ARM Group LLC
Engineers and Scientists

July 6, 2022

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

Re: Soil Excavation Work Plan
Area A: Sub-Parcel A11-2
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

ARM Group LLC (ARM), on behalf of Tradepoint Atlantic (TPA), has prepared this Work Plan to conduct excavation activities inside Sub-Parcel A11-2 (the Site) on the Tradepoint Atlantic (TPA) property located in Sparrows Point, Maryland. Following review and approval of this Work Plan by the Maryland Department of the Environment (MDE) and the United States Environmental Protection Agency (USEPA), the excavation will be completed at the Site to address known areas of non-aqueous phase liquid (NAPL) impacted soil.

1. PROJECT BACKGROUND

A Phase II Investigation was performed for the Site in accordance with the requirements outlined in the Administrative Consent Order (ACO) as further described in the Phase II Investigation Work Plan for Area A: Parcel A11 (Revision 1 dated May 18, 2016). Findings from the original Parcel A11 Phase II Investigation were presented within the Phase II Investigation Report (Revision 1 dated May 22, 2020). During the Phase II Investigation, several soil samples were identified with elevated concentrations of semi-volatile organic compounds (SVOCs), particularly naphthalene. To supplement the original Phase II Investigation, additional delineation activities were conducted in accordance with the Work Plan for Delineation of Naphthalene: Parcel A11 (Revision 1 dated June 7, 2018). A total of 293 soil samples (from 119 boring locations) and 21 shallow groundwater samples were collected for analysis between June 12, 2018 and August 23, 2018 as part of the supplemental delineation activities.

There were multiple soil exceedances for volatile organic compounds (VOC) and SVOC parameters, in particular elevated levels of benzene, benzo[a]pyrene, and naphthalene, which have been identified as the main constituents of potential concern (COPCs) at the Site. These

constituents, along with other representative VOCs and SVOCs in Parcel A11, are provided in the table below along with concentrations corresponding to baseline carcinogenic risk screening levels of 1E-6 to 1E-4:

Table 1: VOC and SVOC Risk Screening Levels

Parameter	1E-6 (RSLs) (mg/kg)	1E-5 (mg/kg)	1E-4 (mg/kg)
Biphenyl	410	4,100	41,000
Benzene	5.1	51	510
Benz(a)anthracene	21	210	2,100
Benzo(a)pyrene	2.1	21	210
Benzo(b)fluoranthene	21	210	2,100
Dibenz(a,h)anthracene	2.1	21	210
Indeno(1,2,3-c,d)pyrene	21	2	2,100
Naphthalene	8.6	86	860

The concentrations associated with 1E-4 were considered to be the delineation thresholds for each individual compound during the preceding delineation activities. However, since the carcinogenic risk is cumulative for polycyclic aromatic hydrocarbons (PAHs), the delineation thresholds for the three primary risk drivers were set at approximately 1/3 of the concentration corresponding to the risk level of 1E-4, as follows:

Table 2: VOC and SVOC Delineation Thresholds

Delineation Thresholds	
Benzene	150
Benzo(a)pyrene	75.0
Naphthalene	275

The soil data obtained during the original Phase II Investigation and the supplemental delineation sampling were compared to the listed delineation thresholds. If a soil sample contained a concentration of benzene, benzo[a]pyrene, or naphthalene above one of the specified delineation thresholds, the associated soil boring was flagged to indicate elevated chemical data. Soil borings exhibiting these analytical exceedances were often co-located with observations of NAPL in the soil cores. Based on this screening approach, summaries of elevated soil conditions and observed NAPL at the Site are presented in **Figure 1a** (0 to 5 feet below ground surface [bgs]) and **Figure 1b** (below 5 feet bgs).

2. PROPOSED HOT SPOT EXCAVATIONS

Each point shown on **Figures 1a** and **1b** as having an exceedance of the delineation criteria was evaluated. For screening purposes, the delineation criteria were calculated by dividing the EPA RSL concentration at 1E-4 by three to account for the cumulative risk from benzene,

benzo[a]pyrene, and naphthalene. Locations A11-024AA-SB and A11-024Y-SB were originally identified as locations above the 1E-4 delineation threshold based on the benzo[a]pyrene concentrations of 144 mg/kg and 95.8 mg/kg, respectively. However, due to the low levels of benzene and naphthalene in these locations, the actual risk at both locations is less than 1E-4; these locations were removed from consideration for hot spot excavations.

The remaining locations were further evaluated to determine whether the impacts were observed to be above or below the water table. An isopach map showing the vadose zone thickness (or depth to the saturated zone) was created by subtracting the groundwater elevation from the ground surface elevation from the original topographic survey. This vadose (or unsaturated) zone thickness is shown on the attached **Figure 2**. The location of each exceedance was then plotted on this map and the depth of the samples exceeding the delineation criteria were posted and compared to the calculated thickness of the unsaturated zone at that location. If the sample depth is less than the unsaturated zone thickness, that location would be identified as a soil hotspot that could be excavated above the saturated zone. If the sample lies within the saturated zone, then it will not be proposed for excavation.

Based on this analysis, the following locations are proposed for hot spot excavation:

- A11-024B-SB
- A11-024CC-SB
- A11-024H-SB
- A11-024O-SB
- A11-024S-SB
- A11-024V-SB

Soil borings for the above locations are included in **Attachment A**.

3. EXCAVATION PROCEDURES

TPA will take appropriate precautions to avoid subsurface utilities and structures during the site work. Prior to initiating any subsurface work, TPA will attempt to determine the location of all private utilities in the project area. If TPA is unable to adequately identify all utilities, then TPA may engage a private utility locator to perform an additional private utility mark-out of utilities in the excavation area. If it is found that the utility lines are in close proximity to the proposed excavations – the ultimate depth and locations of the excavations will be modified so as to not compromise their integrity.

As discussed above, there are six separate locations where hotspot excavations are proposed: three points along the northern side of the site, and three locations to the south of the main building. All six locations have already been located in the field via GPS and staked.

3.1 Northern Excavation Area

The northern excavation locations include A11-024B-SB, A11-024CC-SB, and A11-024H-SB. All three locations had soil exceedances at 5-feet bgs. Soil samples collected at 10 feet bgs were below the delineation criteria.

