

Appendix 3-2

**Abandoned Well
Drilling Logs**

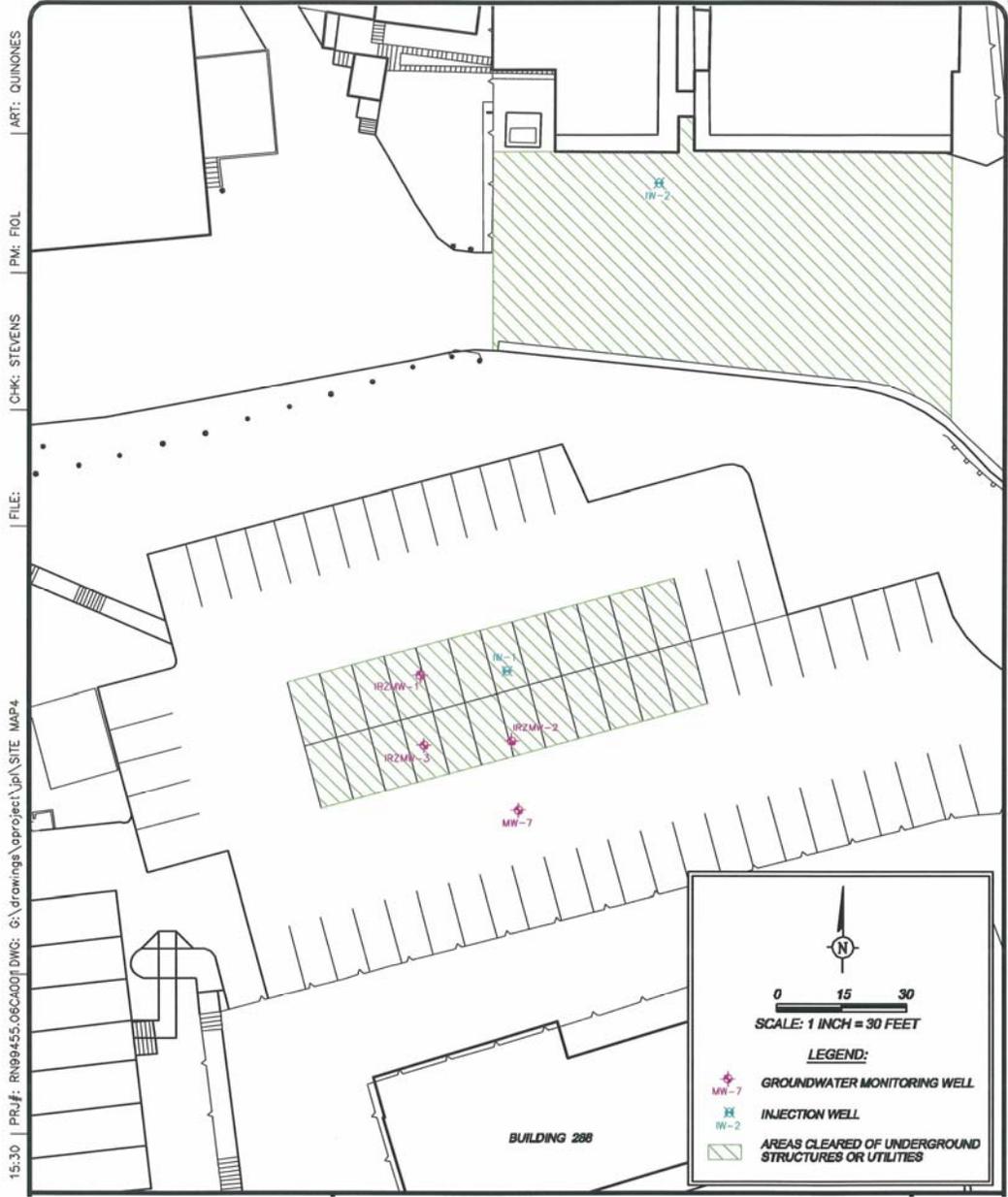


Figure 5-1. Geophysical Survey Area and Well Placement



BORING LOG OF IW1

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JPL

RN099455.0005.CA001

Date Started : 11/6/02
 Date Completed : 11/13/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IW1 TOC Elev.: 1215.88 ft amsl	DESCRIPTION
0					Hand augered to 5 feet below ground surface (bgs).
5					Clayey SAND with silt, very fine to coarse grained, with few pebbles and occasional gravels. Loose. Brown [7.5YR 4/3]. Dry. Poorly sorted. No odor.
10					Cobbles. Clayey SAND, very fine to coarse grained with trace angular gravels. Loose. Brown [7.5YR 4/4]. Dry. Poorly sorted. No odor.
15		SC/SM			Same as above except slightly lighter color.
20					Cobbles Clayey SAND, very fine to coarse grained with few angular cobbles and gravels. Loose. Dark grayish brown [10YR 4/2]. Dry. No odor.
25					



BORING LOG OF IW1

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Date Started : 11/6/02
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 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IW1 TOC Elev.: 1215.88 ft amsl	DESCRIPTION
25					<p>Clayey SAND, very fine to coarse grained with trace fine to coarse gravels. Dark Brown [7.5 YR 3/2]. Dry. Poorly sorted. No odor.</p> <p>Same as above except slightly higher clay content. Gravels are granitic composition.</p> <p>Clayey SAND, very fine to coarse grained. Dark Brown [7.5 YR 3/2]. Dry. Poorly sorted. No odor.</p> <p>Trace cobbles.</p> <p>Light coloring (white/grey).</p> <p>Clayey SAND, very fine to coarse grained with trace coarse gravel. Dark gray [7.5 YR 4/2]. Dry. Poorly sorted. No odor. Sample taken due to prevalent white discoloration.</p>
30		SC			<p>Clayey SAND, very fine to coarse with little coarse gravels. Dark Brown [7.5 YR 3/3]. Dry. Very poorly sorted. No odor.</p> <p>Cobble (granitic composition)</p>
