ARM Group Inc.
Engineers and Scientists

December 4, 2019

Ms. Barbara Brown
Project Coordinator
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: NAPL Delineation Completion Report and
Permanent Well Installation Work Plan
B22-119-PZ (PORI Lagoon)
Area B: Parcel B22
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

In June 2016, ARM Group Inc. (ARM) completed a Phase II Investigation of Parcel B22, which is located within Area B of the Tradepoint Atlantic property in Sparrows Point, Maryland. Following completion of the Phase II Investigation, ARM, on behalf of EnviroAnalytics Group (EAG), prepared a final Phase II Investigation Report (Revision 1 dated August 8, 2019) to describe the findings of the investigation and provide recommendations.

The Palm Oil Recovery, Inc. (PORI) Lagoon, in the northern section of Parcel B22, was targeted during the Phase II Investigation by four soil borings (B22-119-SB, B22-120-SB, B22-121-SB, and B22-174-SB). A black and viscous product was observed in soil boring B22-119 SB within the soil core from 9 to 10 feet below ground surface (bgs). A temporary groundwater piezometer was installed at this location, with a screen from 7 to 22 feet bgs, to determine the presence or absence and potential mobility of non-aqueous phase liquid (NAPL) in groundwater. There was no measurable NAPL present in the piezometer B22-119-PZ during the 0-hour, 48-hour, or 30-day gauging events. The piezometer was later abandoned on October 11, 2016.

A *Work Plan for the Characterization of Naphthalene and Benzo[a]pyrene Impacts at the PORI Lagoon (Work Plan)*, dated April 19, 2018, was submitted to the Maryland Department of the Environment (MDE) and the United States Environmental Protection Agency (USEPA) to further investigate conditions in this area. Following review of the Work Plan, the proposed approach was approved by the agencies via email on April 30, 2018. The characterization activities were implemented, and the findings have been formally submitted within the

Characterization of Naphthalene and Benzo[a]pyrene Impacts Interim Submittal, dated August 8, 2019. The findings related to the NAPL delineation activities are summarized below.

Characterization activities were conducted in the vicinity of the PORI Lagoon from May 7 to May 9, 2018 and included a total of 12 supplemental soil borings. During this timeframe, temporary piezometers were installed at four of the soil boring locations (B22-119-PZ, B22-119I-PZ, B22-119J-PZ, and B22-119K-PZ). During the 48-hour gauging event, B22-119K-PZ (screened from 4.5 to 24.5 feet bgs) had 0.14 feet of NAPL that had accumulated in the piezometer screen. To further delineate the extent of NAPL in groundwater, six additional groundwater piezometers (B22-119L-PZ, B22-119M-PZ, B22-119N-PZ, B22-119O-PZ, B22-119P-PZ, and B22-119Q-PZ) were installed on October 12, 2018. None of the six additional delineation piezometers had measurable NAPL during the 0-hour, 48-hour, or 30-day gauging events. The locations of the piezometers and findings related to NAPL are shown on **Figure 1**. The dates of monitoring activities, as well as NAPL thickness measurements and water level measurements, have been included in **Table 1**. This table also includes the installation date of each piezometer, as well as relevant construction details (screen intervals, etc.). Boring logs documenting soil core observations were completed for all delineation piezometers installed around B22-119-PZ. Soil boring observation and piezometer construction logs for each piezometer are provided in **Attachment 1**. The original log for B22-119-SB (2016) is not included in this set, but the log generated from its reinstallation in 2018 is provided.

During a NAPL gauging event on September 3, 2019, it was discovered that piezometer B22-119I-PZ had apparently been destroyed during the construction of a staging lot that was being used to store Volkswagen vehicles. There were no historical detections of NAPL at this location and the piezometer was located relatively distant from the piezometer containing NAPL (B22-119K-PZ).

The NAPL impacts in the vicinity of B22-119-PZ have been adequately defined to implement a more formal monitoring and recovery program. Therefore, approval is requested to abandon the remaining NAPL screening piezometers within the B22-119-PZ delineation area. The NAPL delineation piezometers will be gauged a final time on the abandonment date as recommended by the MDE, and the MDE will be notified if NAPL is detected in any piezometers which were not previously determined to be impacted.

It is recommended that continued NAPL monitoring, along with recovery of any accumulated NAPL, occur in the vicinity of B22-119-PZ. The monitoring/recovery will be facilitated through the installation of one permanent 2-inch diameter groundwater well. The proposed depth of the well is 23 feet with a screen interval from 3 to 23 feet bgs. The new permanent well will be installed at the location of B22-119K-PZ, which has accumulated NAPL during prior gauging events. The location of the proposed permanent well is shown on **Figure 1**.

