

Ground Water Monitoring Report
Second Quarter 2003

ISAACS PROPERTY

ORESTES Seattle, Washington

14 Roy St.

Prepared for

RMB Properties, LLC

Project No. KV03139A
May 30, 2003

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DEPT OF ECOLOGY

GROUND WATER MONITORING REPORT SECOND QUARTER 2003

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1.0 INTRODUCTION

This report presents the results of ground water monitoring activities for the second quarter of 2003 performed by Associated Earth Sciences, Inc. (AESI) at the site located at 14 Roy Street in Seattle, Washington.

1.1 Site Location And Description

The project site is located to the northeast of the Seattle Center on Roy Street. The project address is 14 Roy Street, Seattle, Washington. Currently, a newly constructed building is located on the subject property with the Barclay Court Apartments on the upper levels and The UPS store, Quinzo's, and Family Medical Offices on the street level. The project location is shown in Figure 1 (Vicinity Map) and Figure 2 (Ground Water Monitoring Well Site Schematic).

1.2 Site History

The site was reportedly a dry cleaner in the past. AESI was provided with a copy of a previous environmental ground water monitoring report by Kleen Environmental Technologies, Inc. (KETI) dated May 10, 2001 after AESI had sampled the wells in April 2003. Monitoring well numbers assigned by AESI did not match previous well identification numbers assigned by KETI. Table 1 below summarizes depth to static water levels measured by AESI and corresponding well numbers used. KETI monitoring wells MW1 and MW2 were reportedly removed during construction.

1.3 Site Hydrology

No surface water bodies are located near the subject property.

1.4 Site Hydrogeology

Depth to ground water in the three monitoring wells was measured by AESI on April 22, 2003 prior to purging. Table 1 summarizes the measurements taken, and how the well numbers assigned by AESI correspond to monitoring well numbers assigned by KETI.

Table 1
Static Water Levels for Monitoring Wells MW1 through MW3

AESI Well Number	KET Well Number	Date Measured	Depth to Water Below TOC
MW1	MW4	4-22-03	10.5 feet
MW2	MW3	4-22-03	16.0 feet
MW3	MW5	4-22-03	8.0 feet

TOC = Top of Casing

2.0 GROUND WATER MONITORING ACTIVITIES

On April 22, 2003, ground water samples were collected from three existing monitoring wells. A minimum of three casing volumes were purged from each monitoring well prior to collecting water samples using a disposable bailer. The purge water from each well was generally turbid, with slight observable sheens and trace odors of petroleum products. The ground water samples were decanted into 40 ml VOAs and 1-liter amber sample containers provided by the laboratory. The samples were then placed into a cooler, chilled with frozen gel packs, and delivered to Friedman and Bruya, Inc. laboratories in Seattle by courier under chain-of-custody procedures. Analytical results are presented in Tables 2 through 4 below. Laboratory analytical certificates are located in Appendix A.

Table 2
Ground Water Analytical Results
Total Petroleum Hydrocarbons as Diesel Extended to Motor Oil (NWTPH-Dx)
(Sample results are in parts per billion [ppb])

Sample Number	Date Collected	Diesel	Motor Oil
IP-MW1	4-22-03	< 50	< 250
IP-MW2	4-22-03	< 50	< 250
IP-MW3	4-22-03	270	< 250
MTCA Method A CL ¹		500	500

Analytical results above MTCA Method A limits are in Bold

¹ CL-cleanup confirmation levels

Table 3
Ground Water Analytical Results
Gasoline Range Petroleum Hydrocarbons
Using Method NWTPH-Gx/BTEX¹
(Sample results are in parts per billion [ppb])

Sample Number	Benzene	Toluene	Ethyl benzene	Xylenes	Gasoline
IP-MW1*	< 5	< 10	< 10	< 10	590
IP-MW2	< 1	< 1	< 1	< 1	59
IP-MW3	< 1	< 1	5	6	340
MTCA Method A CCL	5.0	1,000	700	1,000	800/1,000**

Analytical results above MTCA Method A limits are in Bold.

*Sample IP-MW1 was diluted and reanalyzed for benzene, toluene, ethyl benzene, and xylenes. Detection limits are raised due to dilution. Benzene detection limits were later lowered to check if benzene was below the MTCA Method A cleanup level.

