

## Technical Memorandum

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**Date** 13 October 2009

**To** Bob Brock, USAED COR

**From** Terry Heikkila, PE, PMP

**Subject** Taku Gardens: Installation of Monitoring Wells North of the Site

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The objective of this Technical Memorandum is to summarize the results of the groundwater plume investigation at the Taku Gardens site and to describe procedures that will be followed to install groundwater wells at the site's northern boundary. Installation of three monitoring wells is proposed with the objective of monitoring the downgradient extent of contamination at the northern boundary of Taku Gardens and within the Former Hoppe's Slough (Figure 1).

### **Previous Investigations**

During the 2007 field season, 63 soil borings were advanced, logged, and sampled; then 62 of the borings were completed into monitoring wells. In 2008, five additional wells (MW77 through MW81) were installed to locate the edges of plumes of contaminated groundwater for risk-screening purposes. The 62 original wells were sampled in October 2007, May 2008, and October 2008. The five additional wells were sampled in only September 2008. The results of these investigations showed that 27 of the wells had exceedances of diesel-range organics (DRO), residual-range organics, trichloroethene (TCE), and/or vinyl chloride (Figure 2).

Because well monitoring indicated that groundwater contamination may extend north of the existing borings, 17 additional borings were installed along Neely Road to more accurately delineate the northern extent of contamination. Soil and groundwater grab samples were collected from these borings, with results indicating that 12 borings had DRO, TCE and/or vinyl chloride levels above risk assessment screening levels. The contaminated wells are located south of Building 4077 (Figure 3). Three wells have exceedances for DRO, 10 for TCE, and 11 for vinyl chloride. The DRO and TCE plumes appear delineated by these borings.

### **Groundwater Monitoring Well Installation and Sampling Methodology**

Boreholes will be drilled by auger for installation of permanent 2-inch groundwater monitoring wells downgradient of the current locations of borings SB14, SB15, and SB16 (Figure 1). Based on previous drilling activities at the site, difficult drilling conditions are not anticipated. Cuttings will be logged from the surface to final depth. Lithologic logging will be based on the Unified Soil Classification System and standard description procedures (American Society for Testing and Materials 2006a, 2006b) with color matching to the nearest standard soil color. Field screening, using visual, olfactory, and photoionization detector methods, will be conducted approximately every 2.5 feet. Groundwater is anticipated to be encountered between 11 and 13 feet below ground surface. The 10-foot screened interval of each well will be centered approximately on the groundwater table. If contamination is suspected, the groundwater

monitoring well will not be installed at this location, and the boring will be abandoned. The new location will be upgradient approximately 20 feet.

The groundwater monitoring wells will be installed, developed, and sampled in accordance with Alaska Department of Environmental Conservation's *Monitoring Well Guidance*, Section 3.0 of the *Work Plan for Fall 2008 Remedial Investigation Activities* (CH2M Hill 2008), and *Addendum 4 to the Remedial Investigation Work Plan Groundwater Investigation* (CH2M Hill 2007).

Groundwater wells will be developed and sampled for DRO (AK102), volatile organic compounds (VOC) selected ion monitoring, (SW8260B SIM), and VOC full list (SW8260B). Each sample will require two 1-liter hydrochloric acid (HCl)-preserved amber and six VOA vials. One duplicate (two 1-liter HCl-preserved amber and six VOA vials) and one matrix spike/matrix spike duplicate (four 1-liter HCl-preserved amber and 12 VOA vials) will also be collected. Samples will be submitted on 3-day turnaround time (or 7-day, depending on laboratory availability).

