ARM Group LLC
Engineers and Scientists

April 30, 2021

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

Re: Lead & Thallium Impacted Soil
Supplemental Investigation Report
Area A: Parcel A7 (A7-008-TP)
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

ARM Group LLC (ARM), on behalf of Tradepoint Atlantic (TPA), completed the Phase II Investigation of Parcel A7 (the Site) in October 2017. Parcel A7 is located within Area A of the TPA property located in Sparrows Point, Maryland. The Phase II Investigation included the collection of soil samples via test pitting in addition to conventional soil sampling via continuous core soil borings. Test pits were completed at 10 locations throughout the Site, with each location intended to characterize the contents of existing berms and mounds. Berms and mounds were built at various locations in the Site, potentially associated with historical waste disposal areas. At each test pit location, a 10-part composite sample was collected for analysis, and the test pits were backfilled following the completion of sampling. The Phase II Investigation identified elevated soil concentrations of lead (6,780 mg/kg) and thallium (83.6 mg/kg) in the sample collected from test pit A7-008-TP. Following review of the sampling results, the Maryland Department of the Environment (MDE) requested a delineation investigation to further characterize the observed metals concentrations in A7-008-TP.

A Delineation Work Plan for Lead & Thallium Impacted Soil at A7-008-TP was submitted to the MDE and the United States Environmental Protection Agency (USEPA) on September 1, 2020. Following review of the proposed sampling approach, the Work Plan was formally approved via email on September 25, 2020. Delineation activities were completed in January and February 2021. This Supplemental Investigation Report provides a summary of the field methods and findings of the completed delineation activities.

Delineation Field Methods

To delineate the lead and thallium impacted material at A7-008-TP, five borings were completed using a Geoprobe® direct push rig, or a hand auger, to facilitate the collection of soil samples. Soil samples were collected from four locations surrounding the former test pit, and one location (A7-008A-SB) corresponding to the former test pit, as shown on **Figure 1**. Soil boring logs for each location completed during this delineation investigation are provided in **Attachment 1**. All delineation protocols were conducted in accordance with the Standard Operating Procedures (SOPs) and requirements given in the property-wide Quality Assurance Project Plan (QAPP).

At each delineation boring location, soil samples were collected for analysis from the intervals of 0 to 1, 4 to 5, and 9 to 10 feet below ground surface (bgs) using a Geoprobe® direct push rig or hand auger. Due to access considerations, the hand auger (rather than the Geoprobe®) was used at three locations (A7-008A-SB, A7-008C-SB, and A7-008D-SB) and soil samples were collected only from 0 to 1 and 4 to 5 feet bgs (or 2 to 3 feet bgs in A7-008D-SB due to equipment refusal) in accordance with the Work Plan. Groundwater was not encountered during this investigation. Samples collected from the 10-foot bgs interval at A7-008B-SB and A7-008E-SB were held at the laboratory and later discarded due to a lack of Project Action Limit (PAL) exceedances for lead and thallium in the overlying sample.

After sampling had been concluded at each location, all down-hole soil sampling equipment was decontaminated in accordance with the procedures and methods referenced in the QAPP. Delineation soil samples were submitted to Pace Analytical Services, Inc. (PACE) and analyzed for lead and thallium via USEPA Method 6010. Sample containers, preservatives, and holding times for the lead and thallium analysis are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times. The laboratory reports for the delineation samples, as well as the original Phase II Investigation sample collected from A7-008-TP, are included as electronic attachments.

Investigation-Derived Waste (IDW)

No appreciable quantities of waste soil were generated during this delineation investigation. As stated in the Work Plan, the minimal amount of aqueous waste generated during this investigation from decontamination fluids, etc. is being managed in bulk with waste from other investigations on the property. The aqueous waste will be characterized via composite sampling prior to disposal.