** The cleanup level for total petroleum hydrocarbons as gasoline is 800 ppb if benzene is present and 1,000 ppb if benzene is not detected.

⁽¹⁾ BTEX: acronym for benzene, toluene, ethylbenzene, and xylenes.

Table 4
Ground Water Quality Analytical Results
Volatile Compounds by EPA Method 8260B
(Sample results are in parts per billion [ppb])

Compounds	IP-MW1*	IP-MW2	IP-MW3	MTCA CL
Dichlorodifluoromethane	< 10	< 1	< 1	
Chloromethane	< 10	< 1	< 1	
Vinyl chloride	< 10	6	3	0.2
Bromomethane	< 10	< 1	< 1	
Chloroethane	< 10	< 1	< 1	
Trichlorofluoromethane	< 10	< 1	< 1	
Acetone	< 100	< 10	< 10	
1,1-Dichloroethene	< 10	< 1	< 1	
Methylene chloride	< 50	< 5	< 5	
trans-1,2-Dichloroethene	< 10	< 1	< 1	
1,1-Dichloroethane	< 10	< 1	< 1	
2,2-Dichloropropane	< 10	< 1	< 1	
cis-1,2-Dichloroethene	1,400	250	110	5
Chloroform	< 10	< 1	< 1	
2-Butanone (MEK)	< 100	< 10	< 10	
1,2-Dichloroethane (EDC)	< 10	< 1	< 1	5
1,1,1-Trichloroethane	< 10	< 1	< 1	200
1,1-Dichloropropene	< 10	< 1	< 1	
Carbon Tetrachloride	< 10	< 1	< 1	
Benzene	< 5	< 1	< 1	5

Compounds	IP-MW1*	IP-MW2	IP-MW3	MTCA CL
Trichloroethene	590	73	17	5
1,2-Dichloropropane	< 10	1	< 1	
Bromodichloromethane	< 10	< 1	< 1	
Dibromomethane	< 10	< 1	< 1	
4-Methyl-2-pentanone	< 100	< 10	< 10	
cis-1,3-Dichloropropene	< 10	< 1	< 1	
Toluene	< 10	< 1	< 1	1,000
trans-1,3-Dichloropropene	< 10	< 1	< 1	
1,1,2-Trichloroethane	< 10	< 1	< 1	
2-Hexanone	< 100	< 10	< 10	
1,3-Dichloropropane	< 10	< 1	< 1	
Tetrachloroethene	2,000	110	50	5
Dibromochloromethane	< 10	< 1	< 1	
1,2-Dibromoethane (EDB)	< 10	< 1	< 1	0.01
Chlorobenzene	< 10	< 1	< 1	
Ethyl benzene	< 10	< 1	5	700
1,1,1,2-Tetrachloroethane	< 10	< 1	< 1	
m,p-Xylene	< 10	< 1	6	1,000
o-Xylene	< 10	< 1	< 1	1,000
Styrene	< 10	< 1	< 1	
Isopropylbenzene	< 10	< 1	2	
Bromoform	< 10	< 1	< 1	
n-Propylbenzene	< 10	< 1	3	
Bromobenzene	< 10	< 1	< 1	
1,3,5-Trimethylbenzene	< 10	< 1	6	
1,1,2,2-Tetrachloroethane	< 10	< 1	< 1	
1,2,3-Trichloropropane	< 10	< 1	< 1	
2-Chlorotoluene	< 10	< 1	< 1	
4-Chlorotoluene	< 10	< 1	< 1	
tert-Butylbenzene	< 10	< 1	< 1	
1,2,4-Trimethylbenzene	< 10	< 1	20	
sec-Butylbenzene	< 10	< 1	< 1	
p-Isopropyltoluene	< 10	< 1	< 1	
1,3-Dichlorobenzene	< 10	< 1	< 1	
1,4-Dichlorobenzene	< 10	< 1	< 1	
1,2-Dichlorobenzene	< 10	< 1	< 1	
1,2-Dibromo-3-Chloropropane	< 10	< 1	< 1	
1,2,4-Trichlorobenzene	< 10	< 1	< 1	
Hexachlorobutadiene	< 10	< 1	< 1	
Naphthalene	< 10	< 1	1	160
1,2,3-Trichlorobenzene	< 10	< 1	< 1	

*The sample was diluted. Detection limits are raised due to dilution. Benzene detection limit was later lowered to prove that benzene was below MTCA cleanup level.