Initially, monthly NAPL gauging and removal will be performed. During each monitoring event, accumulated NAPL will be removed from the well if measurable NAPL is observed, using hand bailing techniques or a peristaltic pump. The volume removed will be recorded for each event. Any NAPL that is removed will be placed in a sealed drum stored adjacent to the monitoring area or in a centralized location. Ultimately, NAPL removed from the well will be disposed of at a permitted disposal facility, which will be approved by the MDE prior to shipment.

If three consecutive monthly events occur where less than 1 inch of product is measured, the monitoring and NAPL removal schedule will be adjusted to quarterly. Accumulated product will be removed from the well prior to adjusting to the quarterly schedule. If 6 inches or more of product is measured during any monitoring event, a monthly gauging schedule will be implemented, and all of the above-mentioned procedures will continue to apply.

The periodic monitoring events, along with any NAPL removal activities, will be reported to the MDE at a minimum frequency of semi-annually. Should the schedule of NAPL gauging and/or removal be modified, MDE approval will be required for such changes.

If you have any questions, or if we can provide any additional information at this time, please do not hesitate to contact ARM Group Inc. at 410-290-7775.

Respectfully submitted,
ARM Group Inc.

Leandra Glumac
Project Geologist

Eric S. Magdar, P.G.
Vice President

FIGURES

Parcel B22 - PORI Lagoon Aerial NAPL Delineation

December 3, 2019

Figure 1

ARM Group Inc.
Engineers and Scientists

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 150300M-20

TABLES

Table 1 - NAPL Gauging Activities
Parcel B22: B22-119-PZ (PORI Lagoon)

Sample ID	Installation Date	Abandonment Date	Well Total Depth (feet bgs)	Screen Interval (feet bgs)	Riser Stick-Up (feet)	5/19/2016			5/20/2016			5/23/2016		
						Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)
B22-119-PZ	5/19/2016	10/11/2016	22	7-22	2.63	-	11.82	-	-	11.23	-	-	10.93	-
B22-119-PZ	5/8/2018	NA	20	5-20	2.86	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119I-PZ	5/8/2018	*9/3/2019	24	5-24	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119J-PZ	5/9/2018	NA	16	5-16	4.13	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119K-PZ	5/9/2018	NA	24.5	4.5-24.5	5.45	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119L-PZ	10/12/2018	NA	17	7-17	4.83	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119M-PZ	10/12/2018	NA	18	8-18	5.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119N-PZ	10/12/2018	NA	20	10-20	5.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119O-PZ	10/12/2018	NA	20	10-20	2.69	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119P-PZ	10/12/2018	NA	20	10-20	1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119Q-PZ	10/12/2018	NA	19	9-19	3.86	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample ID	Installation Date	Abandonment Date	Well Total Depth (feet bgs)	Screen Interval (feet bgs)	Riser Stick-Up (feet)	6/2/2016			7/22/2016			10/11/2016		
						Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)
B22-119-PZ	5/19/2016	10/11/2016	22	7-22	2.63	-	11.15	-	-	11.31	-	Abandoned		
B22-119-PZ	5/8/2018	NA	20	5-20	2.86	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119I-PZ	5/8/2018	*9/3/2019	24	5-24	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119J-PZ	5/9/2018	NA	16	5-16	4.13	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119K-PZ	5/9/2018	NA	24.5	4.5-24.5	5.45	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119L-PZ	10/12/2018	NA	17	7-17	4.83	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119M-PZ	10/12/2018	NA	18	8-18	5.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119N-PZ	10/12/2018	NA	20	10-20	5.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119O-PZ	10/12/2018	NA	20	10-20	2.69	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119P-PZ	10/12/2018	NA	20	10-20	1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119Q-PZ	10/12/2018	NA	19	9-19	3.86	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Applicable
NM = Not Measured
SHADED = NAPL Detection
bgs = below ground surface
* indicates piezometer was missing or destroyed

Table 1 - NAPL Gauging Activities
Parcel B22: B22-119-PZ (PORI Lagoon)