- A11-024B-SB: trace sheen and strong odor was observed from 3-8.5 feet bgs. Photoionization detector (PID) readings above 100 ppm were observed from 3-7 feet bgs. Based on **Figure 2**, the anticipated depth to water is 7 feet bgs.
- A11-024CC-SB: a petroleum like odor and sheen were observed from 3.5-5.5 feet bgs. A black, moist, layer was observed from 3.5-5.5 feet bgs. The maximum PID reading (70.6 ppm) was observed at 5 feet bgs. Based on **Figure 2**, the anticipated depth to water is 8 feet bgs.
- A11-024H-SB: a light odor was observed from 3-5 feet bgs, and a light sheen was observed from 4-5 feet bgs. Black staining was observed from 3.5-5 feet bgs. PID readings above 100 ppm were observed from 5-8 feet bgs. Based on **Figure 2**, the anticipated depth to water is 8 feet bgs.

The hotspot excavations will begin at each soil boring location noted above and proceed laterally 5-feet in each direction to form a 10-ft by 10-ft excavation area. The lateral excavation extents will be expanded based on observations of NAPL and sheen.

On June 15, 2022, several exploratory test pits were advanced in the northern excavation area. Based on the previous boring logs and the test pits, it is anticipated that the top 3-feet of soil will be suitable for reuse, and will be stockpiled. If the excavated stockpiles have PID readings of less than 10 ppm AND no visible NAPL, then the excavated materials will be re-used within the excavation it came from. The excavated material will not be considered VCP fill or VCP clean material. If PID readings are above 10 ppm OR if the soil may be used on another parcel, then additional sampling will be conducted in accordance with the TPA Site Development Management of Soil Procedure (January 28, 2021). All excavations will be capped with approved VCP capping materials.

The test pits identified a layer with visible black staining and elevated PID readings at approximately 3-4 feet bgs; refer to Attachment C for the laboratory results. Soil samples collected from within this black layer contained concentrations of benzo[a]pyrene and naphthalene. Soil samples collected from immediately above and below the black layer were below the delineation criteria. This black impacted layer was also identified in several of the boring logs. It is anticipated that the hot spot excavations will encounter impacted soil at depths from approximately 3-5 feet bgs. Soil with observations of NAPL or sheen will be excavated and stockpiled for offsite disposal. The excavations will likely stop immediately below this impacted layer of soil.

3.2 Northern Excavation Area - Sampling and Disposal

Once excavation activities have been completed, confirmation soil samples will be collected. This will include four sidewall confirmation samples and one base (or bottom) sample from each excavation area. If the excavation expanded laterally, then the confirmation samples will be collected at a rate of one sidewall sample per 20 linear feet, with a minimum of one sample per sidewall. Base samples will be collected at a rate of one base sample per 400 square feet, with a minimum of one base sample per excavation. Refer to **Figure 3** for the proposed excavation areas. All confirmation samples will be submitted to an accredited laboratory and analyzed for benzene by EPA Method 8260 and benzo[a]pyrene and naphthalene by EPA Method 8270. Initially, the confirmation samples results will be compared to the VOC and SVOC delineation thresholds in Table 2. If the concentrations exceed the delineation thresholds, they will also be compared to the risk-based screening levels to determine overall risk. No further excavation will be conducted once the soil sample results indicate that the risk associated with each individual sample is less than the baseline carcinogenic risk screening levels for 1E-4.

A composite sample will be generated from each of the impacted excavation stockpiles. Each composite sample will consist of 10 randomly selected grab aliquots from the designated stockpile. The composite samples will then be submitted for analysis for Toxicity Characteristic Leaching Procedure (TCLP) VOCs, TCLP SVOCs, TCLP Metals, and total PCBs to facilitate proper disposal or to confirm that the material is suitable to be reclaimed.

If the analytical results from each composite sample indicate that the material in the associated stockpile is non-hazardous, the material will be disposed of at a non-hazardous industrial landfill (which may include the on-site Greys Landfill). Any material determined to be hazardous will be disposed of at an appropriate off-site hazardous landfill and the agencies will be notified.

3.3 Southern Excavation Area

The southern excavation locations include A11-024O-SB, A11-024S-SB, and A11-024V-SB.

- A11-024O-SB: product with sheen from 3-13 feet bgs. Elevated PID readings at 4-7 feet bgs and 9-10 feet bgs. Soil sample collected from 3 feet bgs was above the delineation criteria. Based on **Figure 2**, the anticipated depth to water is 5 feet bgs.
- A11-024S-SB: black sticky product observed from 3-3.4 feet bgs, with moderate odor. Elevated PID reading (249 ppm) from 2-3 feet bgs. Soil sample collected from 3 feet bgs was above the delineation criteria. Based on **Figure 2**, the anticipated depth to water is 5 feet bgs.
- A11-024V-SB: light odor and sheen from 2.5-4 feet bgs, sticky black product from 2-4 feet bgs. Soil sample collected at 2-feet bgs was below the delineation criteria, while soil sample collected at 4-feet bgs was above the delineation criteria. Based on **Figure 2**, the anticipated depth to water is 4.5 feet bgs.

The hotspot excavations will begin at each soil boring location noted above and proceed laterally 5-feet in each direction to form a 10-ft by 10-ft excavation area. The lateral excavation extents will be expanded based on observations of NAPL and sheen. Vertically, the excavations will proceed based on observations of NAPL and sheen, to a maximum depth of the groundwater table. Based on the information presented in **Figure 2**, this is anticipated to be between 4 and 5 feet bgs.

3.4 Southern Excavation Area - Sampling and Disposal

Once excavation activities have been completed, confirmation soil samples will be collected. This will include four sidewall confirmation samples from each excavation area. If the excavation expanded laterally, then the confirmation samples will be collected at a rate of one sidewall sample per 20 linear feet, with a minimum of one sample per sidewall. No base confirmation samples will be collected, as the excavations will continue vertically until the groundwater table is encountered. Refer to **Figure 4** for proposed excavation areas. All confirmation samples will be submitted to an accredited laboratory and analyzed for benzene by EPA Method 8260 and benzo[a]pyrene and naphthalene by EPA Method 8270. Initially, the confirmation samples results will be compared to the VOC and SVOC delineation thresholds in Table 2. If the concentrations exceed the delineation thresholds, they will also be compared to the risk-based screening levels to determine overall risk. No further excavation will be conducted once the soil sample results indicate that the risk associated with each individual sample is less than the baseline carcinogenic risk screening levels for 1E-4.

A composite sample will be generated from each of the impacted excavation stockpiles. Each composite sample will consist of 10 randomly selected grab aliquots from the designated stockpile. The composite samples will then be submitted for TCLP VOCs, TCLP SVOCs, TCLP Metals, and total PCBs to facilitate proper disposal or to confirm that the material is suitable to be reclaimed.