2.1 Discussion Of Ground Water Monitoring Analytical Results

Analytical results for the ground water samples collected from the monitoring wells indicated the presence of chlorinated solvents above MTCA Method A cleanup levels. The following

volatile organic compounds (VOCs) were detected in MW1: cis-1,2-dichloroethene (1,400 ppb), trichloroethene (590 ppb), and tetrachloroethene (2,000 ppb). Due to the relatively high concentrations of cis-1,2-dichloroethene and tetrachloroethene, the sample was diluted and reanalyzed with corresponding detection limits raised. Total petroleum hydrocarbons as gasoline were below MTCA Method A cleanup levels in monitoring well MW1. BTEX and diesel/motor oil range petroleum hydrocarbons were below laboratory analytical detection limits in MW1.

The following VOCs were detected in MW2: vinyl chloride (6 ppb), cis-1,2-Dichloroethene (250 ppb), and tetrachloroethene (110 ppb). Total petroleum hydrocarbons as gasoline were below MTCA Method A cleanup levels in monitoring well MW2. BTEX and diesel/motor oil range petroleum hydrocarbons were below laboratory analytical detection limits in MW2.

The following VOCs were detected in MW3: vinyl chloride (3 ppb), cis-1,2-Dichloroethene (110 ppb), trichloroethene (17 ppb), and tetrachloroethene (50 ppb). Total petroleum hydrocarbons as gasoline were below MTCA Method A cleanup levels in monitoring well MW3. BTEX and diesel/motor oil range petroleum hydrocarbons were below MTCA Method A cleanup levels in MW3.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Ground water samples were collected from the three monitoring wells on April 22, 2003. Gasoline diesel and heavy oil range petroleum hydrocarbons were either not detected, or were present at levels below MTCA Method A cleanup criteria.

Chlorinated solvents were present above MTCA clean up levels in all of the wells. However, upon review of the ground water monitoring report by KETI, levels of chlorinated solvents appear to be decreasing in wells MW2 (KETI well MW3) and MW3 (KETI well MW5). MW1 (KETI well MW4) was not sampled by KETI in 2001 due to the reported lack of water in the well.

If the rate of natural attenuation of chlorinated solvents is not sufficient to meet client and the Washington State Department of Ecology (Ecology) goals, AESI recommends injections of Hydrogen Release Compound (HRC™). HRC™ reportedly enhances the anaerobic degradation of chlorinated compounds using a complex series of chemical and biological mediated reactions. As the HRC™ comes into contact with subsurface moisture, lactic acid is slowly released. The lactic acid is then metabolized by indigenous anaerobic microbes, which produce low concentrations of dissolved hydrogen. Other subsurface microbes use this hydrogen to strip the solvent molecules of their chlorine atoms and allow for further biological degradation.