Sample ID	Installation Date	Abandonment Date	Well Total Depth (feet bgs)	Screen Interval (feet bgs)	Riser Stick-Up (feet)	5/8/2018			5/9/2018			5/10/2018		
						Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)
B22-119-PZ	5/19/2016	10/11/2016	22	7-22	2.63	Abandoned								
B22-119-PZ	5/8/2018	NA	20	5-20	2.86	-	17.11	-	NM	NM	NM	-	11.62	-
B22-119I-PZ	5/8/2018	*9/3/2019	24	5-24	3.13	-	27.37	-	NM	NM	NM	-	14.18	-
B22-119J-PZ	5/9/2018	NA	16	5-16	4.13	NA	NA	NA	-	14.13	-	NM	NM	NM
B22-119K-PZ	5/9/2018	NA	24.5	4.5-24.5	5.45	NA	NA	NA	-	26.95	-	NM	NM	NM
B22-119L-PZ	10/12/2018	NA	17	7-17	4.83	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119M-PZ	10/12/2018	NA	18	8-18	5.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119N-PZ	10/12/2018	NA	20	10-20	5.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119O-PZ	10/12/2018	NA	20	10-20	2.69	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119P-PZ	10/12/2018	NA	20	10-20	1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-119Q-PZ	10/12/2018	NA	19	9-19	3.86	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample ID	Installation Date	Abandonment Date	Well Total Depth (feet bgs)	Screen Interval (feet bgs)	Riser Stick-Up (feet)	5/11/2018			8/24/2018			10/12/2018		
						Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)
B22-119-PZ	5/19/2016	10/11/2016	22	7-22	2.63	Abandoned								
B22-119-PZ	5/8/2018	NA	20	5-20	2.86	NM	NM	NM	-	11.70	-	NM	NM	NM
B22-119I-PZ	5/8/2018	*9/3/2019	24	5-24	3.13	NM	NM	NM	-	8.51	-	NM	NM	NM
B22-119J-PZ	5/9/2018	NA	16	5-16	4.13	-	14.16	-	-	16.43	-	NM	NM	NM
B22-119K-PZ	5/9/2018	NA	24.5	4.5-24.5	5.45	**14.33**	**14.47**	**0.14**	**15.30**	**15.32**	**0.02**	NM	NM	NM
B22-119L-PZ	10/12/2018	NA	17	7-17	4.83	NA	NA	NA	NA	NA	NA	-	15.76	-
B22-119M-PZ	10/12/2018	NA	18	8-18	5.05	NA	NA	NA	NA	NA	NA	-	14.91	-
B22-119N-PZ	10/12/2018	NA	20	10-20	5.05	NA	NA	NA	NA	NA	NA	-	15.64	-
B22-119O-PZ	10/12/2018	NA	20	10-20	2.69	NA	NA	NA	NA	NA	NA	-	15.84	-
B22-119P-PZ	10/12/2018	NA	20	10-20	1.00	NA	NA	NA	NA	NA	NA	-	15.79	-
B22-119Q-PZ	10/12/2018	NA	19	9-19	3.86	NA	NA	NA	NA	NA	NA	-	19.48	-

NA = Not Applicable
NM = Not Measured
SHADED = NAPL Detection
bgs = below ground surface
* indicates piezometer was missing or destroyed

Table 1 - NAPL Gauging Activities
Parcel B22: B22-119-PZ (PORI Lagoon)

Sample ID	Installation Date	Abandonment Date	Well Total Depth (feet bgs)	Screen Interval (feet bgs)	Riser Stick-Up (feet)	10/15/2018			11/14/2018			9/3/2019		
						Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)	Depth to NAPL (feet TOC)	Depth to Water (feet TOC)	NAPL Thickness (feet)
B22-119-PZ	5/19/2016	10/11/2016	22	7-22	2.63	Abandoned								
B22-119-PZ	5/8/2018	NA	20	5-20	2.86	NM	NM	NM	NM	NM	NM	-	12.27	-
B22-119I-PZ	5/8/2018	*9/3/2019	24	5-24	3.13	NM	NM	NM	NM	NM	NM	Destroyed		
B22-119J-PZ	5/9/2018	NA	16	5-16	4.13	NM	NM	NM	NM	NM	NM	-	14.89	-
B22-119K-PZ	5/9/2018	NA	24.5	4.5-24.5	5.45	NM	NM	NM	NM	NM	NM	**trace^**	**15.09**	**trace^**
B22-119L-PZ	10/12/2018	NA	17	7-17	4.83	-	15.88	-	-	15.21	-	-	15.34	-
B22-119M-PZ	10/12/2018	NA	18	8-18	5.05	-	15.03	-	-	14.55	-	-	14.86	-
B22-119N-PZ	10/12/2018	NA	20	10-20	5.05	-	15.40	-	-	14.61	-	-	14.68	-
B22-119O-PZ	10/12/2018	NA	20	10-20	2.69	-	15.73	-	-	14.83	-	-	12.25	-
B22-119P-PZ	10/12/2018	NA	20	10-20	1.00	-	14.63	-	-	13.79	-	-	11.16	-
B22-119Q-PZ	10/12/2018	NA	19	9-19	3.86	-	17.17	-	-	16.12	-	-	13.83	-

^Field representative noted no positive oil reading from the probe, but product was present along the length of the tape.

