documentation

- Tables & Figures

## GROUNDWATER ANALYTICAL RESULTS

Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington 98422

### MW1

Well Depth Feet	Sampling Date	Ground Water Level Feet Below TOC	Elevation (TOC north)* Feet Above MSL	Water Level Elevation Feet Above MSL	TPHd µg/L	TPHo µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L	cPAHs µg/L	Dissolved Arsenic µg/L	Total Arsenic µg/L	Dissolved Lead µg/L	Total Lead µg/L
18.5	04/11/18	2.41	11.75	9.34	--	--	--	--	--	--	--	<2.0	3.0	<2.0	<2.0
	07/13/18	5.01	11.75	6.74	--	--	--	--	--	--	--	<2.0	3.0	<2.0	<2.0
	10/09/18	4.81	11.75	6.94	--	--	--	--	--	--	<0.1	<2.0	8.0	<2.0	<2.0
MTCA Method A Cleanup Levels															
					500	500	5	1,000	700	1,000	0.1*	5	5	15	15

### MW2

Well Depth Feet	Sampling Date	Ground Water Level Feet Below TOC	Elevation (TOC north)* Feet Above MSL	Water Level Elevation Feet Above MSL	TPHd µg/L	TPHo µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L	cPAHs µg/L	Dissolved Arsenic µg/L	Total Arsenic µg/L	Dissolved Lead µg/L	Total Lead µg/L
18.9	04/11/18	8.70	10.27	1.57	--	--	--	--	--	--	--	<2.0	<2.0	<2.0	<2.0
	07/13/18	9.35	10.27	0.92	--	--	--	--	--	--	--	<2.0	<2.0	<2.0	<2.0
	10/09/18	5.20	10.27	5.07	--	--	--	--	--	--	--	<2.0	<2.0	<2.0	<2.0
MTCA Method A Cleanup Levels															
					500	500	5	1,000	700	1,000	0.1*	5	5	15	15

### MW3

Well Depth Feet	Sampling Date	Ground Water Level Feet Below TOC	Elevation (TOC north)* Feet Above MSL	Water Level Elevation Feet Above MSL	TPHd µg/L	TPHo µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L	cPAHs µg/L	Dissolved Arsenic µg/L	Total Arsenic µg/L	Dissolved Lead µg/L	Total Lead µg/L
19.3	04/11/18	9.00	10.72	1.72	--	--	--	--	--	--	--	<2.0	<2.0	<2.0	<2.0
	07/13/18	8.95	10.72	1.77	--	--	--	--	--	--	--	<2.0	<2.0	<2.0	<2.0
	10/09/18	5.57	10.72	5.15	--	--	--	--	--	--	<0.1	<2.0	<2.0	<2.0	<2.0
MTCA Method A Cleanup Levels															
					500	500	5	1,000	700	1,000	0.1*	5	5	15	15

### MW4

Well Depth Feet	Sampling Date	Ground Water Level Feet Below TOC	Elevation (TOC north)* Feet Above MSL	Water Level Elevation Feet Above MSL	TPHd µg/L	TPHo µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L	cPAHs µg/L	Dissolved Arsenic µg/L	Total Arsenic µg/L	Dissolved Lead µg/L	Total Lead µg/L
19.6	04/11/18	6.90	11.02	4.12	--	--	--	--	--	--	--	<2.0	<2.0	<2.0	<2.0
	07/13/18	7.10	11.02	3.92	<200	<500	<1.0	<1.0	<1.0	<1.0	<0.1	<2.0	<2.0	<2.0	<2.0
	10/09/18	7.79	11.02	3.23	<200	<500	--	--	--	--	<0.1	<2.0	<2.0	<2.0	<2.0
MTCA Method A Cleanup Levels															
					500	500	5	1,000	700	1,000	0.1*	5	5	15	15

### EXPLANATION

MTCA = Model Toxic Control Act Cleanup Level (WAC173-340-900)

TOC = Top of Casing MSL = Mean Sea Level

< = not detected at indicated Laboratory Detection Limits -- not analyzed NM = Not Measured

TPHd - Total Petroleum Hydrocarbons as Diesel and TPHo - Total Petroleum Hydrocarbons as Oil by NWTPH-Dx extended

Benzene, Toluene, Ethylbenzene and Xylenes by EPA Method 8021B

\* = Effective concentration using Toxic Equivalency Factor per WAC 173-340-708(e); SUM(Benzo(a)pyrene (x1), Benzo(a)anthracene (x0.1),

Benzo(b)fluoranthene (x0.1), Benzo(k)fluoranthene (x0.1), Chrysene (x0.01), Dibenz(a,h)anthracene (x0.1), Indeno(1,2,3-cd)pyrene (x0.1)

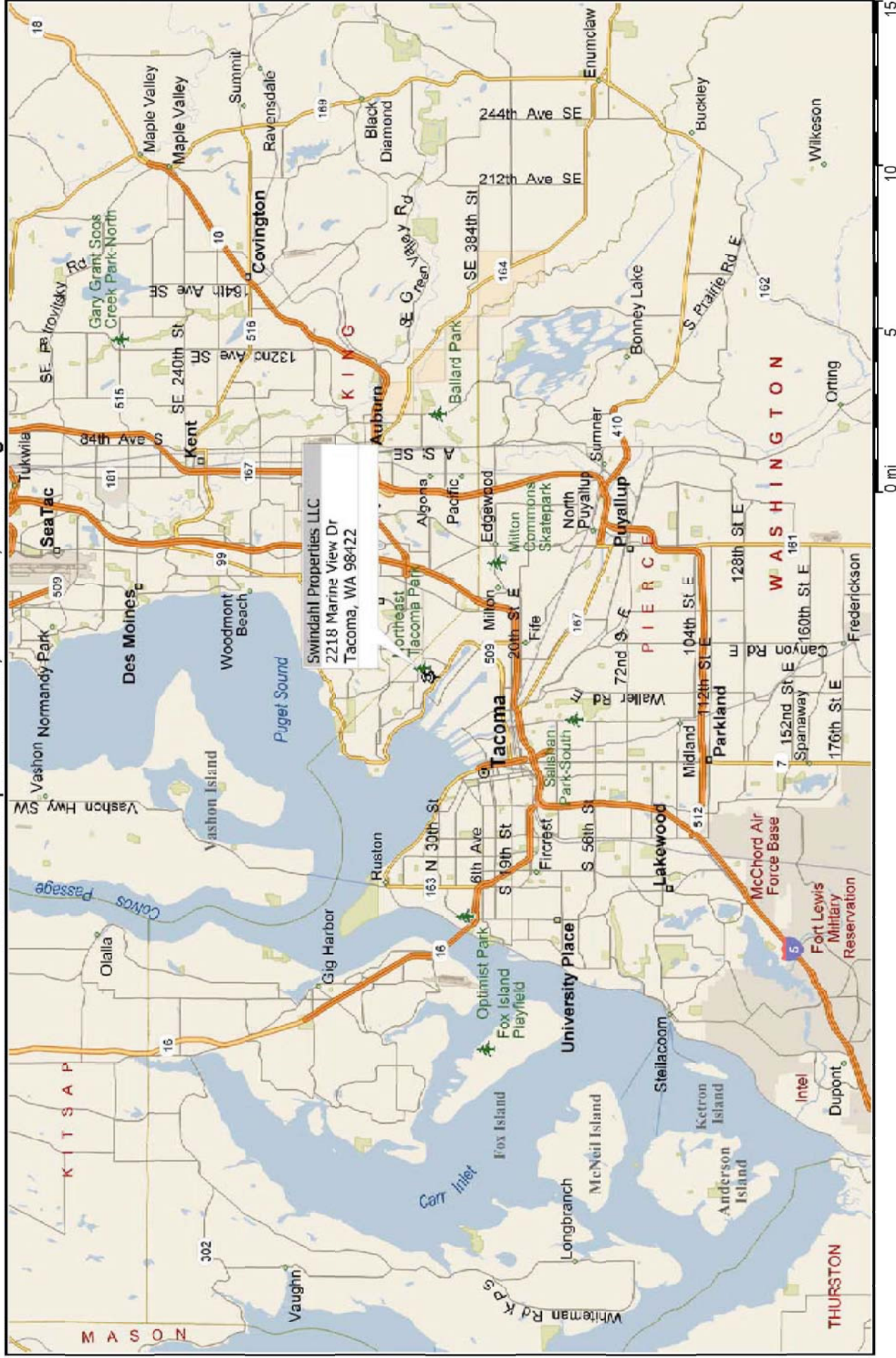
cPAHs by EPA Method 8270 SIM Arsenic and Lead by EPA Method 7010