Delineation Results

The results from this soil delineation are provided on **Table 1** and **Figure 1**. The results from the Phase II Investigation soil borings and test pits in proximity to A7-008-TP have also been included on **Figure 1**. The original test pit sample A7-008-TP had lead and thallium concentrations of 6,780 mg/kg and 83.6 mg/kg, respectively. The resample of A7-008-TP, completed via hand auger

at location A7-008A-SB, had soil samples collected from the 0 to 1 and 4 to 5 foot bgs intervals. The resample confirmed that lead and thallium were present at the Site, with surface soil sample concentrations of 7,020 mg/kg (lead) and 73.3 mg/kg (thallium). The underlying soil sample, A7-008A-SB-5, also had elevated concentrations of both lead (7,020 mg/kg) and thallium (91.6 mg/kg). Since this boring was completed via hand auger, a deeper 9 to 10 foot bgs sample was unable to be collected. Two additional surface soil samples (A7-008C-SB-1 and A7-008D-SB-1) had concentrations of lead (1,600 mg/kg and 2,850 mg/kg, respectively) and thallium (15 mg/kg and 37.8 mg/kg, respectively) exceeding the PALs; however, the concentrations were significantly lower than those detected at A7-008-TP and A7-008A-SB. Additionally, the corresponding subsurface samples (A7-008C-SB-5 and A7-008D-SB-3) had significantly lower lead concentrations (below the PAL), and no thallium detections. The two remaining delineation soil sample locations (A7-008B-SB and A7-008E-SB) had low-level detections of lead (below the PAL) and no thallium detections.

The elevated lead and thallium concentrations at A7-008-TP have been fully delineated. Delineation location A7-008A-SB confirmed that surface and subsurface concentrations of lead and thallium are elevated at the original location of A7-008-TP. The remaining four delineation soil borings had significantly lower concentrations of lead and thallium. There is no established delineation threshold for thallium in soil. The typical delineation threshold for lead in soil is 10,000 mg/kg (requiring further expansion); no lead concentrations were detected above this threshold.

The lead and thallium impacts in the vicinity of A7-008-TP appear to be limited to a relatively small area, on an area of the TPA property which is not currently in use. There does not appear to be a significant exposure risk; therefore, a response action is not warranted and no further action is proposed at this time. In the future, it will be necessary to incorporate the delineation findings into a future Screening Level Risk Assessment (SLRA) of a Response and Development Work Plan (RADWP) or related document for this area of the property. The need for additional action in the future will be contingent on future development planning and the findings of the SLRA.