NA = Not Applicable
NM = Not Measured
SHADED = NAPL Detection
bgs = below ground surface
* indicates piezometer was missing or destroyed

Attachment 1

ARM Group Inc.
Engineers and Scientists

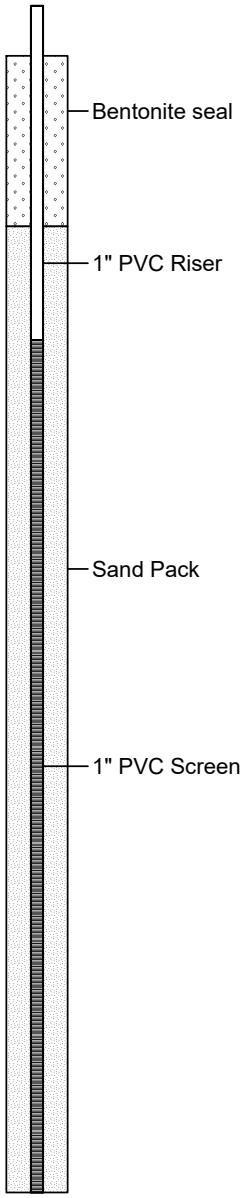
Boring ID: B22-119-SB/PZ

Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: M. Kedenburg, G.I.T.
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Ryan Sites
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 5/18/18
Piezometer Installation Date	: 5/18/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571288.15
Easting (US ft)	: 1461171.37
0-Hr DTW	: 17.11' TOC
48-Hr DTW	: 11.62' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-				
		-				
	60	0.7		(0-5') SAND with GRAVEL, medium to dense, dark brown to black, no plasticity, no cohesion	SW	Trace SLAG COBBLES throughout
		0.5				
		1.3	B22-119-SB-5			
5		-		(5-20') CLAY with SAND and GRAVEL, pale brown to bluish gray, firm, medium plasticity, cohesive, slightly moist to wet at 15' bgs		Wood at 5.5' bgs
		42.5				
	90	180.9				Oil throughout from 7-10' bgs, with prominent oil at 8' bgs and 9' bgs
		237.6				
		18.5				SLAG GRAVEL lens at 7.5' bgs
10		-				
		10.2				
	100	27.8			CL	
		1.4				
		1.5	B22-119-SB-15			
15		-				Wet at 15' bgs
		-				
	90	-				
		-				
		-				Trace NAPL at 19' bgs
20				End of boring		



Boring terminated at 20' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 2.86'
Riser: 0 - 5' bgs
Screen: 5 - 20' bgs [Slot Size: 0.010"]
Sand Pack: 3 - 20' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 3' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

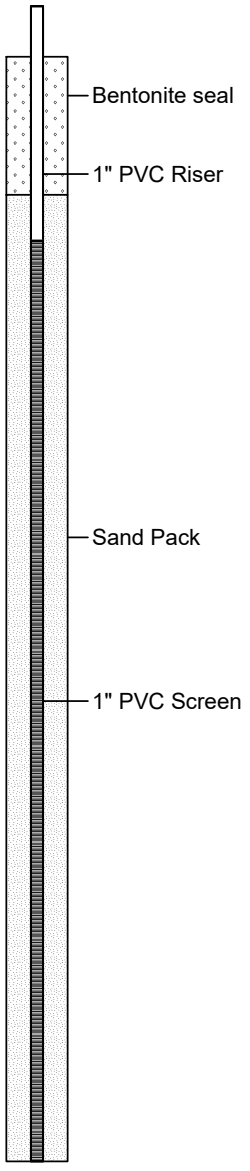
Boring ID: B22-119I-SB/PZ

Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: M. Kedenburg, G.I.T.
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Ryan Sites
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 5/8/18
Piezometer Installation Date	: 5/8/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571240.63
Easting (US ft)	: 1461111.01
0-Hr DTW	: 27.37' TOC
48-Hr DTW	: 14.18' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-				
		0.5		(0-4') SAND with GRAVEL, medium to fine, slightly moist, loose, light brown to pale yellow, no plasticity, no cohesion	SW	BRICK fragments from 1-4' bgs
	80	4.4				
		5.6				
		7.9	B22-119I-SB-5	(4-25') CLAY with SAND and GRAVEL, dark greenish gray to black, very firm, moist, medium plasticity, cohesive		Odor at 5' bgs
5		3.7				
		2.4				
	100	1.6				
		0.2				
		0.4	B22-119I-SB-10			
10		-				
		-				
	70	-				
		-	B22-119I-SB-14			
		-			CL	
15		-				
		-				
	100	-				
		-				
		-				
20		-				
		-				
	100	-				
25				End of boring		