May 30, 2003

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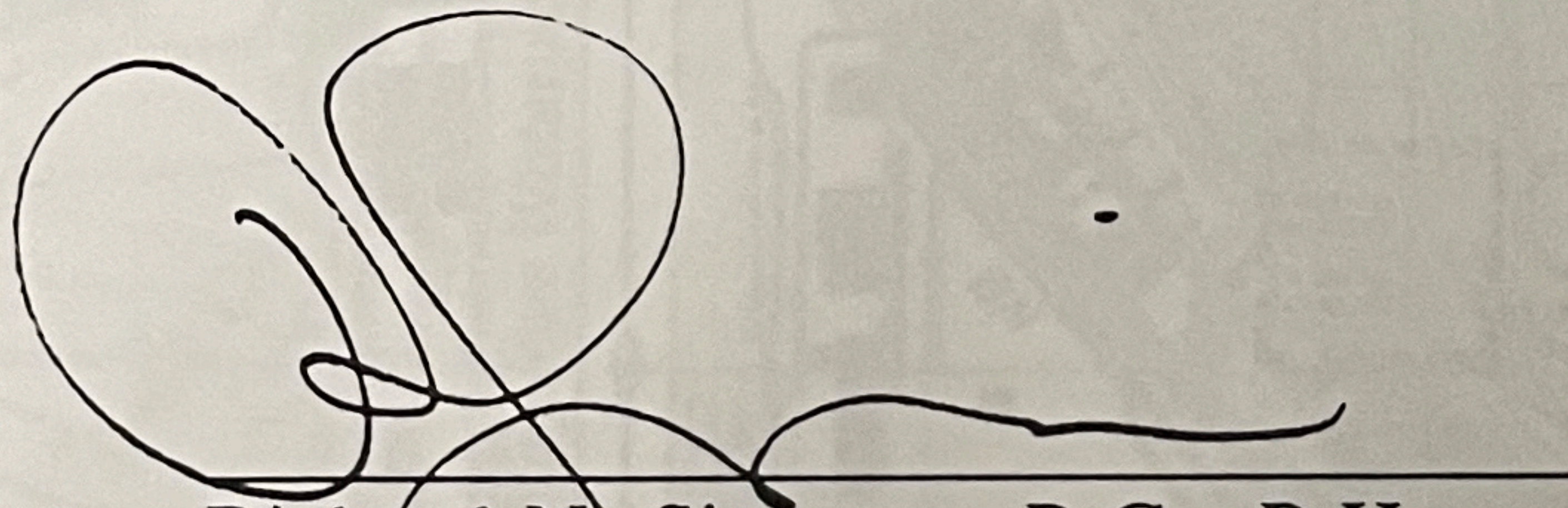
AESI recommends additional quarterly monitoring of the wells. The direction of ground water flow also needs to be determined by measuring top of casing elevations using optical differential leveling techniques and static water levels in the existing wells. AESI will provide a proposal for the two recommended tasks at your request.

4.0 LIMITATIONS

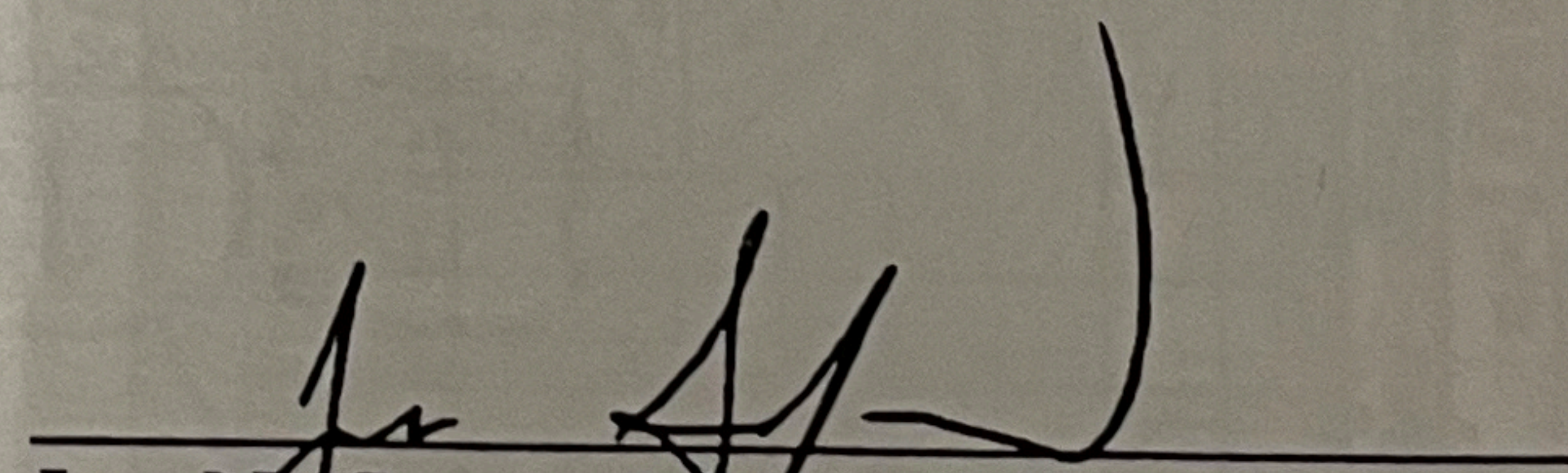
This report is for the exclusive use of RMB Properties, LLC and their agents. The report is based upon data and information collected by AESI. The recommendations and conclusions contained in this report represent our professional opinions. These opinions were derived in accordance with currently accepted environmental practices at this time and location. Other than this, no warranty expressed or implied is given.