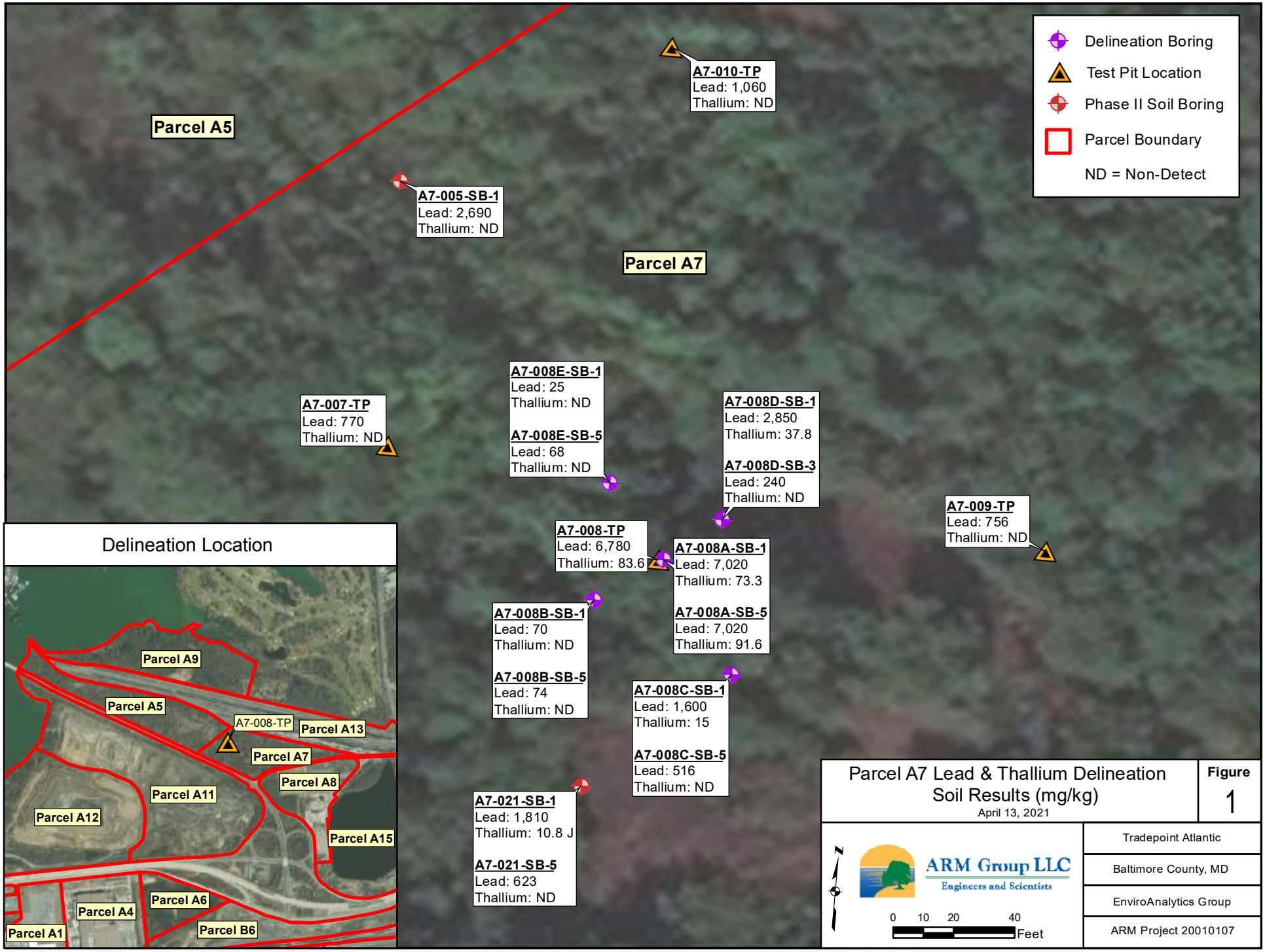
If you have questions regarding any information covered in this document, please feel free to contact ARM Group LLC at (410) 290-7775.

Respectfully Submitted,
ARM Group LLC

Leandra Glumac
Project Geologist

Eric S. Magdar, P.G.
Vice President
QA Reviewer

FIGURES


Delineation Boring
Test Pit Location
Phase II Soil Boring
Parcel Boundary
ND = Non-Detect
Parcel A5
Parcel A7
A7-010-TP
Lead: 1,060
Thallium: ND
A7-005-SB-1
Lead: 2,690
Thallium: ND
A7-007-TP
Lead: 770
Thallium: ND
A7-008E-SB-1
Lead: 25
Thallium: ND
A7-008E-SB-5
Lead: 68
Thallium: ND
A7-008D-SB-1
Lead: 2,850
Thallium: 37.8
A7-008D-SB-3
Lead: 240
Thallium: ND
A7-009-TP
Lead: 756
Thallium: ND
A7-008-TP
Lead: 6,780
Thallium: 83.6
A7-008A-SB-1
Lead: 7,020
Thallium: 73.3
A7-008A-SB-5
Lead: 7,020
Thallium: 91.6
A7-008B-SB-1
Lead: 70
Thallium: ND
A7-008B-SB-5
Lead: 74
Thallium: ND
A7-008C-SB-1
Lead: 1,600
Thallium: 15
A7-008C-SB-5
Lead: 516
Thallium: ND
A7-021-SB-1
Lead: 1,810
Thallium: 10.8 J
A7-021-SB-5
Lead: 623
Thallium: ND
Delineation Location
Parcel A9
Parcel A5
A7-008-TP
Parcel A13
Parcel A7
Parcel A8
Parcel A11
Parcel A12
Parcel A15
Parcel A6
Parcel A4
Parcel A1
Parcel B6
Parcel A7 Lead & Thallium Delineation
Soil Results (mg/kg)
April 13, 2021
Figure
1
ARM Group LLC
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0 10 20 40
Feet
Tradepoint Atlantic
Baltimore County, MD
EnviroAnalytics Group
ARM Project 20010107