35		SC/SM		<p>Grout</p> <p>4" Diameter Sch 40 PVC</p>	<p>Clayey SAND with silt, very fine to medium grained and trace coarse angular sands and gravels. Loose. Dark Brown [7.5 YR 3/3]. Dry. No odor.</p> <p>Same as above except whitish color. Angular gravels and cobbles.</p> <p>Cobbles of highly weathered, micaceous granite. Brown [7.5 YR 4/2]</p>
40					
45					
50					

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Date Started : 11/6/02
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 Logged By : Kristen Stevens
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 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IW1 TOC Elev.: 1215.88 ft amsl	DESCRIPTION
50					Silty SAND with some cobbles. Loose. Brown [7.5 YR 4/2]. Dry. Very poorly sorted. No odor.

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SM

Grout
4" Diameter
Sch 40 PVC



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 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IW1 TOC Elev.: 1215.88 ft amsl	DESCRIPTION
75					SILTY SAND, very fine to medium grained. Loose Brown [10 YR 4/3]. Dry. Moderately sorted.
					Same as above except slightly moist.
80					Same as above.
		SM			Silty SAND, very fine to medium grained. Loose. Dark Brown [7.5 YR 3/3]. Very slight moisture. Moderately sorted. No odor.
85					Silty SAND, fine to coarse grained with trace coarse gravels with fresh fracture surfaces. Loose. Dark Brown [7.5 YR 3/3]. Poorly sorted. Slightly moist. No odor.
				Grout 4" Diameter Sch 40 PVC	Same as above except trace mica rich highly weathered cobbles.
90					Silty SAND with trace gravels. Loose. Dark Brown [7.5 YR 3/3]. Slightly moist. Poorly sorted.
		SC			Clayey SAND, predominantly clayey silt sand with angular granitic clasts. Very fine grained with trace angular gravels. Moderately dense. Dark Brown [7.5 YR 3/3]. Slightly moist. No odor.
95					Silty SAND, very fine to medium grained with trace angular gravels with freshly fractured faces. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
		SM/SC			Same as above.
100					Clayey SAND, Very fine to medium. Loose. Brown [7.5 YR 4/3]. Slightly moist. Trace medium sands. No odor.