If the analytical results from each composite sample indicate that the material in the associated stockpile is non-hazardous, but must be disposed of, the material will be disposed of at a non-hazardous industrial landfill (which may include the on-site Greys Landfill). Any material determined to be hazardous will be disposed of at an appropriate off-site hazardous landfill and the agencies will be notified.

3.5 Dust Monitoring

Dust Monitoring will be performed as part of the ongoing dust monitoring program for the A11-2 Response and Development Work Plan (RDWP) development work. To limit worker exposures to contaminants borne on dust and windblown particulates, dust control measures will be implemented if dust concentrations exceed 3.0 mg/m³. To ensure that this threshold is not exceeded during excavation activities, a real-time dust meter (ThermoElectron Corporation Personal Data RAM 1000AN; Met One Instruments, Inc. E-Sampler; or another equivalent real-time air monitoring device) will be used to monitor the concentration of dust generated while excavating impacted material.

3.6 Health and Safety / PPE & Monitoring

Since the project is expected to encounter soil that is impacted with elevated levels of COPCs, in particular elevated VOCs/SVOCs and NAPL, all of the required ground intrusive construction work or activities which require contact with potentially impacted materials will be performed by OSHA HAZWOPER trained workers. The contractor providing the OSHA HAZWOPER trained workers will develop a site-specific Health and Safety Plan (HASP) which will be applied to all on-site workers who may be engaged in the above-referenced activities. The HASP will specify workspace monitoring, Action Levels, and the appropriate personal protective equipment (PPE) for worker health and safety protection for the project. At a minimum, the OSHA HAZWOPER trained workers will adhere to the modified Level D PPE requirements provided as **Attachment B**.

Contingent air monitoring will be conducted in accordance with Section 7 of the property-wide TPA HASP for all ground intrusive work at the site, to include a contingent air monitoring program. The results of the breathing space air monitoring will determine whether any increased level of health and safety protection (including engineering controls and/or additional PPE) is required. The Environmental Professional (EP) will conduct air monitoring during field operations with a PID equipped with a 10.2 or 11.7-electron volt (eV) probe. Measurements will be made where ground intrusive work is being performed. The instrument will be calibrated using ultra-high purity air and isobutylene vapor of known concentration before each use. Air calibration measurements will be documented in writing and filed appropriately. Action guidance for PID responses is contained in below.

Table 3: PID Action Levels for General Site Work

Meter Response in Breathing Zone (sustained concern, for minimum of 3 minutes)	Action Required
<5 ppm above background	Use Level D or Modified Level D PPE
>5 ppm above background	Cease work, notify supervisor and investigate source.
>50 ppm above background	Stop work

If air concentrations of organic vapors are greater than 5 ppm above background in the breathing zone continuously for a 3-minute period, personnel will stop work, retreat from the area, and allow time (at least 15 minutes) for vapors to dissipate. If subsequent monitoring indicates that concentrations still consistently exceed 5 ppm, workers will stop work and retreat from the area. TPA supervision will investigate the source and establish next steps. These action levels are based on the assumption that the major volatile constituents of concern are benzene and naphthalene,

which are the most common volatile constituents previously identified in the soils at the TPA facility.

All work shall be performed under the existing RDWP development safety program, including the property-wide TPA HASP and the contractor HASP.

4. MDE / EPA APPROVAL PROCESS

All confirmation sample results, locations, and depths will be provided to the MDE and EPA in an email transmittal for review once the excavation is completed. No further excavation will be conducted once the soil sample results indicate that the risk associated with each individual sample is less than the baseline carcinogenic risk screening levels for 1E-4. At that point, all excavations will be surveyed and backfilled.

The results of the composite sampling from the stockpiles will also be provided to the MDE and EPA to verify appropriate handling methodology. Disposal locations and quantities for all excavated material, including any material reclaimed, will also be submitted to the agencies within completion documentation associated with this excavation project.

5. REPORTING

A Completion Letter Report will be submitted to the MDE and EPA upon finishing the project. The report will include supplemental figures with the final excavation boundary and confirmation sample locations; a summary of the field methods used during excavation; quantities and disposal locations (including reclamation) of all excavated material; a description of the contingent air monitoring; descriptions of any notable occurrences; analytical laboratory report(s); a photo log; and other information as appropriate.

If you have questions regarding any information covered in this document, please feel free to contact Peter Haid at Tradepoint Atlantic: 443-649-5055.

Respectfully Submitted,
ARM Group LLC

Kaye Guille, P.E., PMP
Senior Engineer

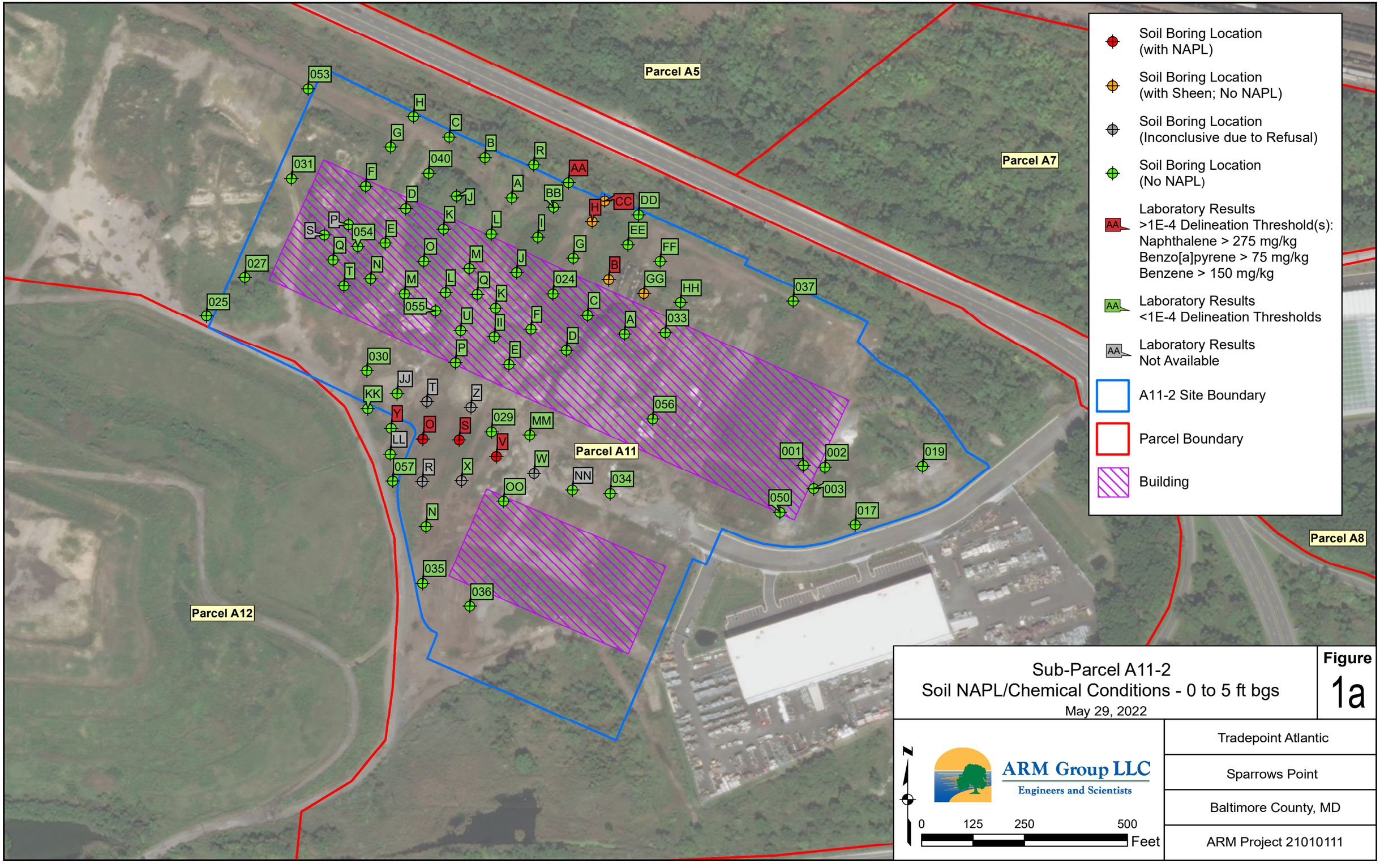
Eric Magdar, P.G.
Vice President
QA Reviewer