Boring terminated at 25' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 3.13'
Riser: 0 - 4' bgs
Screen: 4 - 24' bgs [Slot Size: 0.010"]
Sand Pack: 3 - 24' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 3' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

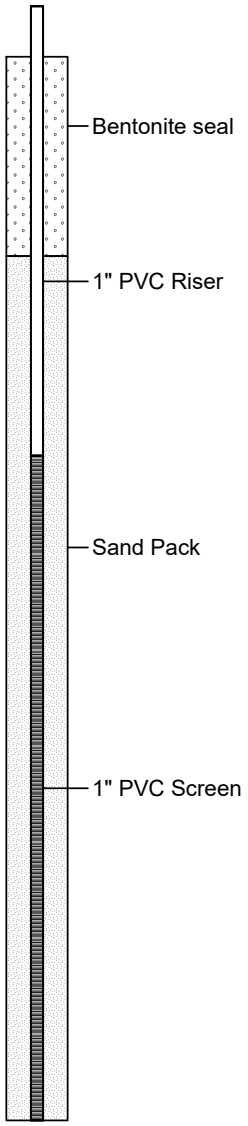
Boring ID: B22-119J-SB/PZ

Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: S. Kabis
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Ryan Sites
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 5/9/18
Piezometer Installation Date	: 5/9/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571337.95
Easting (US ft)	: 1461151.64
0-Hr DTW	: 14.13' TOC
48-Hr DTW	: 14.16' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-		(0-15') SLAG SAND and GRAVEL with some SLAG COBBLES, loose, black, dry, no plasticity, no cohesion		
	80	0.6				
		1.6				
		1.7				
		0.6	B22-119J-SB-5			
5		0.2				
		1.6				
	90	2.5			SW/GW	
		1.7				
		1.3	B22-119J-SB-10			Wet at 9' bgs
10		-				
		-				
	80	-				
		-				
		-				
15		-		(15-17') SLAG SAND and GRAVEL, black, wet, dense, no plasticity, no cohesion		
	100	-			SW/GW	
				End of boring		



Boring terminated at 16' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 4.13'
Riser: 0 - 6' bgs
Screen: 6 - 16' bgs [Slot Size: 0.010"]
Sand Pack: 3 - 16' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 3' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

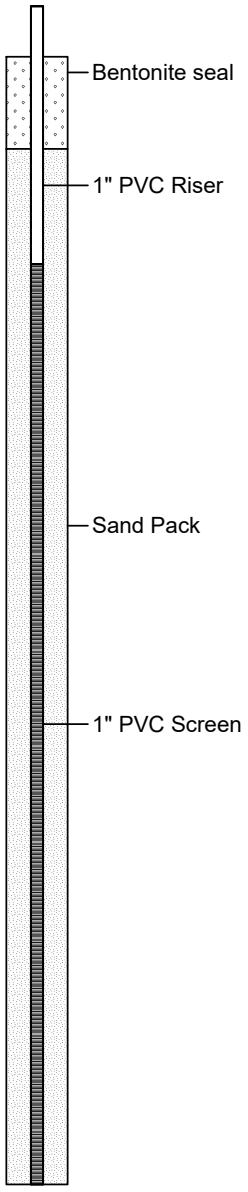
Boring ID: B22-119K-SB/PZ

Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: S. Kabis
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Ryan Sites
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 5/9/18
Piezometer Installation Date	: 5/9/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571366.76
Easting (US ft)	: 1461244.93
0-Hr DTW	: 26.95' TOC
48-Hr DTW	: 14.46' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS
0		-		(0-7') SLAG SAND and GRAVEL, loose, black, dry, no plasticity, no cohesion	
	80	0.8			
		1.4			
		0.4			SW/GW
		0.6	B22-119K-SB-5		
5		0.1			
		0.6			
	100	0.7			
		1.1	B22-119K-SB-9	(8-9') SLAG GRAVEL and SILT, hard, tan, dry, no plasticity, cohesive	GW/ML
		-		(9-12') SLAG SAND and GRAVEL, black, wet, no plasticity, no cohesion	SW/GW
10		-			
		-			
	70	1.7		(12-25') CLAY with GRAVEL from 20-21' bgs, firm, dry to wet at 20' bgs, gray, high plasticity, cohesive	
		0.6			
		0.1	B22-119K-SB-15		
15		-			
		-			
	60	-			CL
		-			
		-			
20					
	100				
25				End of Boring	



REMARKS
Wet at 9' bgs

Boring terminated at 24.5' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 5.45'
Riser: 0 - 4.5' bgs
Screen: 4.5 -24.5' bgs [Slot Size: 0.010"]
Sand Pack: 2 - 24.5' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 2' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