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BORING LOG OF IW1

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Date Started : 11/6/02
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 Logged By : Kristen Stevens
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 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IW1 TOC Elev.: 1215.88 ft amsl	DESCRIPTION
100		SC/SM			Same as above except high clay content.
		SC			Silty SAND, very fine to medium grained. Loose. Brown [7.5 YR 4/3]. Dry. Moderately to well sorted. No odor.
105		SM			Same as above
		SC			Clayey SAND, very fine to coarse grained with trace coarse gravels. Loose. Dark Brown [7.5 YR 3/3]. Moist. Poorly sorted. No odor.
110					Silty SAND, very fine to medium grained with trace cobbles. Brown [7.5 YR 4/3]. Dry.
					Slightly moist.
115					Silty SAND, very fine to medium with trace angular cobbles. Loose. Dark Brown [7.5 YR 4/3]. Dry. Moderately sorted. No odor.
		SM			Silty SAND, very fine to coarse with trace angular coarse gravels which are granitic and highly weathered. Brown [7.5 YR 4/3]. Dry. Loose. Poorly sorted.
120					Same as above
125					



BORING LOG OF IW1

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Date Started : 11/6/02
 Date Completed : 11/13/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IW1 TOC Elev.: 1215.88 ft amsl	DESCRIPTION
125		SC/SM			Silty Clayey SAND, very fine to medium with trace angular gravels. Brown [7.5 YR 4/3]. Very slightly moist. Poorly sorted.
130					Silty SAND, very fine to coarse with trace angular granitic gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. Same as above.
135					Same as above.
140		SM		 Grout 4" Diameter Sch 40 PVC	Silty SAND, very fine to fine with trace highly weathered gravels. Loose. Brown [7.5 YR 4/3]. Dry. Same as above.
145					Silty SAND, very fine to medium grained. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted.
150					Same as above except predominantly very fine to fine grained with trace angular gravels. Fresh fracture surfaces.



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Date Started : 11/6/02
 Date Completed : 11/13/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IW1 TOC Elev.: 1215.88 ft amsl	DESCRIPTION
150		SM			
155		SM/SC			<p>Silty Clayey SAND, very fine to medium grained with trace angular gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted.</p> <p>Same as above except slightly finer.</p>
160				<p>Grout</p> <p>4" Diameter Sch 40 PVC</p>	<p>Silty SAND, very fine to medium. Brown [7.5 YR 4/3]. Dry. Poorly sorted.</p> <p>SILTY SAND, very fine to medium with occasional granitic cobbles with fresh fracture surfaces. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted.</p>
165		SM			<p>Same as above except no cobbles.</p>
170					<p>Silty SAND, very fine to medium grained. Loose. Brown [7.5 YR 4/3]. Dry. Moderately sorted.</p> <p>Cobble</p>
175					



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Date Started : 11/6/02
 Date Completed : 11/13/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IW1 TOC Elev.: 1215.88 ft amsl	DESCRIPTION
200				<p>Grout</p> <p>Bentonite Chips</p> <p>4" Diameter Sch 40 PVC</p> <p># 2/12 Sand</p> <p>0.02" slot screen 4" diameter Stainless</p>	<p>Same as above.</p> <p>Silty SAND, very fine to medium with trace cobbles and gravels with fresh fracture faces. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted.</p> <p>Same as above.</p> <p>Same as above except granitic boulder.</p> <p>Silty SAND, very fine to medium sands with trace angular gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted.</p> <p>Same as above.</p>
205					
210		SM			
215					
220					
225					



BORING LOG OF IRZMW1

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RN099455.0005.CA001

Date Started : 12/15/02
 Date Completed : 12/21/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW1 TOC Elev.: 1216.50 ft amsl	DESCRIPTION
200				<p>Grout</p> <p>Bentonite Chips</p> <p>4" Diameter Sch 40 PVC</p>	<p>Silty SAND. Very fine with trace medium sand and angular granite gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.</p> <p>Same as above.</p> <p>Boulder.</p> <p>Silty SAND. Very fine to medium with occasional angular gravels. Loose. Brown [7.5 YR 4/3]. Dry Poorly Sorted. No odor.</p> <p>Same as above except more granular gravels.</p> <p>Silty SAND. Very fine to medium with trace coarse sands. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.</p> <p>Same as above except trace amount of cobbles.</p> <p>Silty SAND. Very fine to fine grained with trace medium and coarse sand. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.</p> <p>Same as above except slightly more angular cobbles.</p> <p>Boulder.</p> <p>Silty SAND. Very fine to medium grained with abundant subrounded gravels. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.</p>
205					
210		SM			
215					
220				# 2/12 Sand	
225					