Attachments:

Figure 1a: Soil NAPL / Chemical Conditions – 0 to 5 ft bgs
Figure 1b: Soil NAPL / Chemical Conditions – Below 5 ft bgs
Figure 2: Soil Sample results and Vadose Zone Isopach
Figure 3: Proposed Northern Excavation Areas
Figure 4: Proposed Southern Excavation Areas

Attachment A: Soil Borings
Attachment B: SOP for Modified Level D PPE
Attachment C: June 15, 2022 Soil Results

FIGURES



Sub-Parcel A11-2
Soil NAPL/Chemical Conditions - 0 to 5 ft bgs
May 29, 2022

Figure 1a

ARM Group LLC
Engineers and Scientists

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010111

Parcel A5

Parcel A7

Parcel A11

Parcel A12

Parcel A8

Soil Boring Location (with NAPL)

Soil Boring Location (with Sheen; No NAPL)

Soil Boring Location (Inconclusive due to Refusal)

Soil Boring Location (No NAPL)

Laboratory Results >1E-4 Delineation Threshold(s): Naphthalene > 275 mg/kg Benzo[a]pyrene > 75 mg/kg Benzene > 150 mg/kg

Laboratory Results <1E-4 Delineation Thresholds

Laboratory Results Not Available

A11-2 Site Boundary

Parcel Boundary

Building

Sub-Parcel A11-2
Soil NAPL/Chemical Conditions - Below 5 ft bgs

May 29, 2022

Figure 1b

ARM Group LLC
Engineers and Scientists

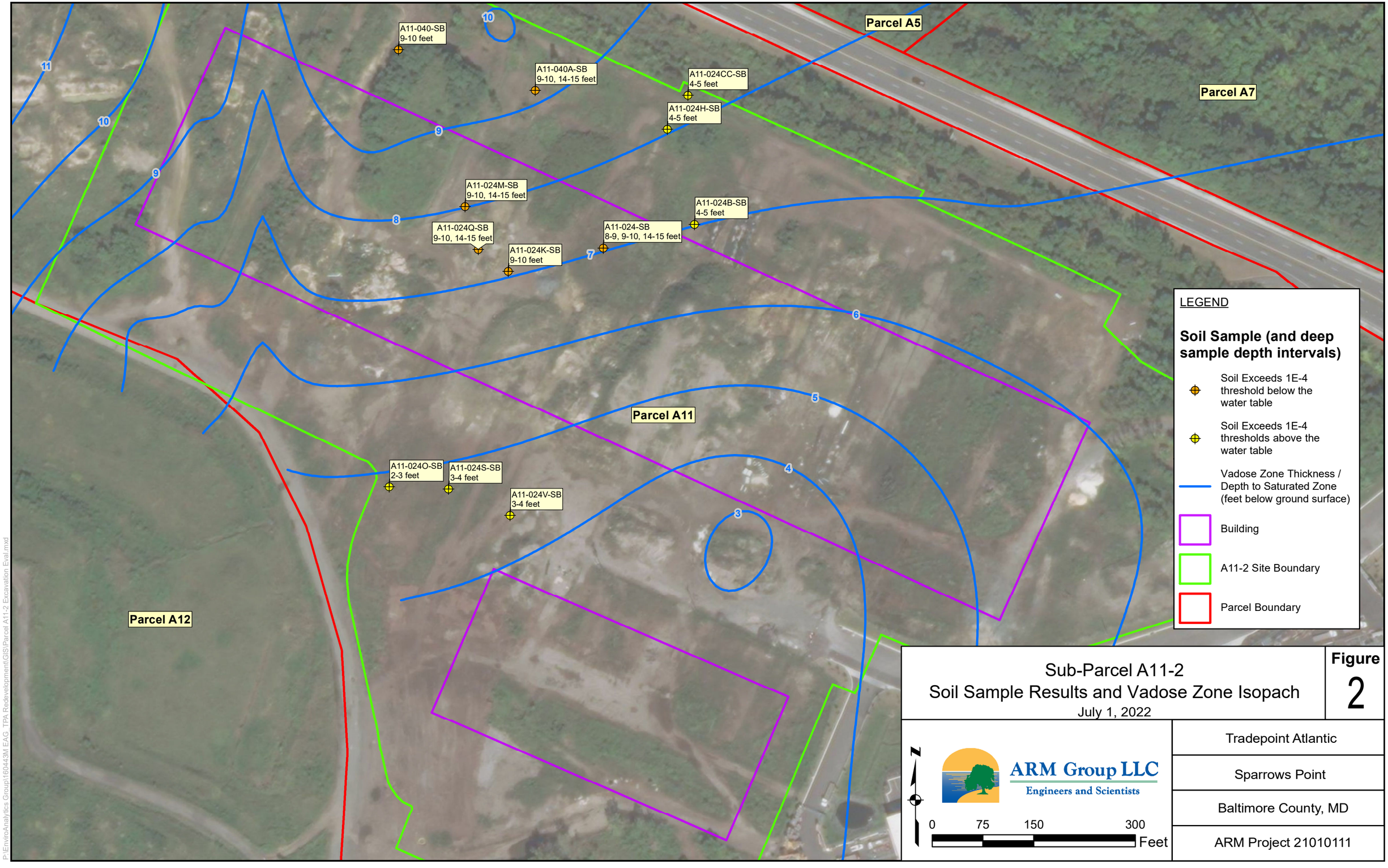
0 125 250 500 Feet

Tradepoint Atlantic

Sparrows Point

Baltimore County, MD

ARM Project 21010111



Sub-Parcel A11-2
Soil Sample Results and Vadose Zone Isopach
July 1, 2022

Figure 2

N

ARM Group LLC
Engineers and Scientists

0 75 150 300 Feet

Tradepoint Atlantic

Sparrows Point

Baltimore County, MD

ARM Project 21010111

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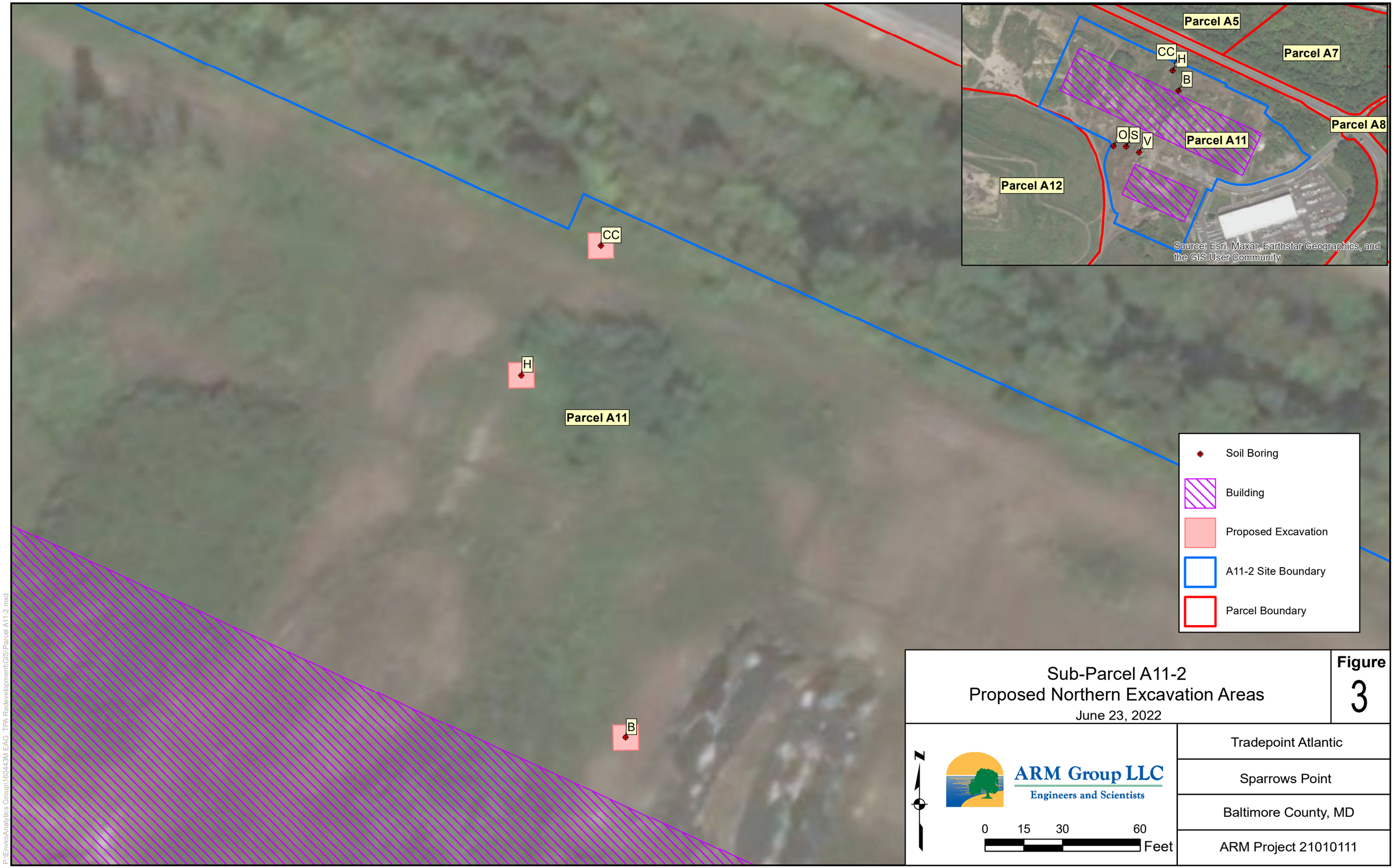

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Sub-Parcel A11-2
Proposed Northern Excavation Areas
June 23, 2022