Bolded numbers and red-shaded cells denote concentrations above the MTCA Method A Cleanup Levels for groundwater

Bolded numbers and gray-shaded cells denote total concentrations above the MTCA Method A Cleanup Levels for groundwater, but dissolved concentrations below the MTCA Method A Cleanup Levels



# Swindahl Properties LLC, Tacoma, Washington



Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington

## REGIONAL MAP

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ENVIRONMENTAL CONSULTING

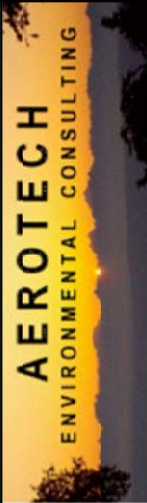
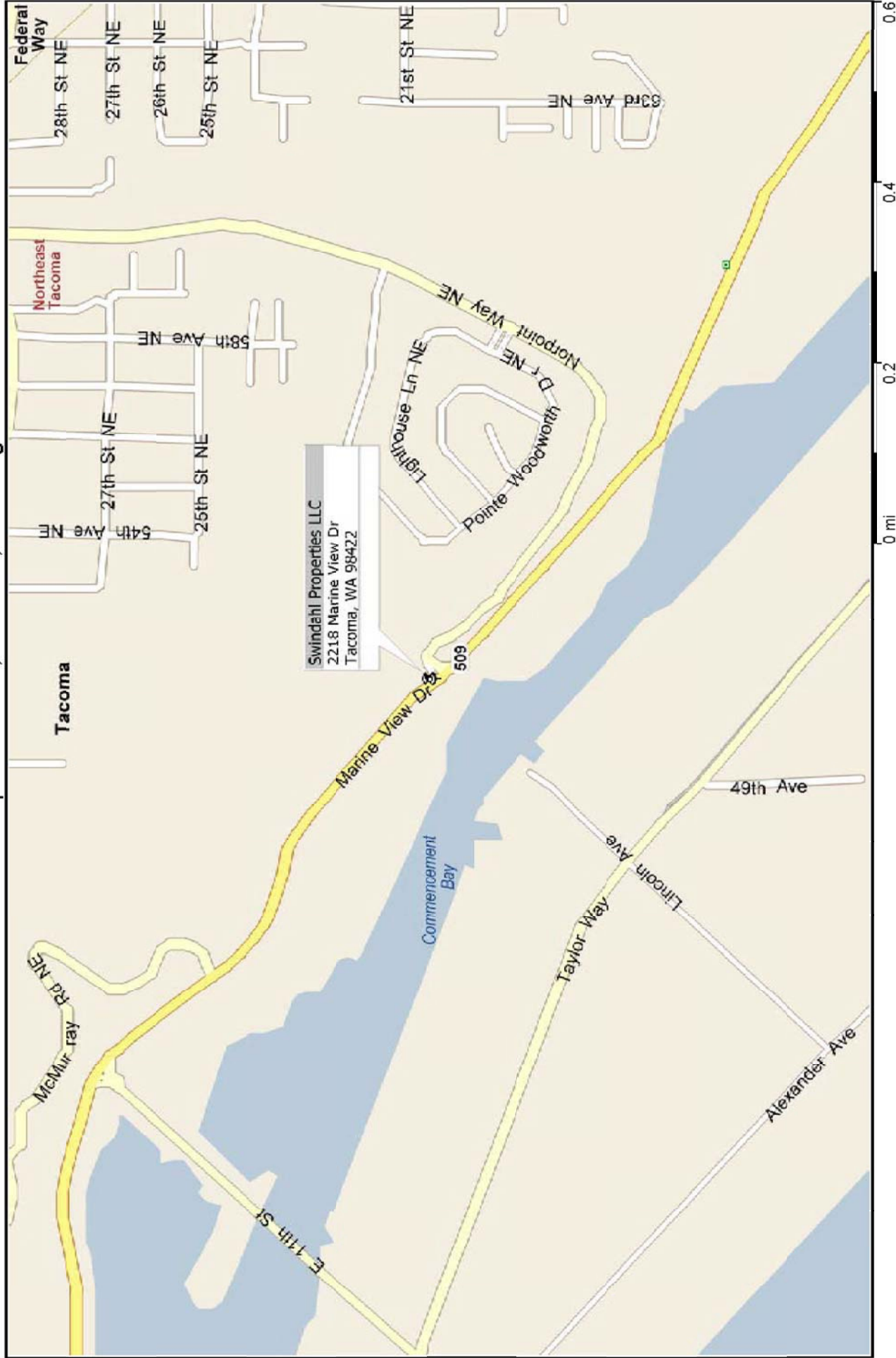
Date: 04/19/18

By: Nick Gerkin

Figure:

1

# Swindahl Properties LLC, Tacoma, Washington



## NEIGHBORHOOD MAP

Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington

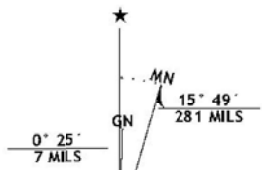
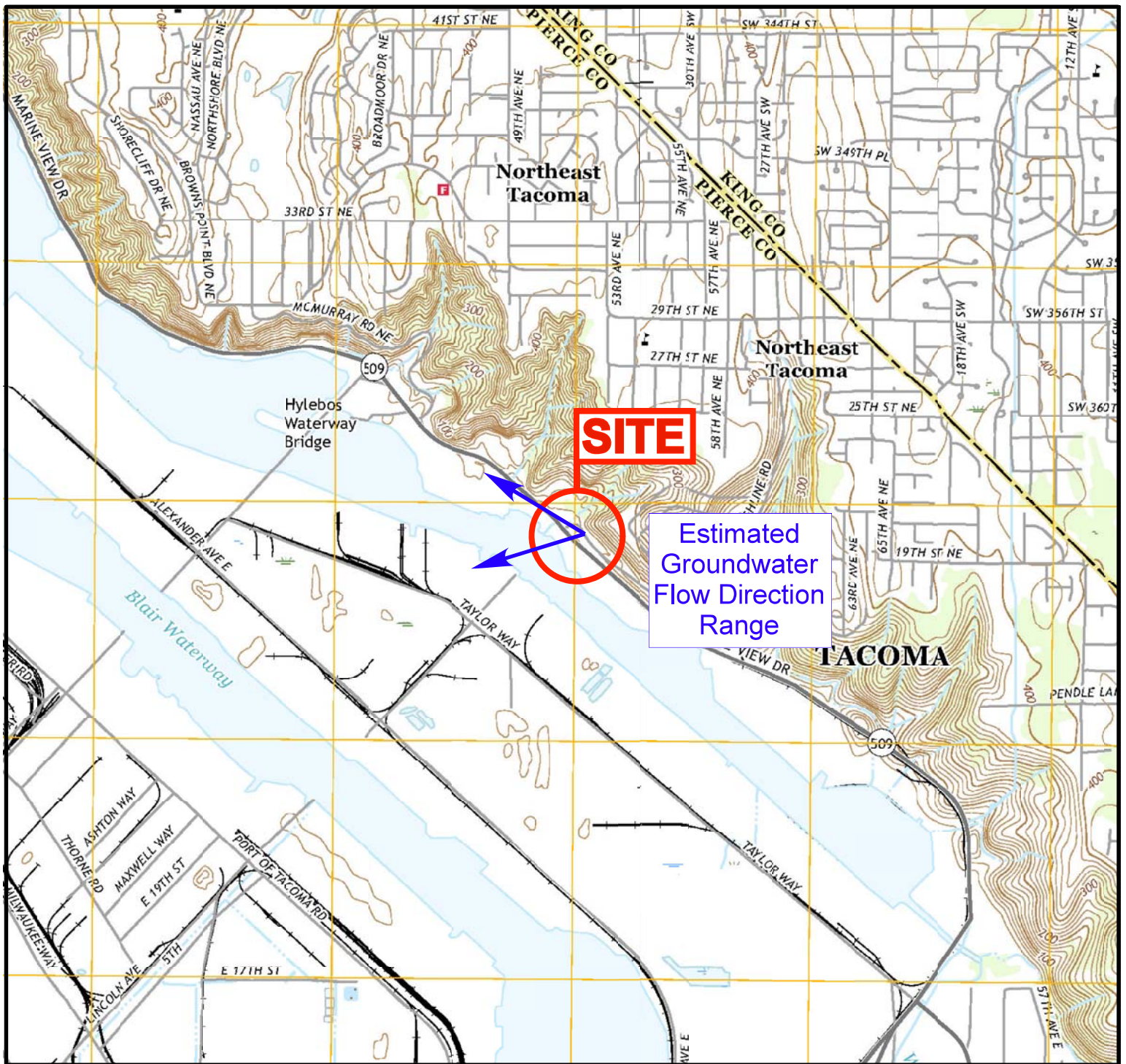
Date: 04/19/18

By: Nick Gerkin

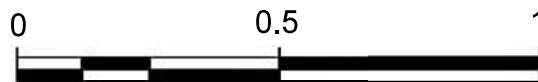
Figure:

2





UTM GRID AND 2017 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET



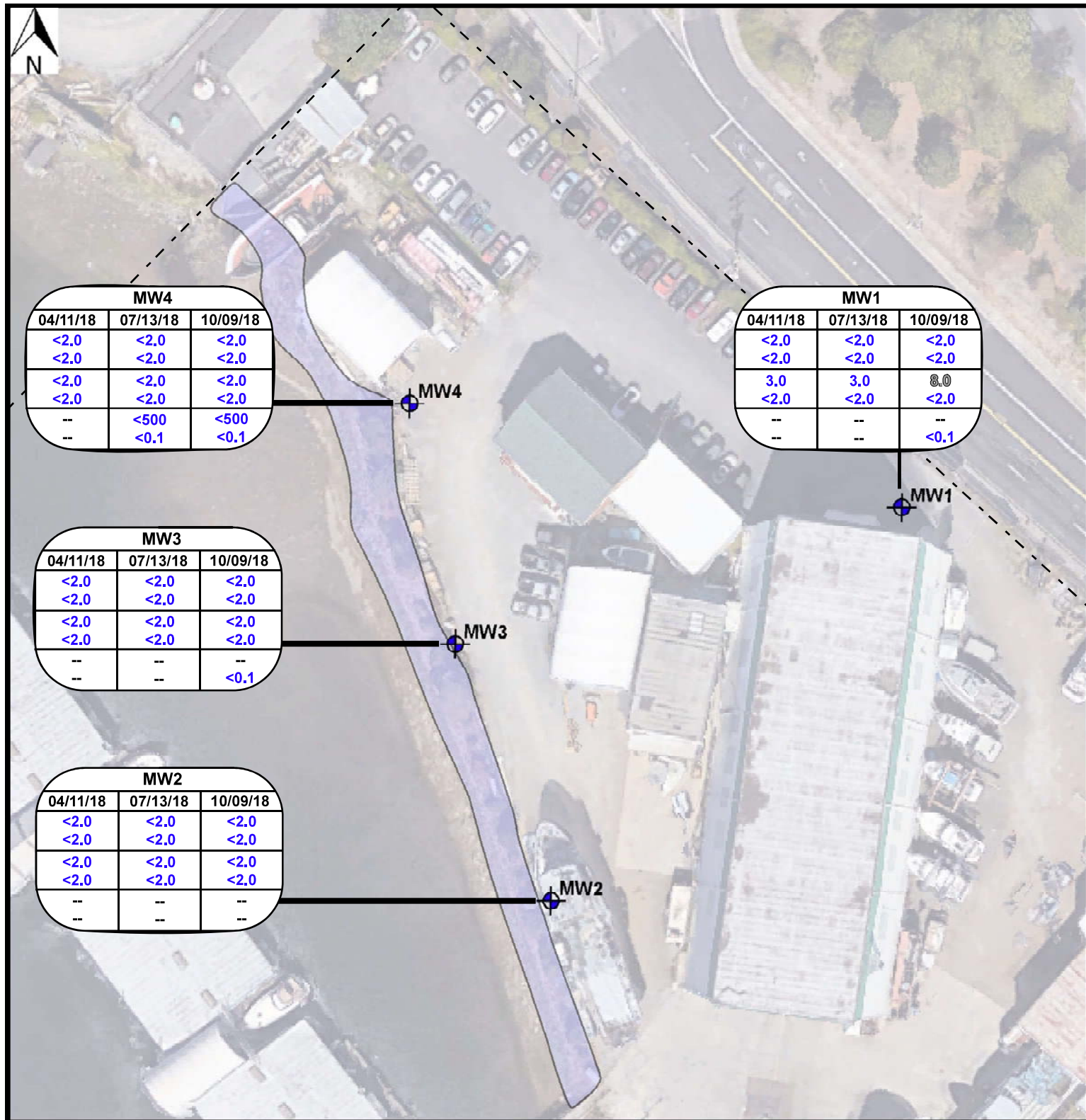
SCALE (mile)