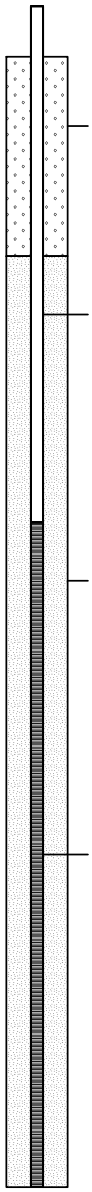
Boring ID: B22-119L-SB/PZ

Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: M. Kedenburg, G.I.T.
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Lou Davis
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 10/12/18
Piezometer Installation Date	: 10/12/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571366.76
Easting (US ft)	: 1461269.93
0-Hr DTW	: 15.76' TOC
48-Hr DTW	: 15.88' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-	No Samples Collected	(0-4') Non-native SAND with some SLAG GRAVEL, medium dense to dense, grayish brown, dry, no plasticity, no cohesion	SW	
	70	0.2				
		0.1				
		0.0		(4-12') CONCRETE and BRICK GRAVEL with SAND, medium dense, yellow and red with brown, dry, no plasticity, no cohesion	NA	
5		-				
		-				
	50	-				
		0.2				
		0.2				
10		-				
		-				
	70	0.3		(12-12.6') SLAG GRAVEL with SAND and SILT, loose, very dark gray, wet, no plasticity, no cohesion	GW/SW	Wet at 12' bgs
		0.0		(12.6-13.4') CLAY with some SAND, greenish gray, gray, and very dark gray, very moist, low plasticity, cohesive	CL	
		0.0		(13.4-14') SLAG GRAVEL with SAND and SILT, loose, very dark gray, wet, no plasticity, no cohesion	GW/SW	
15		-				
	0	-		(14-15') CLAY with some SAND, greenish gray, gray, and very dark gray, very moist, low plasticity, cohesive	CL	
				End of Boring		



Boring terminated at 16' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 4.83'
Riser: 0 - 7' bgs
Screen: 7 - 17' bgs [Slot Size: 0.010"]
Sand Pack: 3 - 17' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 3' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

Boring ID: B22-119M-SB/PZ

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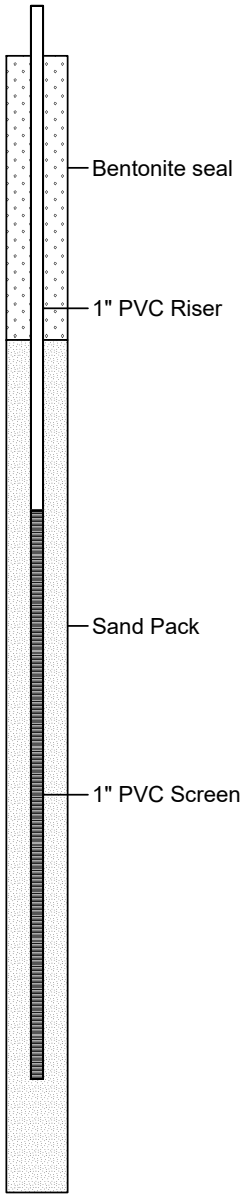
Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Lou Davis
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 10/12/18
Piezometer Installation Date	: 10/12/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571341.76
Easting (US ft)	: 1461244.93
0-Hr DTW	: 14.91' TOC
48-Hr DTW	: 15.03' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0	80	-	No Samples Collected	(0-10') SAND with GRAVEL, coarse to fine, medium dense, dark brown to pale brown to pale gray, slightly moist to dry, no plasticity, no cohesion	SW	
		45.1				
		5.2				
		1.0				
		4.0				
5	60	-				
		-				
		20.5				
		1.6				
		3.6				Wet at 9' bgs
10	80	-		(10-12') SAND, medium, dense, black to pale gray, wet, no plasticity, no cohesion	SP	
		0.4				
		0.6		(12-20') CLAY with GRAVEL, soft, pale gray to bluish gray, wet, low plasticity, cohesive	CL	
		1.5				
		5.8				
15	50	-				
		-				
		1.1				
		0.5				
		0.3				
20				End of Boring		



Boring terminated at 20' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 5.05'
Riser: 0 - 8' bgs
Screen: 8 - 18' bgs [Slot Size: 0.010"]
Sand Pack: 5 - 20' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 5' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