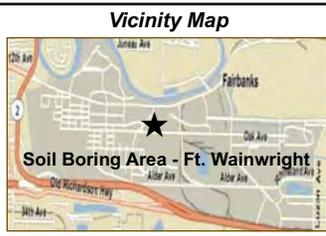
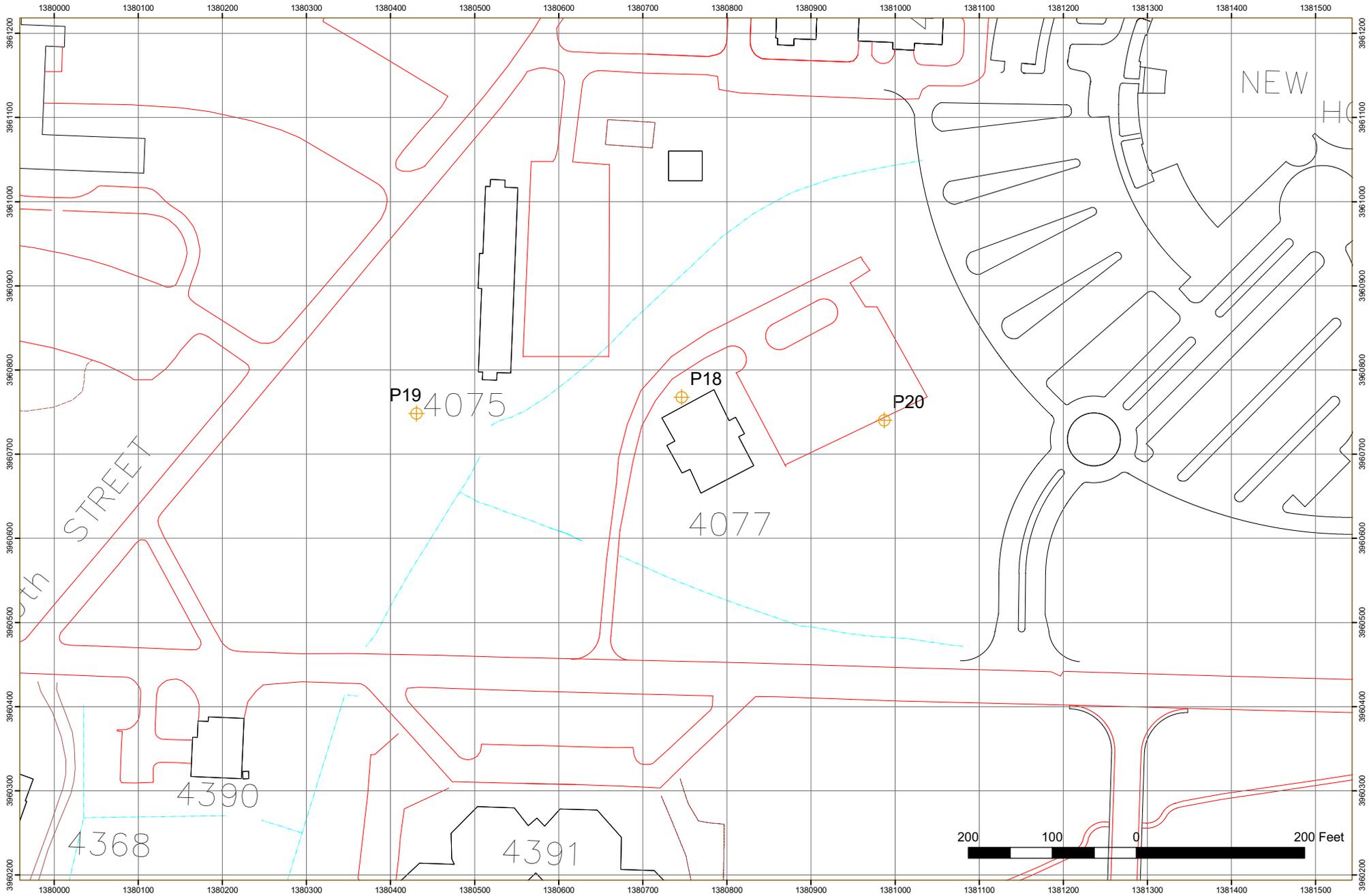
### References

Alaska Department of Environmental Conservation. 1992 (April). *Recommended Practices for Monitoring Well Design, Installation, and Decommissioning*.

American Society for Testing and Materials. 2006. *Standard Practice for Classification of Soils for Engineering Purposes*. D2487-06e1.