TABLES

Table 1 - Parcel A7
A7-008-TP Lead & Thallium Delineation Soil Results

Parameter	Unit	PAL	A7-008-TP	A7-008A-SB-1	A7-008A-SB-5
			10/31/2017	1/19/2021	1/19/2021
Lead	mg/kg	800	**6,780**	**7,020**	**7,020**
Thallium	mg/kg	12	**83.6**	**73.3**	**91.6**

Parameter	Unit	PAL	A7-008B-SB-1	A7-008B-SB-5	A7-008C-SB-1	A7-008C-SB-5
			2/26/2021	2/26/2021	1/19/2021	1/19/2021
Lead	mg/kg	800	**70**	**74**	**1,600**	**516**
Thallium	mg/kg	12	9 U	8.8 U	**15**	10.8 U

Parameter	Unit	PAL	A7-008D-SB-1	A7-008D-SB-3	A7-008E-SB-1	A7-008E-SB-5
			1/19/2021	1/19/2021	2/26/2021	2/26/2021
Lead	mg/kg	800	**2,850**	**240**	**25**	**68**
Thallium	mg/kg	12	**37.8**	8.7 U	8.1 U	8.9 U

Detections in bold

Values in red indicate an exceedance of the Project Action Limit (PAL)

U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.

ATTACHMENT 1

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Boring ID: A7-008A-SB

(page 1 of 1)

Client	: Tradepoint Atlantic
ARM Project No.	: 20010107
Project Description	: Sparrows Point - Parcel A7
Site Location	: Sparrows Point, MD
ARM Representative	: J. Barna
Checked by	: M. Hritz, E.I.T.
Drilling Company	: ARM Group LLC
Driller	: J. Barna/R.Clancy
Drilling Equipment	: Hand Auger

Date	: 01/19/2021
Weather	: Sunny, 50s
Northing (US ft)	: 574853.5
Easting (US ft)	: 1460521.0

Depth (ft.)	% Recovery	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0	100	A7-008A-SB-1	(0-5') SANDY CLAY with SILT, moist, non-plastic, non-cohesive	CL	No water encountered
1					
2					
3					
4		A7-008A-SB-5			
5			End of Boring		
6					

Total Borehole Depth: 5' bgs due to Work Plan.

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Boring ID: A7-008B-SB

(page 1 of 1)

Client	: Tradepoint Atlantic
ARM Project No.	: 20010107
Project Description	: Sparrows Point - Parcel A7
Site Location	: Sparrows Point, MD
ARM Representative	: J. Barna
Checked by	: M. Hritz, E.I.T.
Drilling Company	: GSI
Driller	: K. Pumphrey
Drilling Equipment	: Geoprobe 7822DT

Date	: 02/26/2021
Weather	: Sunny, 40's
Northing (US ft)	: 574838.2
Easting (US ft)	: 1460499.3

Depth (ft.)	% Recovery	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0	80	A7-008B-SB-1	(0-1.5') SANDY SILT, loose, reddish brown, dry, non-plastic, non-cohesive	ML	No water encountered
1					
2			(1.5-2') CONCRETE	NA	
			(2-3') SANDY SILT with GRAVEL, medium dense, gray, moist, non-plastic, non-cohesive	ML	
3			(3-10') CLAY with SILT, firm, gray to white from 3-5' bgs, dark gray from 5-7' bgs, light brown 7-10' bgs, low plasticiy, cohesive		
4		A7-008B-SB-5			
5	100			CL	
6					
7					
8					
9					
10			End of Boring		
11					

Total Borehole Depth: 10' bgs due to Work Plan.