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BORING LOG OF IRZMW1

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Date Started : 12/15/02
 Date Completed : 12/21/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW1 TOC Elev.: 1216.50 ft amsl	DESCRIPTION
225					Same as above.
230		SM			Silty SAND. Very fine to medium with trace cobbles. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
235		SM/SC		GW @ 233'	Silty Clayey SAND. Very fine to coarse sands with abundant angular to subangular gravels. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor. Cobbles. Silty Clayey Sand. Very fine to coarse with abundant granular gravels. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
240		SM/GC		# 2/12 Sand 4"-0.02 slot stainless steel screen	Boulder from 238 feet to 240 feet
245		SC			Silty Clayey SAND. Very fine to coarse grained with occasional granitic subangular to angular gravels. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor. Clayey SAND. Very fine to coarse grained with occasional gravels. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
250					Same as above except increased gravel content. Clayey SAND. Very fine to coarse grained with trace fine gravels. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.

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BORING LOG OF IRZMW1

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Date Started : 12/15/02
 Date Completed : 12/21/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW1 TOC Elev.: 1216.50 ft amsl	DESCRIPTION
250		SC		<p># 2/12 Sand</p> <p>4"-0.02 slot stainless steel screen</p>	Same as above.
					Boulder. Boulder.
		SC/SM			Silty Clayey SAND with occasional gravels and cobble. Very fine to medium grained. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
255		SC/GC			Clayey SAND with abundant gravel. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
					Clayey SAND with very fine to medium grains with trace rounded cobbles and occasional gravels. Moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
					Same as above except increased clay content.
260					Same as above.
					Same as above
265		SC			Clayey SAND with angular gravel fragments with fresh fractured surfaces. Very fine to coarse grained. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
					Clayey SAND. Very fine to fine with trace angular granitic gravels. Loose to moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
270				Clayey SAND. Very fine to medium with occasional coarse sand. Loose to moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.	
275					

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BORING LOG OF IRZMW1

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Date Started : 12/15/02
 Date Completed : 12/21/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW1 TOC Elev.: 1216.50 ft amsl	DESCRIPTION
275		SC		<p># 2/12 Sand 4"-0.02 slot stainless steel screen Cap</p>	<p>Same as above.</p> <p>Same as above except increase clay content and density. Boulder. Boulder. Clayey SAND,. Very fine to medium grained with a high clay content. Loose. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.</p>
280					
285					
290					
295					
300					

Total Depth = 280 feet bgs.



BORING LOG OF IRZMW2

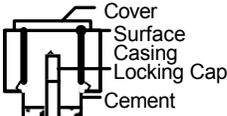
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RN099455.0005.CA001

Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
0				 <p>Cover Surface Casing Locking Cap Cement</p>	Hand Augered to 5 feet below ground surface (bgs).
5					<p>Silty SAND. Very fine to medium grained with trace coarse sands. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.</p>
10				 <p>Grout 4" Diameter Sch 40 PVC</p>	Same as above except trace cobbles.
15		SM			<p>Silty SAND with trace clay. Very fine to fine with trace subangular to angular coarse sands & gravels. Brown [7.5 YR 4/2]. Dry. Poorly sorted. No odor.</p>
20		SM/SC			Same as above except slightly large concentration of gravels.
25		SC/SM		<p>Same as above except slightly more clay.</p> <p>Silty Clayey SAND with trace coarse sands/gravels. Very fine to medium grained. Loose. Dark Brown [7.5 YR 3/2]. Slightly moist. Poorly sorted. No odor.</p> <p>Same as above except highly weathered granitic cobbles.</p>	