CH2M Hill. 2008. *Work Plan for Fall 2008 Remedial Investigation Activities*.

CH2M Hill. 2007. *Addendum 4 to the Remedial Investigation Work Plan Groundwater Investigation*.



**Legend**

- ⊕ Proposed Soil Boring

**FILE REFERENCES**

Jacobs/GIS Geo/Wainwright/Ft Wainwright/

**Coordinate System**

NAD 1983  
State Plane Coordinate  
Alaska Zone 3  
Feet

**NOTES**

**NEW MONITORING WELLS  
PROPOSED LOCATION MAP**

FORT WAINWRIGHT, FAIRBANKS, ALASKA

	DATE:	PROJECT MANAGER:	FIGURE NO.:
	13 October 2009	S. Wendell	1

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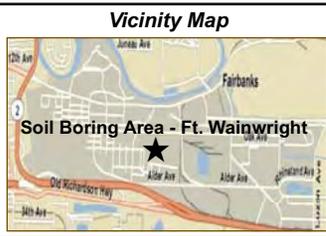
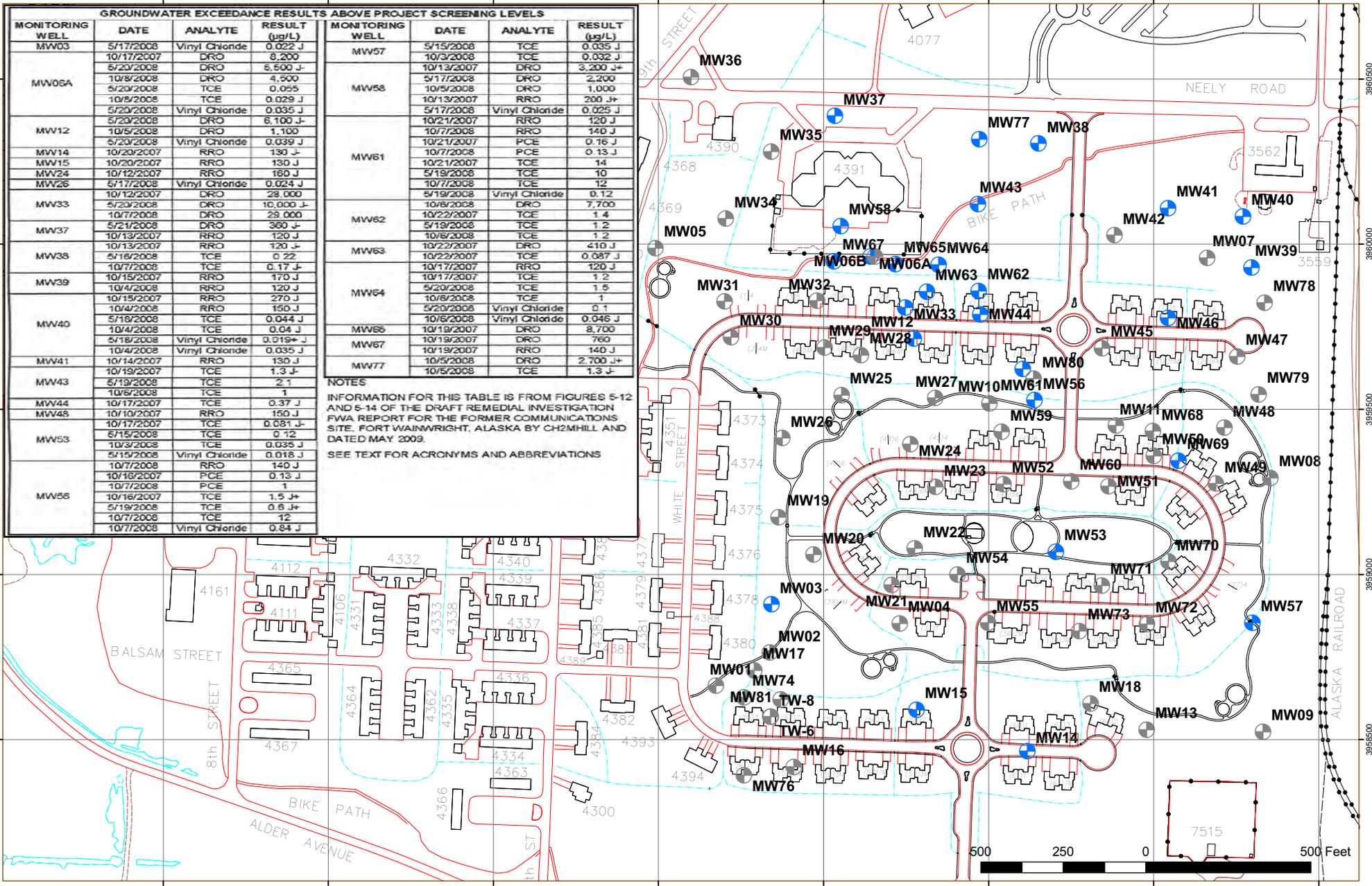
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GROUNDWATER EXCEEDANCE RESULTS ABOVE PROJECT SCREENING LEVELS				GROUNDWATER EXCEEDANCE RESULTS ABOVE PROJECT SCREENING LEVELS			
MONITORING WELL	DATE	ANALYTE	RESULT (µg/L)	MONITORING WELL	DATE	ANALYTE	RESULT (µg/L)
MW03	5/17/2008	Vinyl Chloride	0.029 J	MW57	5/15/2008	TCE	0.035 J
	10/17/2007	DRO	8.200		10/3/2008	TCE	0.032 J
	5/20/2008	DRO	5,500 J		10/13/2007	DRO	3,200 J
MW05A	10/8/2008	DRO	4,500	MW58	5/17/2008	DRO	2,200
	5/20/2008	TCE	0.055		10/5/2008	DRO	1,000
	10/8/2008	TCE	0.029 J		10/13/2007	RRO	200 J
	5/20/2008	Vinyl Chloride	0.035 J		5/17/2008	Vinyl Chloride	0.025 J
	5/20/2008	DRO	6,100 J		10/21/2007	RRO	120 J
MW12	10/5/2008	DRO	1,100		10/7/2008	RRO	140 J
	5/20/2008	Vinyl Chloride	0.039 J		10/21/2007	PCE	0.16 J
MW14	10/20/2007	RRO	130 J		10/7/2008	PCE	0.13 J