CONTOUR INTERVAL 20 FEET  
NORTH AMERICAN VERTICAL DATUM OF 1988

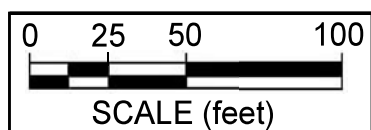


QUADRANGLE LOCATION





## EXPLANATION



Groundwater  
Monitoring Well



Concrete  
Shoreline Fill

- - - - - Property Line

MW4	
10/09/18	
<2.0	Total Lead
<2.0	Dissolved Lead
<2.0	Total Arsenic
<2.0	Dissolved Arsenic
<500	TPHo (Oil)
<0.1	cPAHs

Well ID  
Date  
Total Lead  
Dissolved Lead  
Total Arsenic  
Dissolved Arsenic  
TPHo (Oil)  
cPAHs

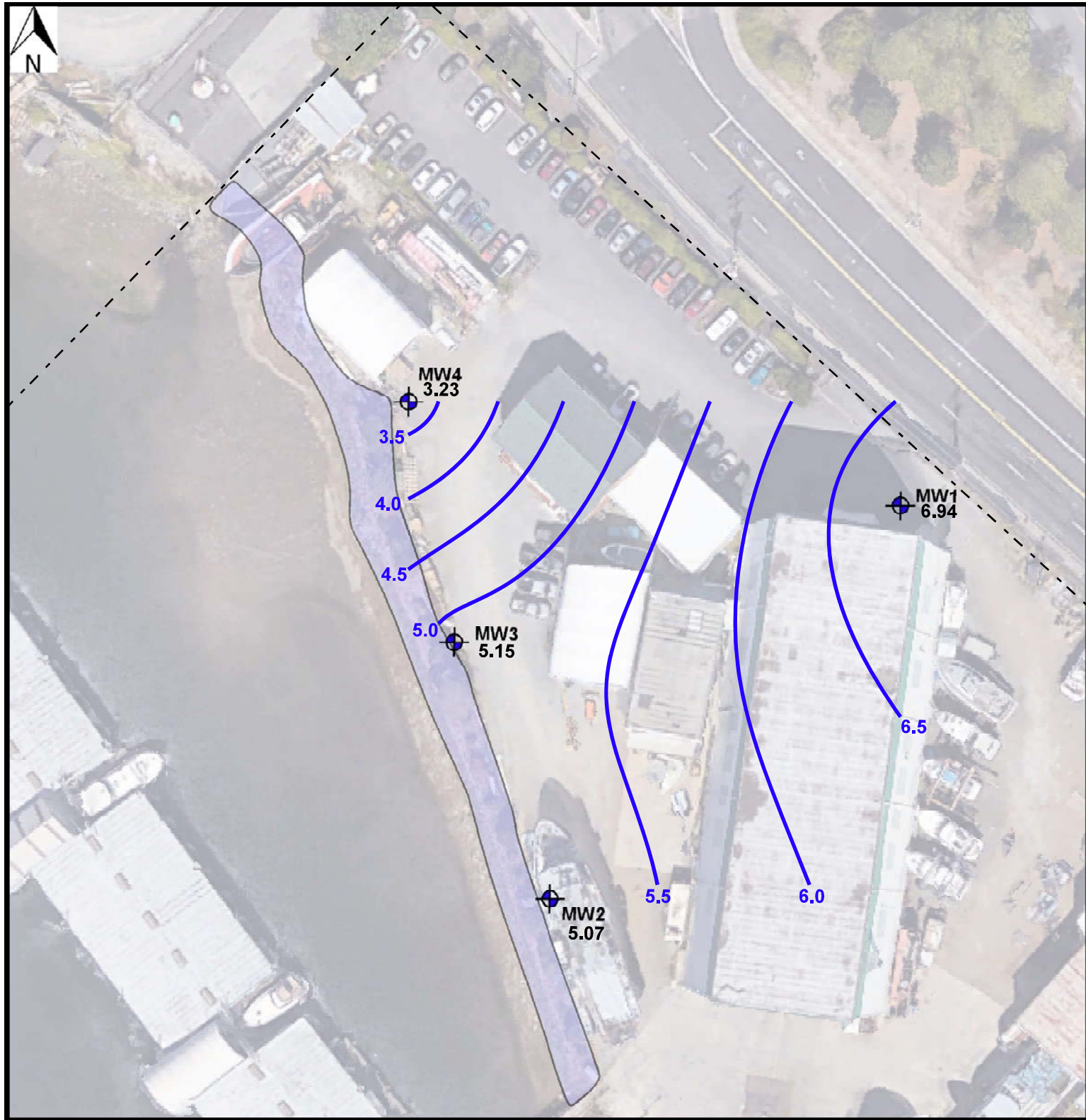
All Concentrations are reported in µg/kg

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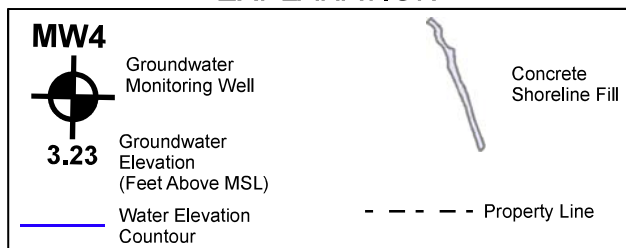
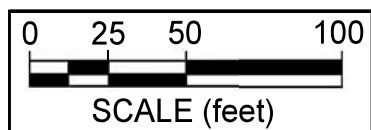
## GROUNDWATER ANALYTICAL RESULTS 10/09/18

Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington

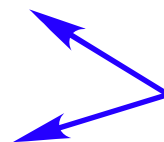
Date: 10/26/18  
By: Nick Gerkin  
Figure:



### EXPLANATION



Estimated Groundwater Flow Direction Range



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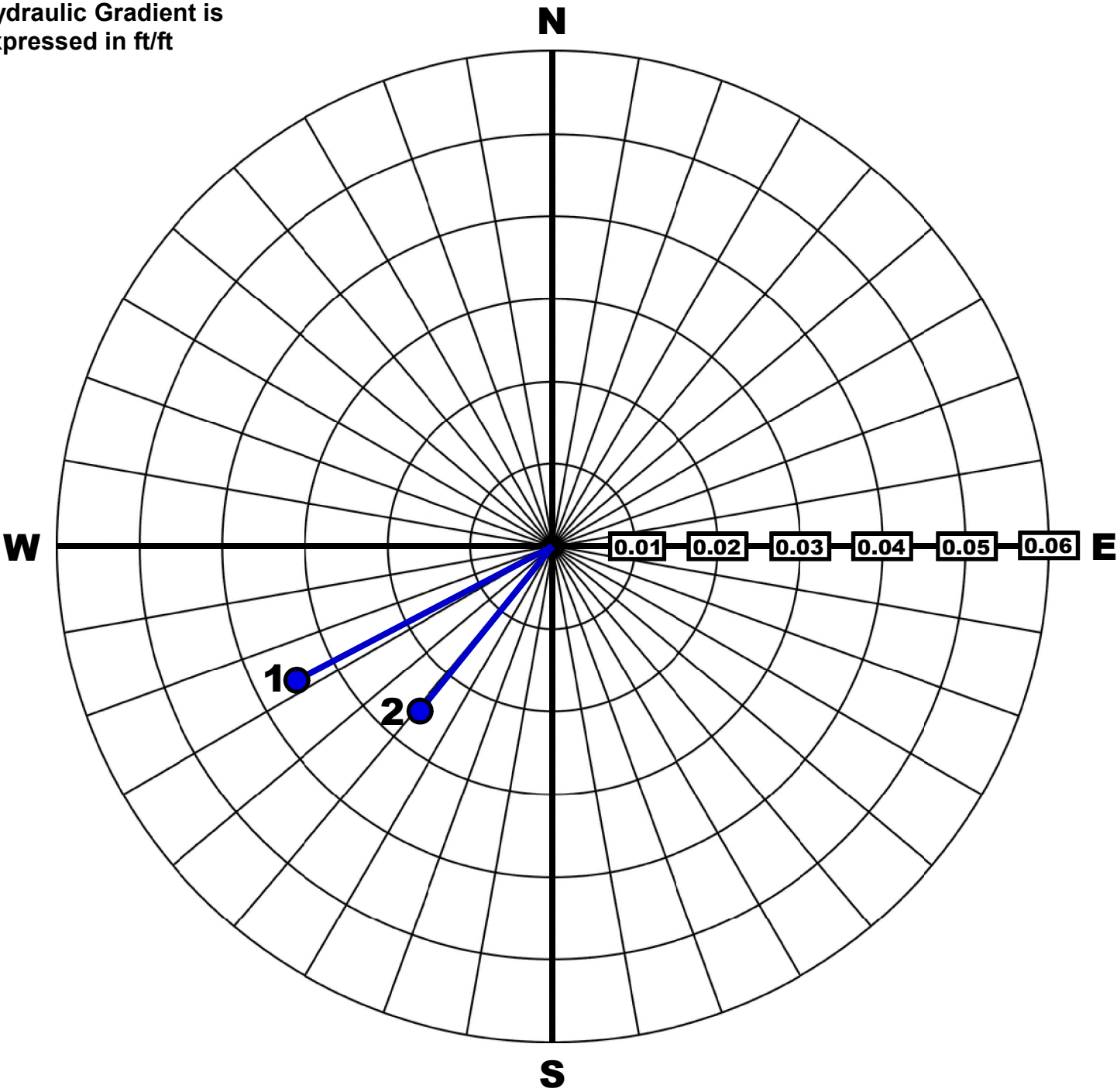
**POTENTIOMETRIC  
SURFACE MAP  
10/09/18**

Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington

Date: 10/25/18  
By: Nick Gerkin  
Figure: 5



Hydraulic Gradient is  
expressed in ft/ft



GAUGING EVENTS

- 1 04/11/18
- 2 07/13/18

10/09/18 is Omitted form the Rose Diagram  
due to Drastic Flow Direction and Gradient  
Variation Across the Site



ROSE DIAGRAM

Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington



- Project Contract Documents

## ENVIRONMENTAL CONTRACTOR'S CERTIFICATION

Swindahl Properties LLC  
2218 Marine View Drive  
Tacoma, Washington 98422

1. Contractor's Name: Aerotech Environmental Consulting, Inc.
2. Contractor's Address: 13925 Interurban Avenue South, Ste. 210, Seattle, Washington 98168
3. Name and title of person completing this certification: Alan T. Blotch / President
4. Answer the following questions about each employee that contractor will have perform the assessment or prepare the report showing the results of the inspection:
  - a. Name and Title of Employee: Alan T. Blotch – Environmental Professional
  - b. Length of experience doing environmental assessments: 31 years
  - c. Education degrees received: Masters of Business Administration  
Juris Doctor – Environmental Law
  - d. Relevant training received: ASTM E50 Environmental Assessment Committee Meetings
5. Identify any certifications and approvals issued to contractor pursuant to an official Federal, State or local program or policy to conduct environmental assessments: Registered Environmental Assessor  
Issued by State of California
6. Describe the generally recognized standards which the contractor will use to perform the assessment.  
*Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process*  
(ASTM E 1903)
7. Disclose the nature of any previous environmental inspections contractor has ever performed for the Owner of the property: Phase I Environmental Site Assessment
8. Disclose the nature of any affiliation or association contractor now has, or ever had, with the above referenced seller of the property, of the above referenced buyer of the property: N/A
9. Describe the liability insurance carried by contractor to cover claims in the event that it fails to discover adverse environmental conditions during an environmental inspection.  
Professional Errors & Omissions Coverage \$1,000,000 / claim and \$1,000,000 aggregate liability

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

Signature



Date

10-26-18

- Laboratory Analytical Report and Chain of Custody

October 18, 2018

*Devin Melville  
Aerotech Environmental, Inc.  
13925 Interurban Avenue South, Suite 210  
Seattle, WA 98168*

Dear Ms. Melville:

Please find enclosed the analytical data report for the *Modutech (Swindahl Properties) (C81010-3)* Project.

Samples were received on *October 10, 2018*. The results of the analyses are presented in the attached tables. Applicable reporting limits, QA/QC data and data qualifiers are included. A copy of the chain-of-custody and an invoice for the work is also enclosed.

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

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

Sincerely,



Val G. Ivanov, Ph.D.  
Laboratory Manager

---

4078 148 Ave NE ■ Redmond, WA 98052

425.702-8571

*E-mail: aachemlab@yahoo.com*



Advanced Analytical Laboratory  
(425) 702-8571

AAL Job Number:	C81010-3
Client:	Aerotech Environmental
Project Manager:	Devin Melville, Nick Gerkin
Client Project Name:	Modutech (Swindahl Properties)
Client Project Number:	na
Date received:	10/10/18

Advanced Analytical Laboratory  
(425) 702-8571

AAL Job Number: C81010-3  
Client: Aerotech Environmental  
Project Manager: Devin Melville, Nick Gerkin  
Client Project Name: Modutech (Swindahl Properties)  
Client Project Number: na  
Date received: 10/10/18

Analytical Results

NWTPH-Dx, ug/L		MTH BLK	W-MW4
Matrix	Water	Water	Water
Date extracted	Reporting	10/10/18	10/10/18
Date analyzed	Limits	10/10/18	10/10/18
Kerosene/Jet fuel	200	nd	nd
Diesel/Fuel oil	200	nd	nd
Heavy oil	500	nd	nd

Surrogate recoveries:

Fluorobiphenyl	125%	115%
o-Terphenyl	124%	115%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits  
na - not analyzed  
C - coelution with sample peaks  
Acceptable Recovery limits: 70% TO 130%  
Acceptable RPD limit: 30%

Advanced Analytical Laboratory  
(425) 702-8571

AAL Job Number: C81010-3  
Client: Aerotech Environmental  
Project Manager: Devin Melville, Nick Gerkin  
Client Project Name: Modutech (Swindahl Properties)  
Client Project Number: na  
Date received: 10/10/18