Figure 3

ARM Group LLC
Engineers and Scientists

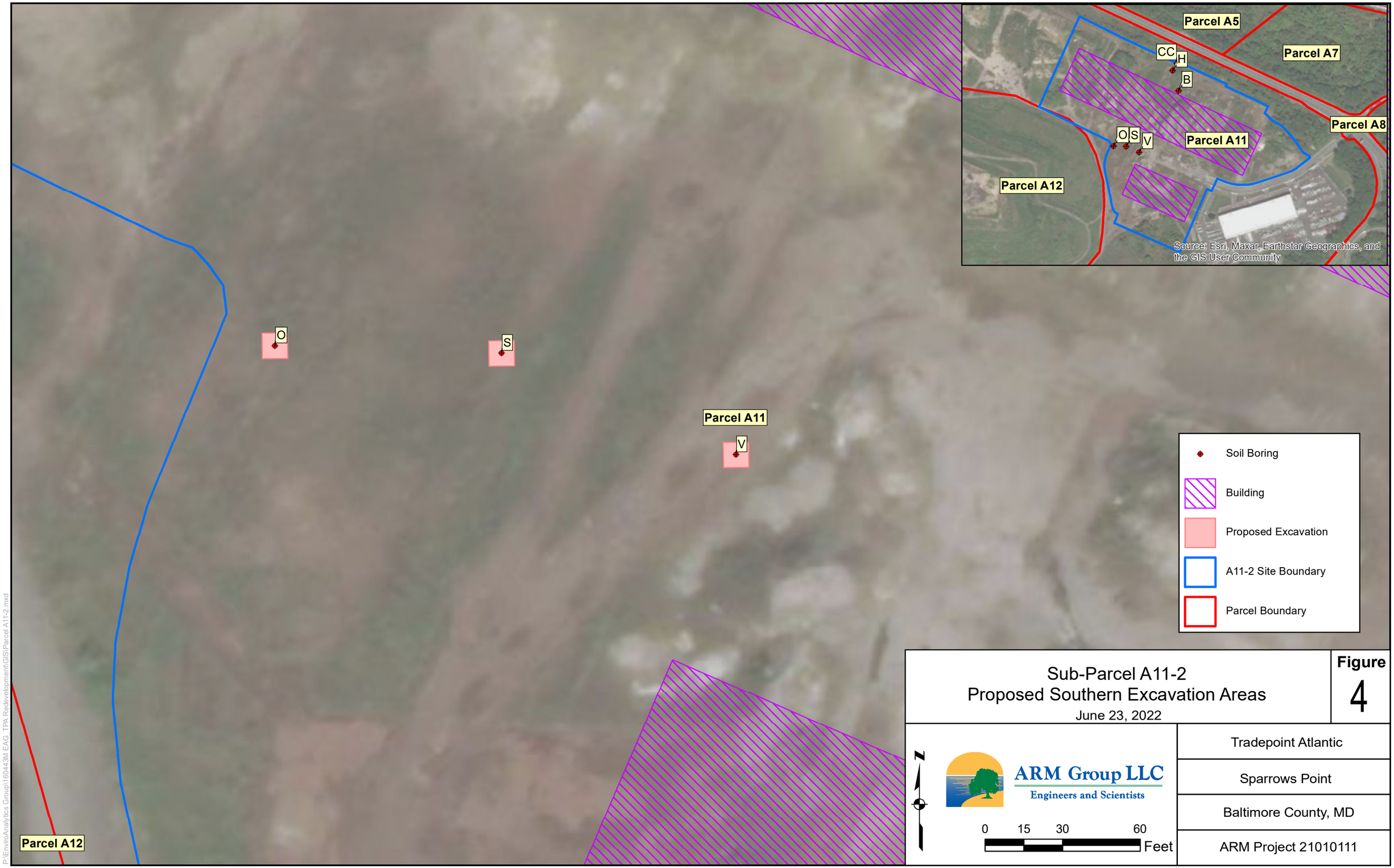
0 15 30 60 Feet

Tradepoint Atlantic

Sparrows Point

Baltimore County, MD

ARM Project 21010111



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Sub-Parcel A11-2
Proposed Southern Excavation Areas
June 23, 2022

Figure 4

ARM Group LLC
Engineers and Scientists

0 15 30 60 Feet

Tradepoint Atlantic

Sparrows Point

Baltimore County, MD

ARM Project 21010111

ATTACHMENT A

ARM Group Inc.
Earth Resource Engineers and Consultants

Boring ID: A11-024B-SB/PZ

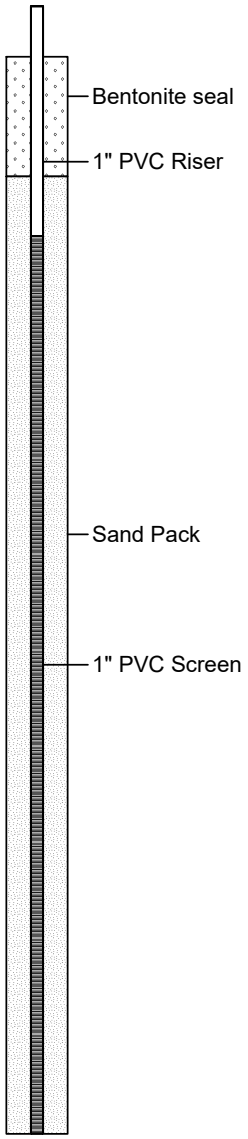
(page 1 of 1)

Client	: EnviroAnalytics Group
ARM Project No.	: 150298M-16-8
Project Description	: Sparrows Point - Parcel A11
Site Location	: Sparrows Point, MD
ARM Representative	: M. Kedenburg
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Ryan Sites
Drilling Equipment	: Geoprobe 7822DT

Boring Installation Date	: 6/13/18
Piezometer Install Date	: 6/27/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Northing (US ft)	: 574422.37
Easting (US ft)	: 1459710.66
0-Hr DTW	: 12.71' TOC
48-Hr DTW	: 10.80' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS
0		-		(0-2') SAND with GRAVEL, loose, dark brown, moist, no plasticity, no cohesion	SW
		2.7			
	80	3.4		(2-3') SLAG GRAVEL, loose, dark gray, slightly moist, no plasticity, no cohesion	GP
		104.5		(3-8.5') CLAY with SLAG COBBLES, soft, black with trace pale brown, moist, low plasticity, cohesive	
		243.4	A11-024B-SB-5		
5		418.3			CL
		254.5			
	100	4.3			
		34.2			
		56.9	A11-024B-SB-10	(8.5-15') CLAY with SAND, firm, reddish yellow, moist to very moist, low plasticity, cohesive	
10		43.5			
		5.2			CL
	100	0.9			
		1.1			
		0.0	A11-024B-SB-15		
15				End of Boring	
20					



REMARKS

Piezometer installed after receipt of soil boring analytical results

Trace sheen and strong odor from 3-8.5' bgs

No water encountered

Boring terminated at 15' bgs due to work plan and piezometer installation.
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 3.10'
Riser: 0 - 3' bgs
Screen: 3 - 18' bgs [Slot Size: 0.010"]
Sand Pack: 2 - 18' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 2' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Earth Resource Engineers and Consultants

Boring ID: A11-024CC-SB/PZ

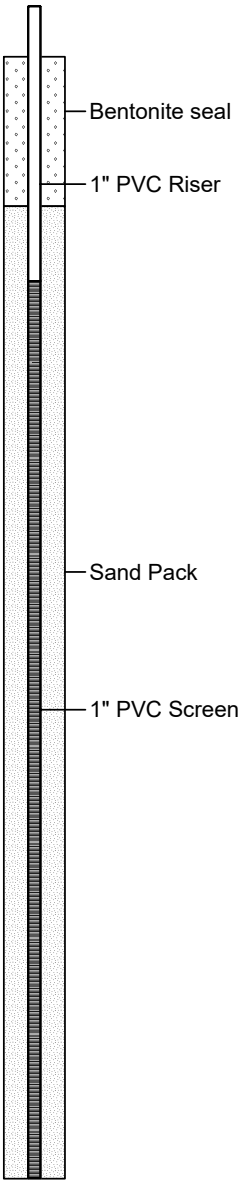
(page 1 of 1)