MW15	10/20/2007	RRO	130 J	MW61	10/2/2007	TCE	14
MW24	10/12/2007	RRO	160 J		5/19/2008	TCE	10
MW26	5/17/2008	Vinyl Chloride	0.024 J		10/7/2008	TCE	12
	10/12/2007	DRO	28,000		5/19/2008	Vinyl Chloride	0.12
MW33	5/20/2008	DRO	10,000 J		10/6/2008	DRO	7,700
	10/7/2008	DRO	29,000	MW62	10/22/2007	TCE	1.4
MW37	5/21/2008	DRO	360 J		5/19/2008	TCE	1.2
	10/13/2007	RRO	120 J		10/6/2008	TCE	1.2
	10/13/2007	RRO	120 J	MW63	10/22/2007	DRO	439 J
MW38	5/18/2008	TCE	0.22		10/22/2007	TCE	0.28 J
	10/7/2008	TCE	0.17 J		10/17/2007	RRO	120 J
MW39	10/15/2007	RRO	170 J		10/17/2007	TCE	1.2
	10/4/2008	RRO	120 J	MW64	5/20/2008	TCE	1.5
	10/15/2007	RRO	270 J		10/6/2008	TCE	1.1
	10/4/2008	RRO	150 J		5/20/2008	Vinyl Chloride	0.1
MW40	5/18/2008	TCE	0.044 J		10/6/2008	Vinyl Chloride	0.046 J
	10/4/2008	TCE	0.04 J	MW65	10/19/2007	DRO	8,700
	5/18/2008	Vinyl Chloride	0.019+ J	MW67	10/19/2007	DRO	760
	10/4/2008	Vinyl Chloride	0.035 J	MW77	10/19/2007	RRO	140 J
MW41	10/14/2007	RRO	130 J		10/5/2008	DRO	2,700 J
	10/19/2007	TCE	1.3 J		10/5/2008	TCE	1.3 J
MW43	5/19/2008	TCE	2.1				
	10/6/2008	TCE	1				
MW44	10/17/2007	TCE	0.37 J				
MW48	10/10/2007	RRO	150 J				
	10/17/2007	TCE	0.081 J				
MW53	5/18/2008	TCE	0.12				
	10/3/2008	TCE	0.035 J				
	5/18/2008	Vinyl Chloride	0.018 J				
	10/7/2008	RRO	140 J				
	10/16/2007	PCE	0.13 J				
	10/7/2008	PCE	1				
MW55	10/16/2007	TCE	1.5 J				
	5/19/2008	TCE	0.6 J				
	10/7/2008	TCE	12				
	10/7/2008	Vinyl Chloride	0.84 J				