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Boring ID: A7-008C-SB

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Client	: Tradepoint Atlantic
ARM Project No.	: 20010107
Project Description	: Sparrows Point - Parcel A7
Site Location	: Sparrows Point, MD
ARM Representative	: J. Barna
Checked by	: M. Hritz, E.I.T.
Drilling Company	: ARM Group LLC
Driller	: J. Barna/R.Clancy
Drilling Equipment	: Hand Auger

Date	: 01/19/2021
Weather	: Sunny, 50s
Northing (US ft)	: 574817.5
Easting (US ft)	: 1460546.4

Depth (ft.)	% Recovery	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0	100	A7-008C-SB-1	(0-4') SANDY CLAY with SILT, moist, brownish red, low plasticity, cohesive	CL	No water encountered
1					
2					
3					
4		A7-008C-SB-5	(4-5') CLAY with SILT, red, moist, low plasticity, cohesive	CL	
5			End of Boring		
6					

Total Borehole Depth: 5' bgs due to Work Plan.

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Boring ID: A7-008D-SB

(page 1 of 1)

Client	: Tradepoint Atlantic
ARM Project No.	: 20010107
Project Description	: Sparrows Point - Parcel A7
Site Location	: Sparrows Point, MD
ARM Representative	: J. Barna
Checked by	: M. Hritz, E.I.T.
Drilling Company	: ARM Group LLC
Driller	: J. Barna/R.Clancy
Drilling Equipment	: Hand Auger

Date	: 01/19/2021
Weather	: Sunny, 50s
Northing (US ft)	: 574868.5
Easting (US ft)	: 1460539.1

Depth (ft.)	% Recovery	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0	100	A7-008D-SB-1	(0-3') CLAY with SILT, moist, brown, low plasticity, cohesive	CL	No water encountered
1					
2		A7-008D-SB-3			
3			End of Boring		
4					

Total Borehole Depth: 3' bgs due to refusal.

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Boring ID: A7-008E-SB

(page 1 of 1)

Client	: Tradepoint Atlantic
ARM Project No.	: 20010107
Project Description	: Sparrows Point - Parcel A7
Site Location	: Sparrows Point, MD
ARM Representative	: J. Barna
Checked by	: M. Hritz, E.I.T.
Drilling Company	: GSI
Driller	: K. Pumphrey
Drilling Equipment	: Geoprobe 7822DT

Date	: 02/26/2021
Weather	: Sunny, 40's
Northing (US ft)	: 574877.3
Easting (US ft)	: 1460501.1

Depth (ft.)	% Recovery	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0–1	80	A7-008E-SB-1	(0-1.5') SILTY SAND with GRAVEL, loose, brownish gray, dry, non-plastic, non-cohesive	SM	
1–2			(1.5-3') GRAVEL with SAND, black, dry, non-plastic, non-cohesive	GW/SW	
2–3			(3-3.5') WOOD CHIPS	NA	
3–4			(3.5-6.5') SILTY SAND with GRAVEL, loose, black, moist, non-plastic, non-cohesive		
4–5		A7-008E-SB-5		SM	No water encountered
5–6					Strong odor from 6-6.7' bgs
6–7	100				
7–8			(6.5-10') CLAY with SILT, black to light brown with light gray and reddish yellow mottling, moist, low plasticity, cohesive	CL	
8–9					
9–10					
10			End of Boring		
11					

Total Borehole Depth: 10' bgs due to Work Plan.