Analytical Results

PAH(8270), ug/L		MTH BLK	LCS	W-MW1	W-MW3	W-MW4	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	10/12/08	10/12/08	10/12/08	10/12/08	10/12/08	10/12/08	10/12/08	10/12/08
Date analyzed	Limits	10/12/08	10/12/08	10/12/08	10/12/08	10/12/08	10/12/08	10/12/08	10/12/08
Naphthalene	0.1	nd		3.8	0.66	3.7			
1-Methylnaphthalene	0.1	nd		0.52	nd	0.46			
2-Methylnaphthalene	0.1	nd		nd	nd	nd			
Acenaphthylene	0.1	nd		nd	nd	nd			
Acenaphthene	0.1	nd	100%	2.3	0.56	0.58	103%	102%	0%
Fluorene	0.1	nd		nd	nd	nd			
Phenanthrene	0.1	nd		0.68	0.22	0.16			
Anthracene	0.1	nd		nd	nd	nd			
Fluoranthene	0.1	nd		nd	nd	nd			
Pyrene	0.1	nd	105%	nd	nd	nd	105%	108%	2%
Benzo(a)anthracene	0.1	nd		nd	nd	nd			
Chrysene	0.1	nd		nd	nd	nd			
Benzo(b)fluoranthene	0.1	nd		nd	nd	nd			
Benzo(k)fluoranthene	0.1	nd		nd	nd	nd			
Benzo(a)pyrene	0.1	nd		nd	nd	nd			
Indeno(1,2,3-cd)pyrene	0.1	nd		nd	nd	nd			
Dibenzo(ah)anthracene	0.1	nd		nd	nd	nd			
Benzo(ghi)perylene	0.1	nd		nd	nd	nd			

Surrogate recoveries:

Fluorobiphenyl	98%	101%	87%	99%	83%	101%	103%
o-Terphenyl	102%	99%	102%	98%	103%	97%	101%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits  
na - not analyzed  
Acceptable Recovery limits: 50% TO 150%  
Acceptable RPD limit: 50%

Advanced Analytical Laboratory  
(425) 702-8571

AAL Job Number: C81010-3  
Client: Aerotech Environmental  
Project Manager: Devin Melville, Nick Gerkin  
Client Project Name: Modutech (Swindahl Properties)  
Client Project Number: na  
Date received: 10/10/18

Analytical Results

Metals Total (7010), ug/L		MTH BLK	LCS	W-MW1	W-MW2	W-MW3	W-MW4
Matrix	Water	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	10/18/18	10/18/18	10/18/18	10/18/18	10/18/18	10/18/18
Date analyzed	Limits	10/18/18	10/18/18	10/18/18	10/18/18	10/18/18	10/18/18
Lead Total (Pb)	2.0	nd	85%	nd	nd	nd	nd
Arsenic Total (Pb)	2.0	nd	88%	8.0	nd	nd	nd

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

na - not analyzed

Acceptable Recovery limits: 70% TO 130%

Acceptable RPD limit: 30%



Advanced Analytical Laboratory  
(425) 702-8571

AAL Job Number: C81010-3  
Client: Aerotech Environmental  
Project Manager: Devin Melville, Nick Gerkin  
Client Project Name: Modutech (Swindahl Prope  
Client Project Number: na  
Date received: 10/10/18

Analytical Results

Metals Total (7010), ug/L		MS	MSD	RPD
Matrix	Water	Water	Water	Water
Date extracted	Reporting	10/18/18	10/18/18	10/18/18
Date analyzed	Limits	10/18/18	10/18/18	10/18/18
Lead Total (Pb)	2.0	106%	96%	9%
Arsenic Total (Pb)	2.0	91%	90%	0%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

na - not analyzed

Acceptable Recovery limits: 70% TO 130%

Acceptable RPD limit: 30%

Advanced Analytical Laboratory  
(425) 702-8571

AAL Job Number: C81010-3  
Client: Aerotech Environmental  
Project Manager: Devin Melville, Nick Gerkin  
Client Project Name: Modutech (Swindahl Properties)  
Client Project Number: na  
Date received: 10/10/18

Analytical Results

Metals Dissolved (7010), ug/L		MTH BLK	LCS	W-MW1	W-MW2	W-MW3	W-MW4
Matrix	Water	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	10/18/18	10/18/18	10/18/18	10/18/18	10/18/18	10/18/18
Date analyzed	Limits	10/18/18	10/18/18	10/18/18	10/18/18	10/18/18	10/18/18
Lead Total (Pb)	2.0	nd	85%	nd	nd	nd	nd
Arsenic Total (Pb)	2.0	nd	88%	nd	nd	nd	nd

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

na - not analyzed

Acceptable Recovery limits: 70% TO 130%

Acceptable RPD limit: 30%

Advanced Analytical Laboratory  
(425) 702-8571

AAL Job Number: C81010-3  
Client: Aerotech Environmental  
Project Manager: Devin Melville, Nick Gerk  
Client Project Name: Modutech (Swindahl Proj  
Client Project Number: na  
Date received: 10/10/18

Analytical Results

Metals Dissolved (7010), ug/L		MS	MSD	RPD
Matrix	Water	Water	Water	Water
Date extracted	Reporting	10/18/18	10/18/18	10/18/18
Date analyzed	Limits	10/18/18	10/18/18	10/18/18
Lead Total (Pb)	2.0	106%	96%	9%
Arsenic Total (Pb)	2.0	91%	90%	0%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

na - not analyzed

Acceptable Recovery limits: 70% TO 130%

Acceptable RPD limit: 30%

# Chain of Custody Record

Page of

**ADVANCED ANALYTICAL**

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

Laboratory Job #: C81010-3

Client: Leeward Environmental Consulting  
Project Name: Multimedia Environmental Properties

Project Manager: Debra Neville  
Project Number: ---

Address: 13025 International Ave. S. Tukwila, WA  
Collector: Debra Neville

Phone: (206) 764-4644  
Date of collection: 10/10/18

Sample ID	Time	Matrix	Container type	8260 Volatiles	BTEX	BTEX/NWTPH-GX	NWTPH-GX	NWTPH-DX	NWTPH-HCID	8270 Semivolatiles	8270 PAH	8082 PCBs	8081 Pesticides	RCRA 8 Metals	Lead	MTCAS Metals	Notes, comments	# of containers
1	0831	poly	poly															1
2	0832	poly	poly															1
3	0833	poly	poly															5
4	0834	poly	poly															5
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		

Sample receipt info:  
Total # of containers: 0  
Condition (temp, °C): 24 hr  
Seals (intact?, Y/N): 48 hr  
Comments: Standard

Relinquished by:	Date/Time	Received by:	Date/Time
<u>Ady...</u>	<u>10/10/18</u>	<u>...</u>	<u>10/10/18 14:45</u>
Relinquished by:	Date/Time	Received by:	Date/Time

- Standard Operating Procedure

# ***AEROTECH***

## ***Environmental Consulting Inc.***

13925 Interurban Avenue South, Suite No.210  
Seattle, Washington 98168  
(360)710-5899

512 W. International Airport Road, Suite 201  
Anchorage, Alaska 99518  
(907) 575-6661

### **LOW-FLOW GROUNDWATER SAMPLING STANDARD OPERATING PROCEDURE**

The following protocol and sampling procedures were designed to meet or exceed standards for groundwater monitoring well sampling, as specified by the State of Washington Department of Ecology “*Standard Operating Procedures for Purging and Sampling Monitoring Wells, Version 1.0,*” dated and approved on October 4, 2011. These procedures are strictly adhered to by Aerotech field staff:

#### **Cross-Contamination Mitigation Protocol**

A sampling table is set up adjacent to the well head in order to protect field equipment from contact with the ground, to prevent or minimize the possible introduction of foreign materials into the wells, and in general in order to mitigate the possibility of cross-contamination. Where previous laboratory data is available, or where visual or olfactory indicators provide initial evidence, well sampling order is arranged to proceed with the least contaminated well, often the upgradient groundwater monitoring wells, and sampling order proceeds by sampling wells associated with successively higher contamination levels. Thus, the wells exhibiting the highest contamination levels are sampled last, in order to minimize the possibility of cross contamination.