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BORING LOG OF IRZMW2

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RN099455.0005.CA001

Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
25		SC/SM		<p>Grout 4" Diameter Sch 40 PVC</p>	Silty Clayey SAND. Very fine to medium grained. Loose. Dark Brown [7.5 YR 3/2]. Moist. Poorly sorted. No odor.
		SM			
30		SC/SM			Clayey SAND. Very fine to medium grained. Dark Brown [7.5 YR 3/2]. Moist. Poorly sorted. No odor.
		SM			Silty SAND. Very fine to medium grained. Brown [7.5 YR 4/2]. Dry. Poorly sorted. No odor.
35		SC/SM			Silty Clayey SAND. Very fine to medium grained. Dark brown [7.5 YR 3/2]. Slightly moist. Moderately sorted. No odor.
					Same as above
40		SC/SM			Same as above
		SM			Same as above except trace cobbles.
		SC/SM			Silty SAND. Very fine to fine grained. Loose. Brown [7.5 YR 4/2]. Dry. Moderately to well sorted. No odor.
		SM			Clayey/Silty SAND with trace cobbles. Very fine to medium grained. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
45		SM		Silty SAND. Very fine to medium grained with trace coarse sands. Loose. Dark Brown [7.5 YR 3/2]. Slightly moist. Poorly sorted. No odor.	
		SC		Clayey SAND. Very fine to fine grained. Moderately dense. Dark Brown [7.5 YR 3/2]. Slightly moist to dry. Poorly sorted with trace cobbles. No odor.	
50		SM		Silty SAND with trace angular gravels. Very fine to medium grained. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.	



BORING LOG OF IRZMW2

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RN099455.0005.CA001

Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
50		SM		 <p>Grout 4" Diameter Sch 40 PVC</p>	
55		SC/SM			<p>Silty Clayey SAND with trace angular gravels. Very fine to medium grained. Moderately dense to loose. Poorly sorted. No odor.</p>
60				<p>Silty SAND. Very fine to medium grained with trace coarse angular gravels. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.</p> <p>Same as above</p>	
65		SM		<p>Same as above except trace amount clay.</p> <p>Silty SAND. Very fine to coarse with trace angular cobbles and gravels. Fresh fracture surfaces on cobbles. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.</p> <p>Boulder</p>	
70				<p>Silty SAND. Very fine to medium grained with occasional coarse sands to fine gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.</p> <p>Same as above.</p>	
75				<p>Silty SAND. Very fine to coarse grained with trace angular gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.</p> <p>Same as above except more angular gravels.</p>	



BORING LOG OF IRZMW2

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Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
75					<p>Silty SAND. Very fine to coarse grained with occasional highly weathered angular gravels and cobbles. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted.</p> <p>Same as above.</p>
80		SM			<p>Silty Clayey SAND. Very fine to medium grained with trace gravels. Moderately dense. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.</p>
		SM/SC			<p>Silty SAND. Very fine to fine grained with trace medium. Brown [7.5 YR 4/3]. Dry. Moderately sorted. No odor.</p>
85		SM			<p>Silty SAND. Very fine to fine grained. Loose. Brown [7.5 YR 4/3]. Dry. Well Sorted. No odor.</p> <p>Same as above</p>
90		SM/SC			<p>Same as above except trace clay.</p>
		SC			<p>Clayey SAND with trace angular gravels. Very fine to medium grained. Moderately dense. Dark Brown [7.5 YR 3/2]. Dry. Poorly sorted. No odor.</p>
95		SC/SM			<p>Same as above except less clay.</p>
		SM			<p>Silty SAND with trace angular gravels with fresh fracture surfaces. Very fine to fine grained. Loose. Brown [7.5 YR 4/3]. Dry. No odor.</p> <p>Same as above.</p>
100					