NOTES  
 INFORMATION FOR THIS TABLE IS FROM FIGURES 5-12 AND 5-14 OF THE DRAFT REMEDIAL INVESTIGATION FWA REPORT FOR THE FORMER COMMUNICATIONS SITE, FORT WAINWRIGHT, ALASKA BY CH2MHILL AND DATED MAY 2009.  
 SEE TEXT FOR ACRONYMS AND ABBREVIATIONS

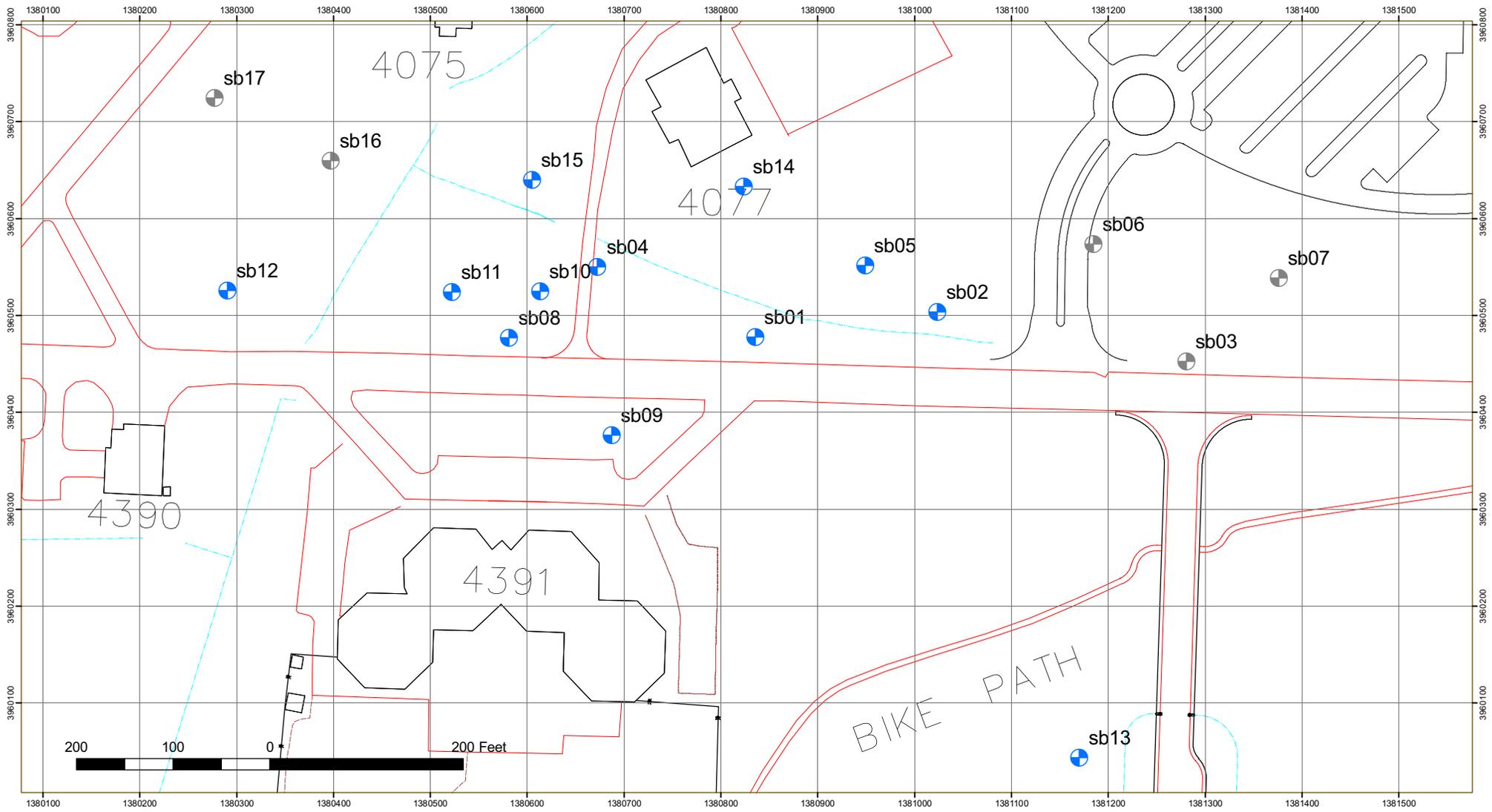


FILE REFERENCES  
 Jacobs/GIS Geo/Wainwright/Fl Wainwright/  
  
 Coordinate System  
 NAD 1983  
 State Plane Coordinate  
 Alaska Zone 3  
 Feet

Legend  
 ● Monitoring Well (MW)  
 ●+ MW Exceeding Project Screening Levels

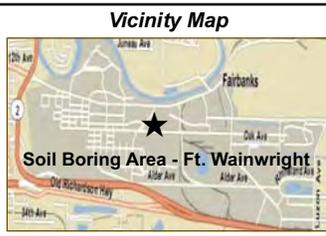
2007 BORING AND MONITORING WELL LOCATIONS AND RESULTS  
 FORT WAINWRIGHT, FAIRBANKS, ALASKA

JACOBS	DATE: 27 JULY 2009	PROJECT MANAGER: S. Wendell	FIGURE NO.: 2
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Analytes	Units	ADEC Cleanup	Risk Assessment	SB01	SB02	SB03	SB04	SB05	SB06	SB07	SB08	SB09	SB10	SB11	SB12	SB13	SB14	SB15	SB16	SB17
DRO	mg/L	1.5	N/A	1.5	0.302	ND	0.295	0.372	ND	ND	0.489	ND	0.403	3.63	3.02	ND	ND	0.354	0.529	0.522