We trust that this report meets your current project needs. Should you have any questions or require additional information, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

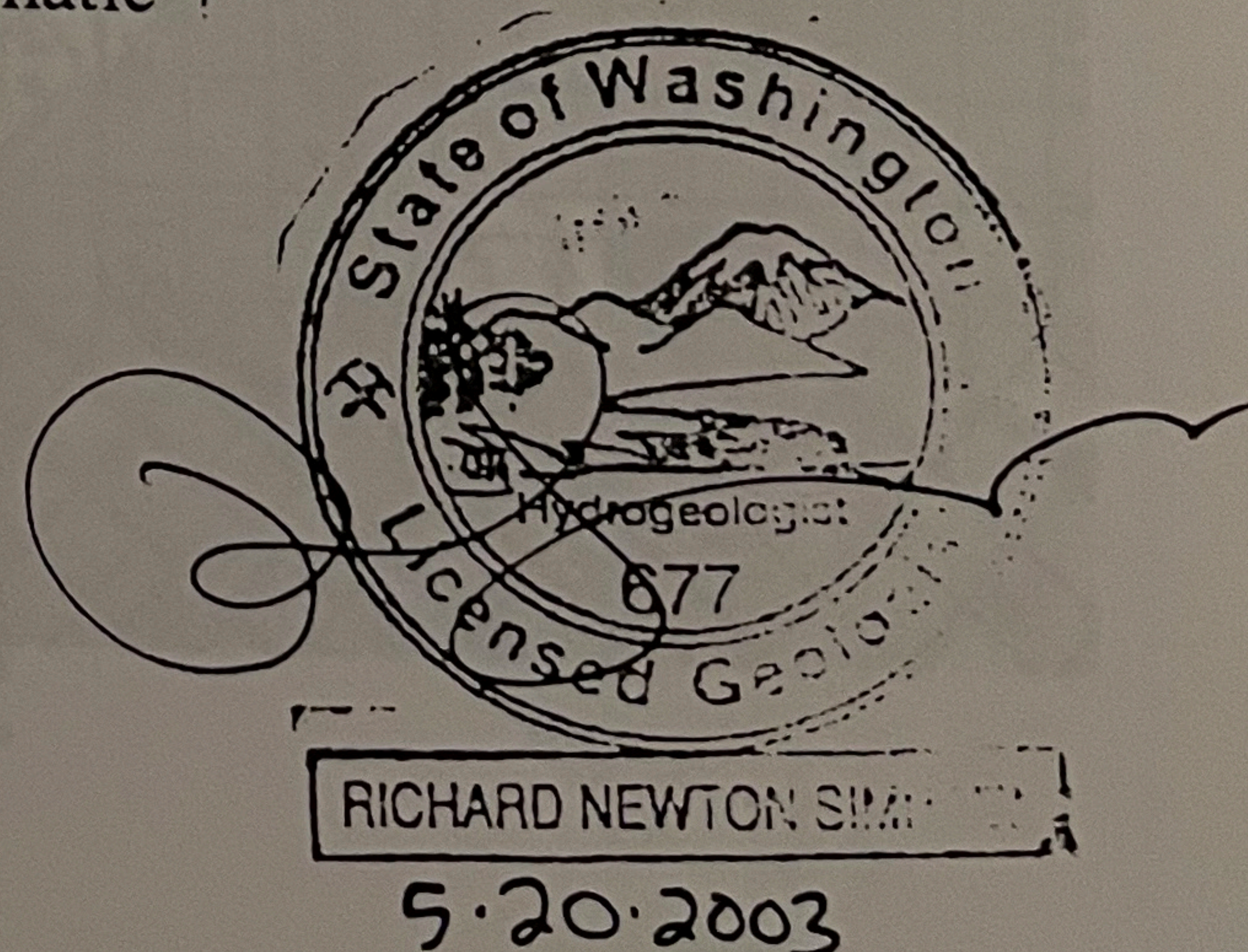


Richard N. Simpson, P.G., P.Hg.
Environmental Hydrogeologist



Jon N. Sondergaard, P.G., P.E.G.
Associate Geologist

Attachments: Figure 1: Vicinity Map
Figure 2: Ground Water Monitoring Well Site Schematic
Appendix A: Laboratory Analytical Results