A fresh pair of disposable Nitrile gloves is worn at each well. Equipment neither disposable nor dedicated to wells, is washed in a dedicated container prepared with non-phosphate Alconox detergent and triple rinsed in a second container prepared with distilled and/or deionized water. Surfaces that cannot be readily submerged for the purpose of decontamination, are sprayed with wash water followed by rinse water, and wiped with a fresh disposable paper towel. For shallow wells that require a peristaltic pump, dedicated tubing is left in each well after sampling, however, for deeper wells that require a submersible pump, dedicated tubing is recovered from wells after each use, and deployed to a designated dedicated clean plastic bag, bearing a label indicating well identification information.

#### **Water Level Measurement**

Prior to the well purge process and the collection of groundwater samples, groundwater levels are measured at the north side of the (“TOC”) with a piezometer/water level indicator, by slowly lowering the sensor into wells prior to purging, in order to minimize disturbances. The water levels are measured twice, with tape marked in 0.01 foot increments, in order to reduce possible reading error. Where appropriate, free product thickness is measured with gas level indicator paste or an interface indicator. Upon arrival at the well and visual inspection, the condition of the well and well head.

#### **Groundwater Monitoring Well Purge and Sampling Methodologies**

Prior to groundwater sample collection, A dedicated length of high density polyethylene tubing is lowered into each well to a level near the middle of the screened interval. A dedicated



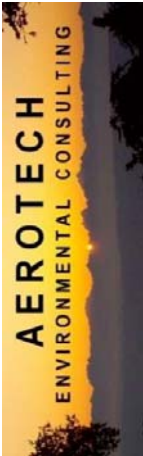
length of clean silicone tubing is utilized within the pump mechanism. The wells are purged by means of low flow techniques, during which time groundwater is monitored for physical parameters, including temperature, pH, specific conductivity, dissolved oxygen (DO), and oxidation-reduction potential (ORP), by means of a multi-parameter device mounted upon a flow cell, until such time as values recorded have stabilized and equilibrium conditions are verified according to State guidelines. This protocol ensures that collected groundwater samples are representative of in-situ groundwater conditions. Readings are recorded once every 2 to 5 minutes, including water level measurement. The pumping rate shall remain below 1 L/min during monitoring and sampling procedures. This is verified by periodically filling a one-Liter graduated cylinder and recording the rate, adjusting the pump as necessary. The water column within the well should remain within 5% of the static height during the purge and sample process, if this cannot be achieved, the pump rate will be reduced until the water level stabilizes. The following conditions must be met in three consecutive readings prior to sampling:

- pH +/- 0.1 standard units
- Specific Conductivity +/- 10.0  $\mu\text{mhos/cm}$  for values  $< 1,000 \mu\text{mhos/cm}$   
+/- 20.0  $\mu\text{mhos/cm}$  for values  $> 1,000 \mu\text{mhos/cm}$
- DO +/- 0.05 mg/L for values  $< 1 \text{ mg/L}$   
+/- 0.2 mg/L for values  $> 1 \text{ mg/L}$
- Temperature +/- 0.1 degrees Celsius
- ORP +/- 10 mV

Groundwater samples are collected in containers specified by the laboratory for the analyses established at the Site, and in accordance with State of Washington regulations or guidelines. Sample containers are labeled with site name, well identification, and date of collection information. Each sample is documented on a *Chain of Custody* (“COC”) form, and immediately placed in an iced cooler (maintained at 4 degrees Celsius or less) for transport to a certified laboratory for analysis. Please note that any purge water suspected or confirmed to contain concentrations above the MTCA Cleanup Levels is drummed and left on Site.

Please feel free to contact the Aerotech Geologist Mr. Simon Payne at (206) 741-1651, or the Aerotech Environmental Scientist/Field Sampling Coordinator, Mr. Nicholas Gerkin, at (206) 257-4211, if you have questions regarding work completed at this Site.

- Field Documentation



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GROUNDWATER MONITORING WELL  
GAUGING RECORD

FIELD CREW: DRM	PROJECT NAME: Swindahl Properties LLC
DATE: 10/09/18	PROJECT ADDRESS: 2218 Marine View Drive, Tacoma, Washington

Well ID	Time	Wellhead Elevation	Depth to Water	Groundwater Elevation	Depth of Well	Well Diameter	Comments
	hh:mm	Feet Above MSL	Feet Below TOC	Feet Above MSL	Feet Below TOC	Inches	
MW1	7:58	11.75	4.81	6.94	18.5	2	Well is new and in great condition
MW2	8:01	10.27	5.20	5.07	18.9	2	Well is new and in great condition
MW3	8:00	10.72	5.57	5.15	19.3	2	Well is new and in great condition
MW4	7:59	11.02	7.79	3.23	19.6	2	Well is new and in great condition

EXPLANATION

MSL = Mean Sea Level

TOC = Top of Casing

-- = Not Measured or Not Calculated



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## GROUNDWATER MONITORING WELL LOW FLOW SAMPLING FIELD LOG

<b>FIELD CREW:</b> DRM	<b>PROJECT NAME:</b> Swindahl Properties LLC
<b>DATE:</b> 10/09/18	<b>PROJECT ADDRESS:</b> 2218 Marine View Drive, Tacoma, Washington

<b>MW1</b>		Purge Start: 8:08		Purge Stop: 8:39		Purge V (L): <b>5.43</b>	
Time	DTW	Purge Rate	Temperature	Specific Conductivity	DO	pH	ORP
hr:min	feet	mL/min	°C	mS/cm	mg/L	unit	mV
07:58	4.81	--	--	--	--	--	--
08:11	4.97	175	16.1	336.2	1.42	7.21	293.7
08:13	4.97	175	16.0	333.6	1.11	7.05	274.6
08:15	4.97	175	16.2	328.5	0.93	6.98	240.4
08:17	4.97	175	16.2	329.4	0.89	6.95	196.9
08:19	4.97	175	16.2	3331.1	0.77	6.91	111.3
08:21	4.97	175	16.2	333.9	0.76	6.89	72.2
08:23	4.97	175	16.3	333.1	0.71	6.88	33.5
08:25	4.97	175	16.3	331.2	0.67	6.87	13.5
08:27	4.97	175	16.2	331.4	0.68	6.86	-3.3
08:29	4.97	175	16.3	332.5	0.64	6.86	-13.7
08:31	4.97	175	16.3	334.4	0.61	6.85	-20.9
08:33	4.97	175	16.4	333.6	1.90	6.85	-27.4
08:35	4.97	175	16.4	330.9	3.14	6.85	-33.8
08:37	4.97	175	16.4	329.5	2.87	6.84	-38.6
08:39	4.97	175	16.4	327.1	2.97	6.84	-41.6
Ecology Parameter Limits (3 Consecutive Readings)			<b>+/- 0.1</b>	<b>+/- 10</b>	<b>+/- 0.2</b>	<b>+/- 0.1</b>	<b>+/- 10</b>
<b>08:39</b>	<b>SAMPLE</b>	--	--	--	--	--	--
<b>Comments:</b>							