Trichloroethene (TCE)	µ/L	5	0.028	0.32 JM+	0.049 B	0.017 B	0.35	0.1 JP,B	0.025 B	0.018 B	0.063 B	0.12	0.052 B	0.029 B	0.035 B	0.23	ND	ND	ND	ND
Vinyl chloride	µ/L	2	0.015	0.046	ND	ND	0.097	0.015 JP	ND	ND	0.071	0.019	0.028	0.07	0.021	0.018	0.019	0.02	ND	ND

Result Exceeds ADEC Cleanup Standards  
 Results Exceeds Risk Assessment Screening Level



**Legend**

- Monitoring Well (MW)
- MW Exceeding Project Screening Levels

FILE REFERENCES	NOTES
Jacobs/GIS Geo/Wainwright/Ft Wainwright/	mg/L = milligram per liter JM+ = Result biased high due to matrix spike JP = Result biased low due to preservation issues B = Result biased high due to blank contamination
<b>Coordinate System</b>	
NAD 1983 State Plane Coordinate Alaska Zone 3 Feet	

**2009 SOIL BORING AND GROUNDWATER GRAB SAMPLE LOCATIONS AND RESULTS**

FORT WAINWRIGHT, FAIRBANKS, ALASKA

<b>JACOBS</b>	DATE: 17 September 2009	PROJECT MANAGER: S. Wendell	FIGURE NO.: 3
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