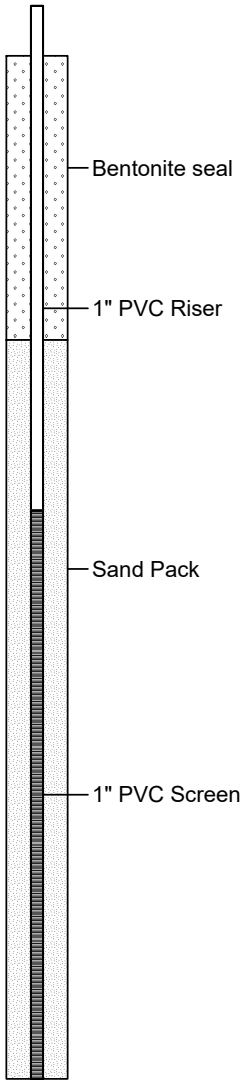
Boring ID: B22-119N-SB/PZ

Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: M. Kedenburg, G.I.T.
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Lou Davis
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 10/12/18
Piezometer Installation Date	: 10/12/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571391.76
Easting (US ft)	: 1461244.93
0-Hr DTW	: 15.64' TOC
48-Hr DTW	: 15.40' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-	No Samples Collected	(0-8') Non-native SAND with trace BRICK GRAVEL, fine to coarse, medium dense to dense, brown to grayish brown, dry, no plasticity, no cohesion	SW	
	74	0.0				
		0.1				
		0.2				
		0.1				
5		-				
		-				
	60	0.0				
		1.5		(8-13') CLAY, soft to firm, greenish gray with heavy black staining, moist, low plasticity, cohesive	CL	
		0.0				
10		-				
		-				
	62	11.7				
		0.0		(13-13.2') BRICK GRAVEL, medium dense, white, dry, no plasticity, no cohesion	NA CL	
		0.1		(13.2-14') CLAY, soft to firm, greenish gray with heavy black staining, moist, low plasticity, cohesive		Wet at 14' bgs
15		-		(14-18') CLAYEY SAND with trace BRICK GRAVEL, medium dense, pale brown, wet, no plasticity, no cohesion	SC	
		-				
	56	0.2				
		0.2		(18-20') CLAY, soft, gray, very moist, low plasticity, cohesive	CL	
		0.3				
20				End of Boring		



Boring terminated at 20' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 5.05'
Riser: 0 - 10' bgs
Screen: 10 - 20' bgs [Slot Size: 0.010"]
Sand Pack: 8 - 20' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 8' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

Boring ID: B22-119O-SB/PZ

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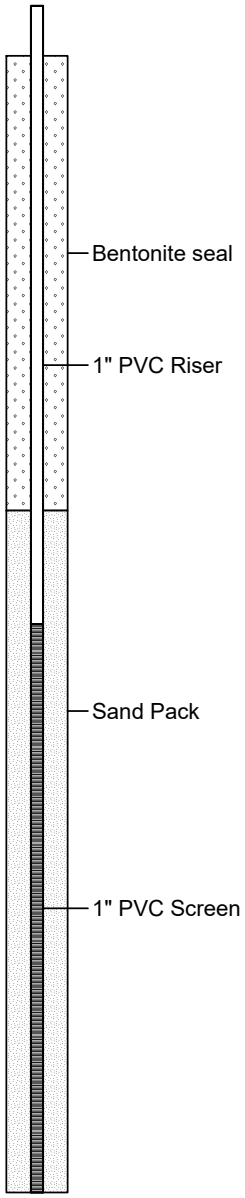
Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: M. Kedenburg, G.I.T.
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Lou Davis
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 10/12/18
Piezometer Installation Date	: 10/12/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571366.76
Easting (US ft)	: 1461219.93
0-Hr DTW	: 15.84' TOC
48-Hr DTW	: 15.73' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-	No Samples Collected	(0-8') SAND with GRAVEL, medium to fine, medium dense, dark brown to pale gray, moist, no plasticity, no cohesion	SW/GW	
	40	-				
		1.2				
		2.1				
5		-				
		1.3				
	80	0.4				
		1.6		(8-8.5') BRICK	NA	
		59.2		(8.5-13.5') SAND with GRAVEL, medium to fine, medium dense, dark brown to pale gray, moist, no plasticity, no cohesion	SW	
10		-				
		-				
	50	18.7				
		4.2				Wet at 13.5' bgs
		2.5		(13.5-15.5') GRAVEL with SAND, medium, dense, black to dark brown, wet, no plasticity, no cohesion	GP	
15		-				
		0.3		(15.5-20') CLAY, soft, dark bluish gray, wet, low plasticity, cohesive	CL	
	80	0.2				
		0.1				
		0.3				
20				End of boring		



Boring terminated at 20' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 2.69'
Riser: 0 - 10' bgs
Screen: 10 - 20' bgs [Slot Size: 0.010"]
Sand Pack: 8 - 20' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 8' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