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## GROUNDWATER MONITORING WELL LOW FLOW SAMPLING FIELD LOG

<b>FIELD CREW:</b> DRM	<b>PROJECT NAME:</b> Swindahl Properties LLC
<b>DATE:</b> 10/09/18	<b>PROJECT ADDRESS:</b> 2218 Marine View Drive, Tacoma, Washington

<b>MW2</b>		Purge Start: 8:58		Purge Stop: 9:32		Purge V (L): 8.50	
Time	DTW	Purge Rate	Temperature	Specific Conductivity	DO	pH	ORP
hr:min	feet	mL/min	°C	mS/cm	mg/L	unit	mV
08:01	9.35	--	--	--	--	--	--
09:02	9.73	250	14.8	34,786	21.19	7	-69.8
09:04	9.73	250	14.9	34,750	17.20	7.08	-72.7
09:06	9.79	250	14.8	34,690	17.39	7.22	-73.7
09:08	9.79	250	14.8	34,634	17.12	7.31	-71.8
09:10	9.81	250	14.8	34,605	15.89	7.35	-69.4
09:12	9.81	250	14.8	34,546	13.62	7.39	-66.0
09:14	9.84	200	14.8	34,456	11.36	7.4	-63.5
09:16	9.84	200	14.7	34,289	15.06	7.44	-60.1
09:18	9.84	200	14.7	34,038	18.15	7.48	-57.4
09:20	9.87	200	14.7	33,919	17.96	7.51	-57.0
09:22	9.87	200	14.6	33,752	19.17	7.55	-54.7
09:24	9.87	200	14.6	33,655	19.09	7.59	-51.6
09:26	9.87	200	14.6	33,629	19.18	7.61	-48.3
09:28	9.87	200	14.6	33,619	20.11	7.64	-43.5
09:30	9.87	200	14.6	33,605	20.16	7.66	-39.7
09:32	9.87	200	14.6	33,610	20.66	7.67	-35.4
Ecology Parameter Limits (3 Consecutive Readings)			<b>+/- 0.1</b>	<b>+/- 10</b>	<b>+/- 0.2</b>	<b>+/- 0.1</b>	<b>+/- 10</b>
09:32	<b>SAMPLE</b>	--	--	--	--	--	--
<b>Comments:</b>							



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## GROUNDWATER MONITORING WELL LOW FLOW SAMPLING FIELD LOG

<b>FIELD CREW:</b> DRM	<b>PROJECT NAME:</b> Swindahl Properties LLC
<b>DATE:</b> 10/09/18	<b>PROJECT ADDRESS:</b> 2218 Marine View Drive, Tacoma, Washington

<b>MW3</b>		Purge Start: 9:32		Purge Stop: 10:17		Purge V (L): 9.00	
Time	DTW	Purge Rate	Temperature	Specific Conductivity	DO	pH	ORP
hr:min	feet	mL/min	°C	mS/cm	mg/L	unit	mV
08:00	5.57	--	--	--	--	--	--
09:51	8.69	200	14.2	37,095	16.62	7.77	84.7
09:53	8.75	200	14.2	37,135	15.59	7.81	67.7
09:55	8.80	200	14.3	37,200	15.26	7.83	54.9
09:57	8.85	200	14.3	37,259	14.67	7.85	47.4
09:59	8.88	200	14.3	37,298	13.79	7.86	43.9
10:01	8.92	200	14.3	37,340	13.11	7.87	40.6
10:03	8.92	200	14.3	37,388	11.95	7.88	38.7
10:05	8.92	200	14.4	37,433	11.00	7.89	37.3
10:07	8.98	200	14.4	37,436	10.69	7.89	37.2
10:09	8.98	200	14.4	37,459	10.56	7.90	36.6
10:11	8.98	200	14.4	37,486	9.80	7.90	36.1
10:13	8.98	200	14.4	37,517	9.07	7.90	36.0
10:15	8.98	200	14.4	37,532	9.06	7.91	35.8
10:17	8.99	200	14.5	37,546	9.00	7.91	35.6
Ecology Parameter Limits (3 Consecutive Readings)			<b>+/- 0.1</b>	<b>+/- 10</b>	<b>+/- 0.2</b>	<b>+/- 0.1</b>	<b>+/- 10</b>
<b>10:17</b>	<b>SAMPLE</b>	--	--	--	--	--	--
<b>Comments:</b>							





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## GROUNDWATER MONITORING WELL LOW FLOW SAMPLING FIELD LOG

<b>FIELD CREW:</b> DRM	<b>PROJECT NAME:</b> Swindahl Properties LLC
<b>DATE:</b> 10/09/18	<b>PROJECT ADDRESS:</b> 2218 Marine View Drive, Tacoma, Washington

<b>MW4</b>		Purge Start: 10:36		Purge Stop: 11:06		Purge V (L): 6.75	
Time	DTW	Purge Rate	Temperature	Specific Conductivity	DO	pH	ORP
hr:min	feet	mL/min	°C	mS/cm	mg/L	unit	mV
07:59	7.79	--	--	--	--	--	--
10:40	8.09	225	15.8	4568	1.19	7.50	162.1
10:42	8.15	225	15.9	4495	1.02	7.39	129.7
10:44	8.22	150	15.9	4444	2.82	7.32	69.9
10:46	8.22	150	15.9	4355	4.51	7.28	19.8
10:48	8.36	150	16.0	4307	3.85	7.26	-11.0
10:50	8.41	150	16.0	4287	4.07	7.25	-34.6
10:52	8.40	150	16.0	4292	4.12	7.25	-40.3
10:54	8.50	150	16.0	4301	3.26	7.24	-49.8
10:56	8.50	150	16.0	4315	0.86	7.23	-59.1
10:58	8.55	150	16.0	4318	0.88	7.23	-61.4
11:00	8.55	150	16.0	4330	0.83	7.23	-66.1
11:02	8.64	150	16.0	4337	0.75	7.22	-70.4
11:04	8.70	150	16.0	4346	0.73	7.22	-73.3
11:06	8.70	150	16.0	4353	0.73	7.21	-76.0
Ecology Parameter Limits (3 Consecutive Readings)			<b>+/- 0.1</b>	<b>+/- 10</b>	<b>+/- 0.5</b>	<b>+/- 0.1</b>	<b>+/- 10</b>
<b>11:06</b>	<b>SAMPLE</b>	--	--	--	--	--	--
<b>Comments:</b>							