BORING LOG OF IRZMW2

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Date Started : 11/14/02
 Date Completed : 11/20/02
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 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
100		SM			Same as above.
		SC		Grout	Clayey SAND. Very fine to medium grained with trace coarse gravel / cobble. Moderate density. Dark Brown [7.5 YR 3/2]. Dry. No odor.
105					Same as above.
				Bentonite Chips	Silty SAND. Very fine to medium grained with trace coarse sands. Brown [7.5 YR 4/3]. Dry. Loose. No odor.
110					Same as above except with trace angular gravels.
				4" Diameter Sch 40 PVC	Same as above
115		SM			Silty SAND. Very fine to coarse grained with abundant coarse gravels. Loose. Brown [7.5 YR 4/3]. Dry. No odor.
					Silty SAND. Very fine to coarse grained with trace gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
120				#2/12 Sand	Same as above
					Same as above
					Silty SAND. Very fine to coarse grained with angular cobbles and gravels of granitic composition. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
125					Silty SAND. Very fine to coarse grained with trace gravels. Loose. Brown [7.5 YR 4/3]. Dry. No odor.

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BORING LOG OF IRZMW2

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RN099455.0005.CA001

Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
125					
130					Same as above except fractured cobbles with fresh surfaces. Fractured cobbles/gravels are highly weathered and of very quartz-rich granitic composition.
					Same as above
135					Silty SAND. Very fine to coarse grained with angular gravels and cobbles. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
		SM		4" Diameter Sch 40 PVC	Same as above
140				#2/12 Sand	Silty SAND. Very fine to medium grained with occasional gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
					Same as above except trace cobbles.
145					Silty SAND. Very fine to coarse grained with trace gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
150					Same as above

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Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
150					Same as above.
155					Silty SAND. Very fine to coarse grained with trace angular cobbles of granitic composition. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
					Same as above
160					Same as above except trace fractured quartz rich boulder.
		SM		4" Diameter Sch 40 PVC #2/12 Sand	Silty SAND with trace clay. Very fine to coarse grained with occasional angular coarse gravels and cobbles. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
165					Same as above except no cobbles.
					Silty SAND with occasional angular gravels. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
170					Silty SAND with trace clay. Very fine to medium grained. Loose. Dark Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
175					Same as above

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Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
175					Silty SAND. Very fine to coarse grained with cobbles and boulder. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. Boulder.
180					Same as above.
185					Silty SAND. Very fine to coarse with abundant angular gravels and cobbles with fresh fracture surfaces. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor. Same as above. Same as above
190		SM		4" Diameter Sch 40 PVC #2/12 Sand	Boulder. Boulder. Same as above.
195					Silty SAND. Very fine to fine grained with abundant angular coarse gravels and trace quartz and mica rich cobbles. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor. Same as above
200					Same as above except more angular coarse gravels and cobbles. Same as above

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Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
200					Silty SAND. Fine to coarse grained with occasional subangular gravels. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
205					Same as above.
					Same as above.
210					Same as above except trace cobbles.
				4" Diameter Sch 40 PVC	Same as above.
				#2/12 Sand	Silty SAND. Very fine to coarse grained with abundant angular gravels and occasional cobbles. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
215					Same as above.
220					Silty SAND. Very fine to coarse grained with gravels and cobbles with fresh fracture surfaces. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor. Boulder.
				0.02" slot screen 4" diameter Stainless	Silty SAND. Very fine to coarse grained with occasional gravels. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
225					Same as above.

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Date Started : 11/14/02
 Date Completed : 11/20/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW2 TOC Elev.: 1215.52 ft amsl	DESCRIPTION
225					Same as above with granitic cobbles.
230		SM			Same as above.
		SM/SC			Silty SAND. Very fine to coarse grained with occasional gravels, cobbles and trace clay. Loose to moderately dense. Dark Brown [7.5 YR 3/3]. Moist. Very poorly sorted. No odor.
				GW @ 233.5'	
235		SM			Same as above except no clay.
				0.02" slot screen 4" diameter Stainless	
				#2/12 Sand	
240		SM/GM			Broken boulder of highly weathered granite.
					Silty SAND. Very fine to coarse grained with abundant gravels and angular cobbles. Loose. Brown [7.5 YR 4/3]. Moist. Very poorly sorted. No odor. Boulder.
245		SM			Same as above except no cobbles.
					Silty SAND with angular gravels, cobbles and boulders. Very fine to coarse grained. Loose. Brown [7.5 YR 4/3]. Moist. Very poorly sorted. No odor.
					Boulder.
250					Boulder.....