Client	: EnviroAnalytics Group
ARM Project No.	: 150298M-16-8
Project Description	: Sparrows Point - Parcel A11
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Green Services Inc.
Driller	: Don Marchese
Drilling Equipment	: Geoprobe 7822DT

Boring Installation Date	: 8/21/18
Piezometer Install Date	: 8/21/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Northing (US ft)	: 574612.51
Easting (US ft)	: 1459701.04
0-Hr DTW	: 6.11' TOC
48-Hr DTW	: 6.30' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-				
		0.0		(0-3.5') Non-native SAND and GRAVEL, loose to dense, brown grading to black, dry to wet, no plasticity, no cohesion	SW/GW	
	80	1.9				Light odor from 3-5' bgs
		5.4				
		70.6	A11-024CC-SB-5	(3.5-5') SILTY CLAY, very firm, gray with black staining, moist, low plasticity, cohesive	CL	Light sheen from 4-5' bgs
5		0.3		(5-13.5') CLAY, hard, reddish yellow with very pale brown, dry, low plasticity, cohesive		
		0.0				
	100	0.0				
		0.0				
		0.0	A11-024CC-SB-10		CL	
10		0.0				
		3.0				
	100	0.0				
		0.0	A11-024CCC-SB-13.5			Wet at 13.5' bgs
		0.2		(13.5-15') CLAYEY SAND, dense, reddish yellow, wet, no plasticity, no cohesion	SC	
15				End of Boring		



Boring terminated at 15' bgs due to work plan and piezometer installation.
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 3.35'
Riser: 0 - 3' bgs
Screen: 3 - 15' bgs [Slot Size: 0.010"]
Sand Pack: 2 - 15' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 2' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Earth Resource Engineers and Consultants

Boring ID: A11-024H-SB/PZ

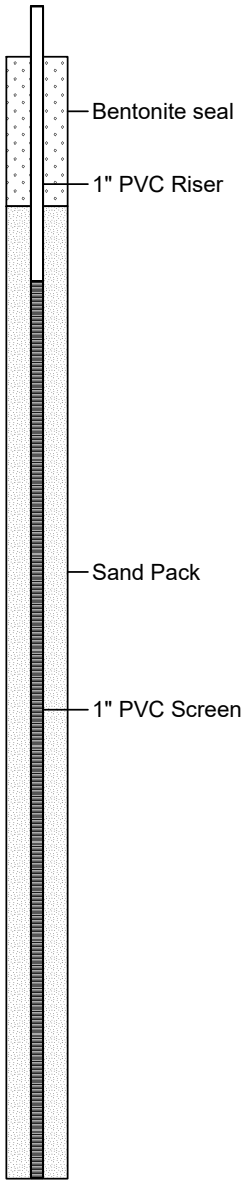
(page 1 of 1)

Client	: EnviroAnalytics Group
ARM Project No.	: 150298M-16-8
Project Description	: Sparrows Point - Parcel A11
Site Location	: Sparrows Point, MD
ARM Representative	: M. Kedenburg
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Allied Drilling Co.
Driller	: Ryan Sites
Drilling Equipment	: Geoprobe 7822DT

Boring Installation Date	: 6/14/18
Piezometer Install Date	: 6/27/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Northing (US ft)	: 574562.43
Easting (US ft)	: 1459670.29
0-Hr DTW	: 3.92' TOC
48-Hr DTW	: 6.28' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS
0		-		(0-1.7') SAND with GRAVEL, dense, pale brown to bluish gray, moist, no plasticity, no cohesion	SW
		4.2			
	80	6.4		(1.7-3') CLAY with GRAVEL, firm, pale brown, moist, low plasticity, low cohesion	CL
		12.4		(3-3.5') SILT with SAND, soft, brownish red, moist, low plasticity, low cohesion	ML
		11.3	A11-024H-SB-5	(3.5-5.5') SAND with GRAVEL, dense, black, moist, no plasticity, no cohesion	SW
5		168.3		(5.5-15') CLAY with SAND, very firm, pale brown to pale bluish gray, moist, low plasticity, low cohesion	
		120.4			
	100	112.3			
		12.6			
		24.5	A11-024H-SB-10		
10		2.4			CL
		12.5			
	100	66.4			
		44.2			
		96.3	A11-024H-SB-15		
15				End of Boring	



REMARKS

Petroleum like odor and sheen from 3.5-5.5' bgs

No water encountered

Boring terminated at 15' bgs due to work plan and piezometer installation.
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 3.18'
Riser: 0 - 3' bgs
Screen: 3 - 15' bgs [Slot Size: 0.010"]
Sand Pack: 2 - 15' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 2' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Earth Resource Engineers and Consultants

Boring ID: A11-024O-SB/PZ

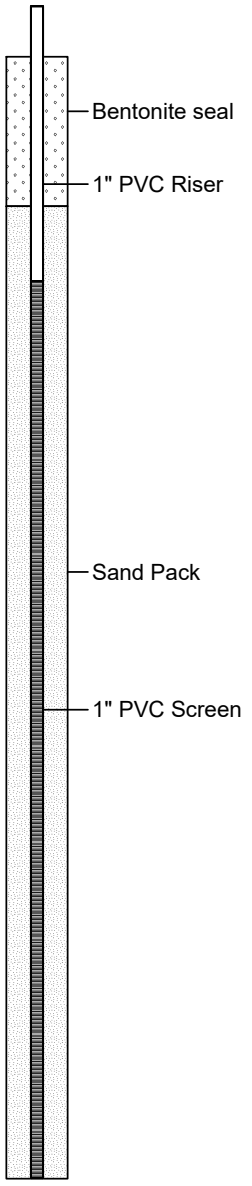
(page 1 of 1)

Client	: EnviroAnalytics Group
ARM Project No.	: 150298M-16-8
Project Description	: Sparrows Point - Parcel A11
Site Location	: Sparrows Point, MD
ARM Representative	: M. Kedenburg
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Green Services, Inc.
Driller	: Don Marchese
Drilling Equipment	: Geoprobe 7822DT