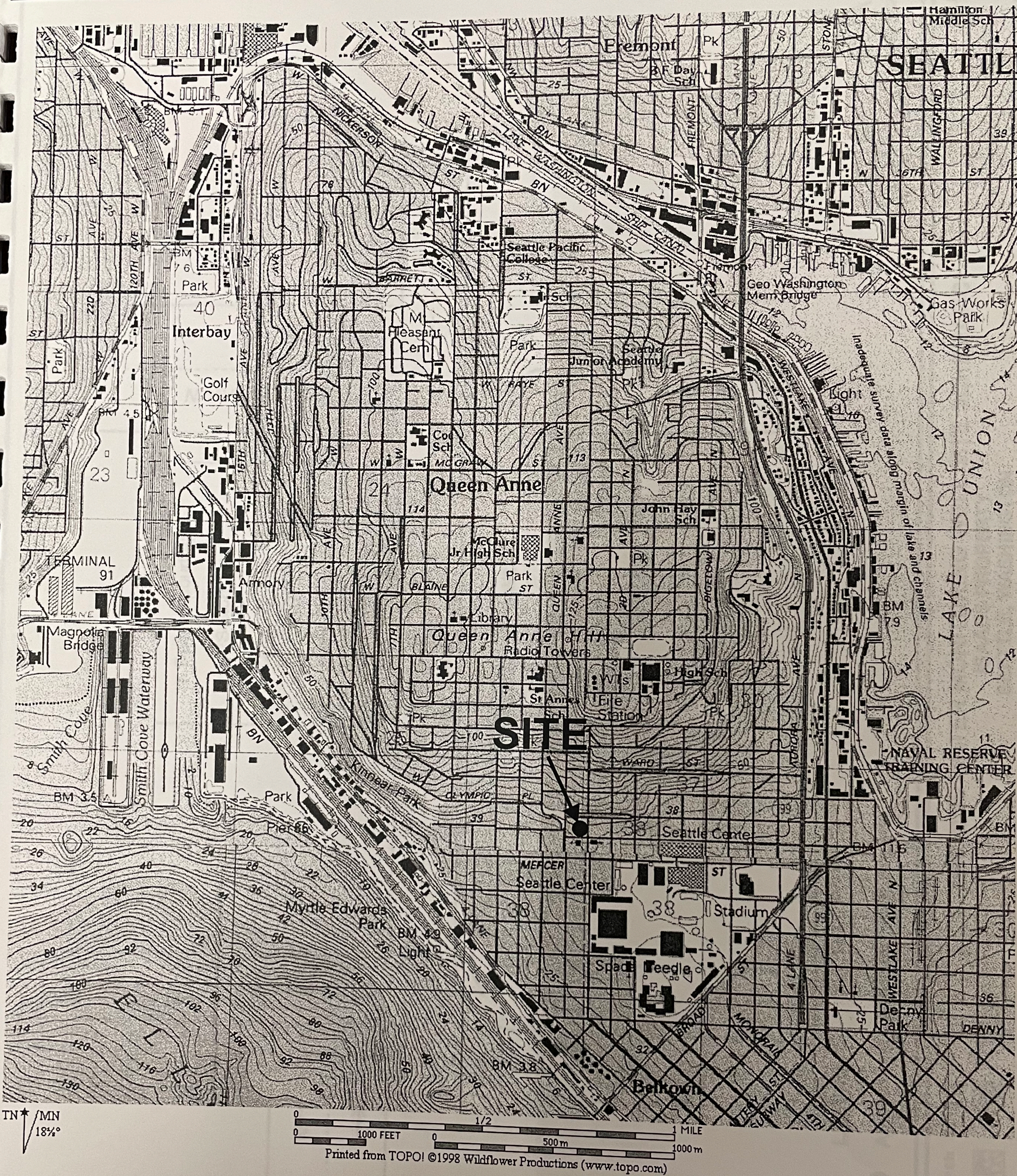


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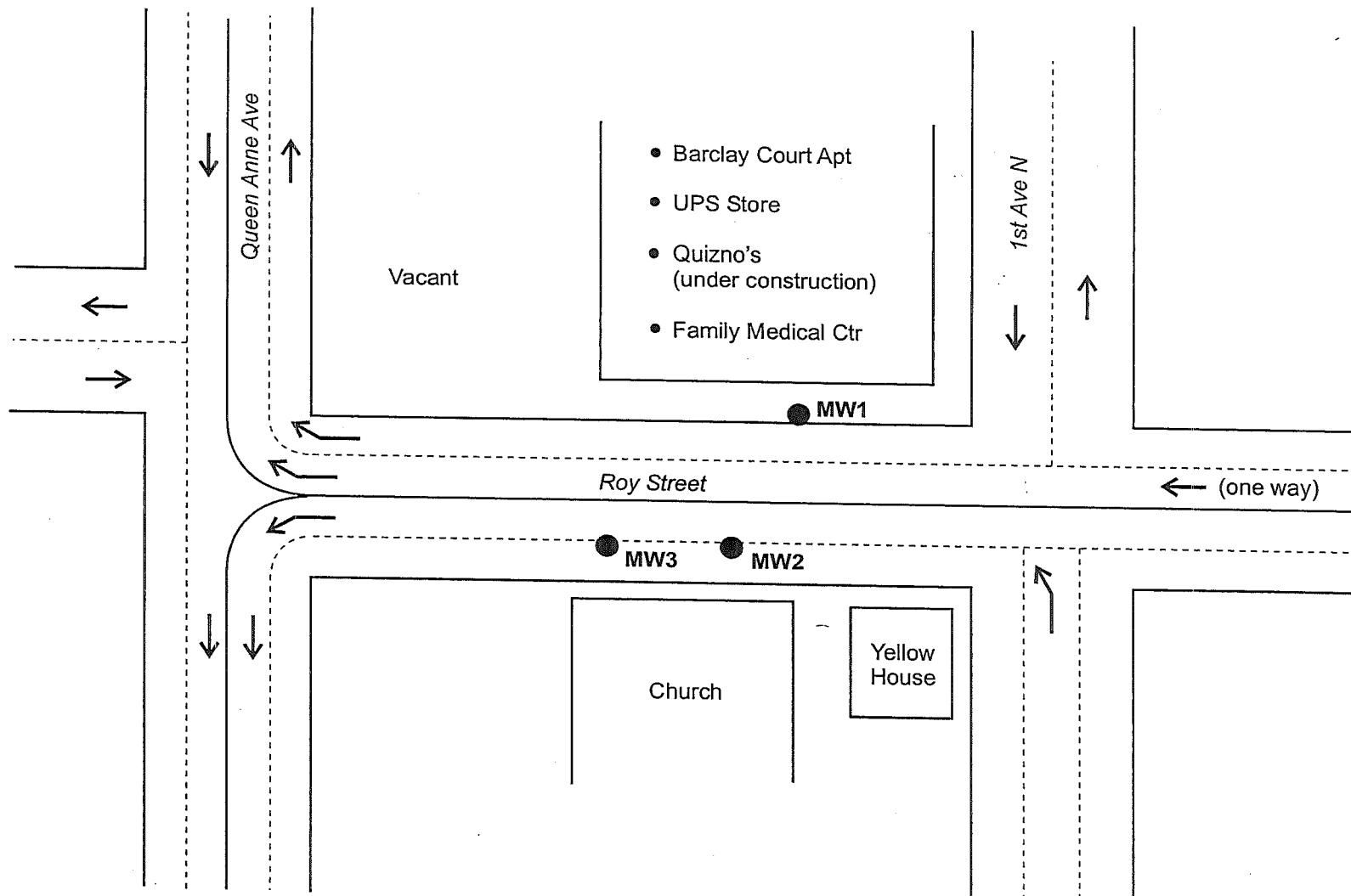


VICINITY MAP ISAACS PROPERTY SEATTLE, WASHINGTON

FIGURE 1

DATE 04/03

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LEGEND

MW1 ● Approximate location of monitoring well



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GROUND WATER MONITORING WELL SITE SCHEMATIC **ISAACS PROPERTY** **SEATTLE, WASHINGTON**

FIGURE 2

DATE 04/03

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