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Date Started : 11/21/02
 Date Completed : 12/15/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW3 TOC Elev.: 1216.25 ft amsl	DESCRIPTION
50		ML/CL			Boulder.
55					
60					Silty SAND. Very fine to medium grained with occasional coarse sand and gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
65		SM		Grout 4" Diameter Sch 40 PVC	Same as above except cobbles of highly weathered granite.
70					Boulder.
75					



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Date Started : 11/21/02
 Date Completed : 12/15/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW3 TOC Elev.: 1216.25 ft amsl	DESCRIPTION
200					Silty SAND. Very fine to coarse grained. Brown [7.5 YR, 4/3]. Dry. Poorly sorted. No odor.
205					Same as above except occasional gravels.
				Bentonite Slurry grout	Same as above except gravels and cobbles.
210		SM			Silty SAND, very fine to coarse with occasional cobbles of highly weathered granite. Loose. Brown [7.5 YR 4/3]. Dry. Very poorly sorted. No odor.
				4" Diameter Sch 40 PVC	Same as above Granite boulder
215					Granite boulder Granite boulder Granite boulder
				# 2/12 Sand	Silty SAND. Very fine to very coarse with gravels and small cobbles. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
220					Same as above except slightly moist.
					Silty SAND, with boulders and highly weathered granitic cobbles. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
225					Same as above except more cobbles/boulders.

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Date Started : 11/21/02
 Date Completed : 12/15/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW3 TOC Elev.: 1216.25 ft amsl	DESCRIPTION
225					Silty SAND. Very fine to medium with angular gravels. Loose. Brown [7.5 YR 4/3]. Dry. Poorly sorted. No odor.
230	SM				Silty SAND. Very fine to medium with occasional coarse sands, gravels, and trace cobbles. Loose. Brown [7.5 YR 4/3]. Slightly moist. Poorly sorted. No odor.
				GW @ 233'	Silty SAND. Very fine to coarse with occasional fine gravels. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. Slight clay. No odor.
				0.02" slot screen 4" diameter Stainless Steel	Cobbles
235	SM/SC			# 2/12 Sand	Clayey/Silty SAND. Very fine to medium grained. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
	SC				CLAYEY SAND, very fine to medium. Loose to slightly dense. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
240	SC/GC				Clayey SAND/ GRAVEL. Very fine to coarse grained. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
	SC				Same as above except trace cobbles.
245	GC/SC				Clayey SAND. Very fine to medium grained. Dense. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
	SC/GC				Boulder
					Clayey GRAVEL/SAND. Dense. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
250					Clayey SAND/GRAVEL with subangular to angular granite gravels. Moderately dense. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.



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Date Started : 11/21/02
 Date Completed : 12/15/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW3 TOC Elev.: 1216.25 ft amsl	DESCRIPTION
250					Same as above
255		SC/GC			Same as above
260		SC		0.02" slot screen 4" diameter Stainless Steel	Clayey SAND. Very fine to fine with occasional medium sand. Dense. Brown [7.5 YR 4/3]. Moist. Moderately sorted. No odor.
265		SC/GC		# 2/12 Sand	Same as above except trace amount of cobbles.
270		SC			Clayey SAND/GRAVEL. Very fine to coarse grained with angular coarse sands and gravel. Loose to moderately dense. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.
275					Same as above. Same as above except subrounded gravels. Clayey SAND. Very fine to coarse grained with angular gravels. Loose. Brown [7.5 YR 4/3]. Slightly moist. Poorly sorted. No odor. Clayey SAND, with occasional gravels. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor.



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Date Started : 11/21/02
 Date Completed : 12/15/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW3 TOC Elev.: 1216.25 ft amsl	DESCRIPTION
275		SC		0.02" slot screen 4" diameter Stainless Steel	Clayey SAND. Very fine to medium grained. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor. Same as above.
280		SC/GC			Clayey SAND/GRAVEL. Very fine to coarse. Moderately dense. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor. Trace cobbles. Boulder.
285		SM/SC		# 2/12 Sand	Clayey SAND. Very fine to cobble size. Highly weathered granite cobble and subangular to angular gravels. Loose. Brown [7.5 YR 4/3]. Slightly moist. Granitic boulder to 288 ft bgs.
290		SC/SM			Silty clayey SAND. Fine to very fine grained with subangular to subrounded gravels. Loose. Brown [7.5 YR 4/3]. Moist. Poorly sorted. No odor. Same as above.
295		SC/CL		Bentonite Chips	No recovery from 292 feet bgs to 298 feet bgs. Fractured rock observed in hopper. Drilling was very difficult.
300					Clayey SAND. Fine to very fine with trace cobbles and gravels. Loose. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.