Boring ID: B22-119P-SB/PZ

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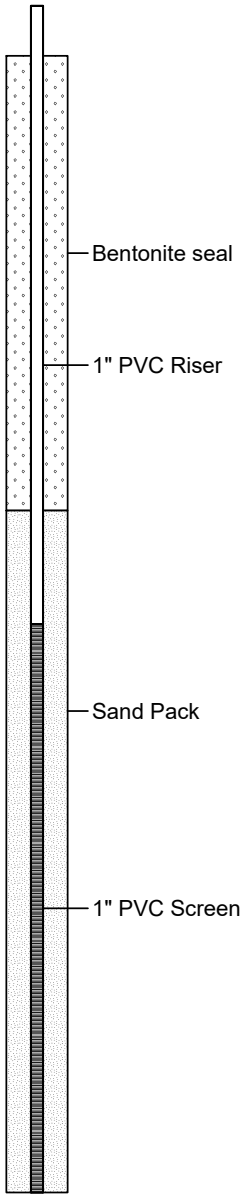
Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Lou Davis
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 10/12/18
Piezometer Installation Date	: 10/12/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571372.66
Easting (US ft)	: 1461178.21
0-Hr DTW	: 15.79' TOC
48-Hr DTW	: 14.63' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-	No Samples Collected	(0-0.5') SLAG GRAVEL, coarse, loose, light gray, dry, no plasticity, no cohesion	GP	
		-		(0.5-14') Non-native SAND with some SLAG and BRICK GRAVEL and some SILT, medium dense, to dense, brown, grayish brown and some yellow, dry, no plasticity, no cohesion		
	60	1.1				
		0.5				
		0.1				
5		-				
		5.2			SW/GW	
	80	0.3				
		0.1				
		0.0				
10		-				
		-				
	60	0.0				
		0.0				
		0.0		(14-20') GRAVEL with SILT and some SAND, fine, medium dense, dark brown with trace yellow, wet, no plasticity, no cohesion		Wet at 14' bgs
15		-				
		0.0			GP-GM	Trace BRICK from 14-20' bgs
	80	0.1				
		0.0				
		0.4				
20				End of Boring		



Boring terminated at 20' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 1.00'
Riser: 0 - 10' bgs
Screen: 10 - 20' bgs [Slot Size: 0.010"]
Sand Pack: 8 - 20' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 8' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Engineers and Scientists

Boring ID: B22-119Q-SB/PZ

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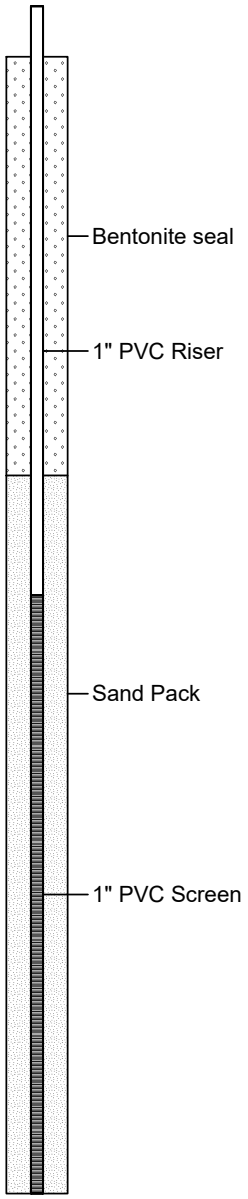
Client	: EnviroAnalytics Group
ARM Project No.	: 150300M-20-10
Project Description	: Sparrows Point - Parcel B22
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Lou Davis
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 10/12/18
Piezometer Installation Date	: 10/12/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 571333.77
Easting (US ft)	: 1461194.88
0-Hr DTW	: 19.42' TOC
48-Hr DTW	: 17.17' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-	No Samples Collected	(0-15') SAND with GRAVEL, fine to coarse, loose, dark brown to pale gray, dry, no plasticity, no cohesion		
	80	2.3				
		2.0				
		59.8				
		2.7				
5		-				
	80	7.7			SW	
		0.5				
		0.6				
		2.6				
10		-				
	80	8.5				
		6.6				
		6.1				
		6.9				
15		0.2		(15-19') SLAG GRAVEL with SAND, medium to coarse, dense, black to reddish brown, no plasticity, no cohesion		Wet at 16' bgs
	100	0.3			SW/GW	BRICK at 17' bgs
		5.5				
		8.0				
20				End of boring		



Boring terminated at 19' bgs due to water and refusal
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 3.86'
Riser: 0 - 9' bgs
Screen: 9 - 19' bgs [Slot Size: 0.010"]
Sand Pack: 7 - 19' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 7' bgs [Grain Size: 3/8" chips]