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Date Started : 11/21/02
 Date Completed : 12/15/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW3 TOC Elev.: 1216.25 ft amsl	DESCRIPTION
300				Bentonite Chips	
					Clayey SAND. Very fine to medium with trace gravels. Dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor. Saturated. Easy drilling. Same as above.
305					Same as above.
		SC/CL		# 3 Sand	Sandy CLAY. Very fine to medium grained. Moderatly dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor. Trace of subrounded gravels. Same as above.
310					Boulder.
					Same as above.
315					Boulder.
					Same as above.
320				Bentonite Chips	
		SC			Sandy CLAY/Clayey SAND. Very fine to medium grained. Moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
325					Clayey SAND. Very fine to coarse with trace rounded gravels. Dense. Brown [7.5 YR 4/3]. Wet. Very poorly sorted. No odor. Same as above except no gravels.

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BORING LOG OF IRZMW3

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Date Started : 11/21/02
 Date Completed : 12/15/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW3 TOC Elev.: 1216.25 ft amsl	DESCRIPTION
325					Same as above.
				Bentonite Chips	
					Same as above.
		SC			Clayey SAND. Very fine to medium. Moderately dense. Brown [7.5 YR 4/3]. Wet. Moderately to poorly sorted. No odor. Less clay than previous.
					Same as above except trace coarse gravels/fine cobbles.
					Clayey SAND. Very fine to coarse grained. Moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
				# 3 Sand	Sandy CLAY/Clayey SAND. Very fine to fine with trace medium grained. Dense. Brown [7.5 YR 4/3]. Wet. Moderately sorted. No odor. Less clay.
		SC/CL			Same as above.
					Clayey SAND. Very fine to coarse grained. Moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
					Clayey SAND. Fine to very fine grained. Moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
		SC			Same as above except trace subrounded gravels.
					Same as above.
					Clayey SAND/Sandy CLAY. Fine to very fine grained with trace medium sand, cobbles, and occasional subrounded gravels. Dense. Brown [7.5 YR 4/3] Wet. Poorly sorted. No odor.
		SC/CL		Bentonite Chips	



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Date Started : 11/21/02
 Date Completed : 12/15/02
 Logged By : Kristen Stevens
 Checked By : Scott Edwards, R.G. 7317
 Drilling Company : Boart Longyear

Sample Device : Core Barrel
 Drill Rig : Sonic Rig
 Drillers : Ron/Dan/Phelps
 Diameter : 9 inches

Depth in Feet	Samples	USCS	GRAPHIC	Well: IRZMW3 TOC Elev.: 1216.25 ft amsl	DESCRIPTION
350		SC/CL			Clayey SAND/Sandy CLAY, very fine to fine with trace medium sands and coarse gravels. Dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor. Trace gneissic cobbles.
		SC/GC			Same as above except increased subrounded gravels.
355					Clayey SAND and GRAVEL. Very fine to coarse. Moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
		GC/SC			Same as above.
360					Same as above.
		SC			Same as above except less gravels and generally finer sediments.
365		SC/CL			Sandy CLAY/Clayey SAND. Moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
370		CL			CLAY with trace sand and trace gravels. Moderately dense. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor.
		SC			Cobble
375					CLAYEY SAND. Very fine to medium with trace coarse sands and fine gravels. Loose. Brown [7.5 YR 4/3]. Wet. Poorly sorted. No odor. Pink granite subrounded coarse sands/fine gravels.

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Total Depth = 375 feet bgs.

Appendix 3-3

**Geotechnical Survey
Results & Recommendations**

Appendix 3-4

**Compaction
Field Reports**