Boring Installation Date	: 8/9/18
Piezometer Install Date	: 8/9/18
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Northing (US ft)	: 574034.52
Easting (US ft)	: 1459259.83
0-Hr DTW	: 4.32' TOC
48-Hr DTW	: 4.94' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-		(0-3') GRAVEL with SAND, medium to coarse, loose, dark brown to black, moist, no plasticity, no cohesion	GW	
		8.8				
	80	7.4	A11-024O-SB-3			
		63.5		(3-3.5') CLAY with GRAVEL and SAND, firm, pale gray to pale brown, wet, low plasticity, cohesive	CL	Wet at 3' bgs
		174.2		(3.5-13') SLAG GRAVEL with CLAY and SAND, medium to coarse, dense, black, wet, no plasticity, no cohesion	GW	Product with sheen from 3-13' bgs
5		-				
		352.5				
	80	87.2				
		64.4				
		5773				
10		-				
		-				
	100	-				
		-		(13-15') CLAY with GRAVEL and SAND, firm, pale gray to pale brown, wet, low plasticity, cohesive	CL	
		-				WOOD at 15' bgs
15				End of boring		



Boring terminated at 15' bgs due to work plan and piezometer installation.
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface
AMSL: Above mean sea level

Riser Stickup: 3.67'
Riser: 0 - 3' bgs
Screen: 3 - 15' bgs [Slot Size: 0.010"]
Sand Pack: 2 - 15' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 2' bgs [Grain Size: 3/8" chips]

ARM Group Inc.
Earth Resource Engineers and Consultants

Boring ID: A11-024S-SB

(page 1 of 1)

Client	: EnviroAnalytics Group
ARM Project No.	: 150298M-16-8
Project Description	: Sparrows Point - Parcel A11
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Green Services, Inc.
Driller	: Don Marchese
Drilling Equipment	: Geoprobe 7822DT

Date	: 8/15/18
Weather	: Sunny, 80s
Northing (US ft)	: 574031.61
Easting (US ft)	: 1459347.51

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0						
		0.0		(0-3.5') SLAG GRAVEL, fine to coarse, with SAND and SILT, coarse, loose to medium dense, brown, light gray, and reddish brown, dry then very moist to wet at 3' bgs, no plasticity, no cohesion; with a SILT lens at 2' bgs	GW/SW	
		5.6	A11-024S-SB			No water encountered
	89	249.2				Viscous, black, sticky product present from 3-3.4' bgs, with moderate odor
		0.0		(3.5-4.5') CLAY, very firm to hard, black with dark brown, moist, low plasticity, cohesive	CL	
				End of Boring		
5						

Total Borehole Depth: 4.5' bgs.
Boring terminated at 4.5' bgs due to refusal.

ARM Group Inc.
Earth Resource Engineers and Consultants

Boring ID: A11-024V-SB

(page 1 of 1)

Client	: EnviroAnalytics Group
ARM Project No.	: 150298M-16-8
Project Description	: Sparrows Point - Parcel A11
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: Green Services, Inc.
Driller	: Don Marchese
Drilling Equipment	: Geoprobe 7822DT

Date	: 8/16/18
Weather	: Sunny, 80s
Northing (US ft)	: 573992.36
Easting (US ft)	: 1459438.20

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0						
		3.2		(0-4') SLAG, SAND and GRAVEL-sized, loose to dense, light gray and brown then dark brown with some gray from 1-1.5' bgs, and black from 1.5-4' bgs, dry then very moist from 1.5-2' bgs then wet from 2.5-4' bgs, no plasticity, no cohesion		
		78.9	A11-024V-SB-2			
	89				SW/GW	
		4.8				Light odor and sheen from 2.5-4' bgs
						Very viscous, sticky black substance: tacky with high tensile strength from 3-4' bgs
		33.0	A11-024V-SB-4			
				End of Boring		
5						

Total Borehole Depth: 4' bgs.
Boring terminated at 4' bgs due to refusal.

ATTACHMENT B

Sparrows Point Development - PPE Standard Operational Procedure, Revision 3

Planning, Tracking/Supervision, Enforcement, and Documentation

Planning

- Response and Development Work Plan (RDWP) for each individual redevelopment sub-parcel identifies and documents site conditions.
- RDWP is reviewed and approved by regulators.
- Contractor HASP to address site-specific conditions and PPE requirements:
    - Contractor H&S professional to sign-off on PPE requirements for site workers;
    - Job Safety Analysis (JSA) to be performed for ground intrusive work.
- Project Environmental Professional (EP) assigned to each construction project – monitors project during environmentally sensitive project phases and is available to construction contractor on an as needed basis. EP responsibilities include the following:
    - Dust monitoring
    - Routine ground intrusive breathing space air monitoring
    - Soil tracking
    - Water handling oversight
    - Ground intrusive work observation
    - Notification for unexpected conditions
- Pre-construction meeting identifies EP roles and responsibilities and reviews site conditions.
- Contractor to perform job-site HazCom. HazCom to be addressed in Contractor HASP and include:
    - PPE requirements,
    - Exposure time limits,
    - Identification of chemicals of concern and potential effects of over-exposure (adverse reactions),
    - Methods and routes of potential exposure.
- All personnel that will be performing ground intrusive work within impacted soils shall sign-off on HazCom.
- If, based on a thorough review of Site conditions, it is expected that construction workers will have the potential to encounter materials considered hazardous waste under RCRA or DOT regulations, HAZWOPER-trained personnel will be utilized.

Tracking/Supervision

- Contractor to record any day that there is ground intrusive work and confirm that proper PPE is being worn.
- EP will note ground intrusive work on daily work sheets and perform at least one spot check per day.
- EP will log on daily work sheets PPE compliance for all intrusive work areas at least once per day.

- EP to take example photos of Exclusion Zones/Contamination Reduction Zones periodically.

Work Zones Delineation

- Exclusion Zone – The Exclusion Zones will include the areas proposed for excavation or with active trenches, excavations, or ground intrusive work, at a minimum. Personnel working within the exclusion zone will be required to wear Modified Level D PPE as described in this SOP. EP to take example photos of Exclusion Zones/Contamination Reduction Zones periodically. The Exclusion Zones will be identified each work day.
- Contamination Reduction Zone – This work zone is located outside of the exclusion zone, but inside of the limits of development (LOD). The Contamination Reduction Zone will be located adjacent to the Exclusion Zone, and all personal decontamination including removal of all disposable PPE/removal of soil from boots will be completed in the Contamination Reduction Zone.

Documentation

- Contractor HASP and HazCom.
- Contractor ground intrusive tracking record.
- HASP and HazCom sign-in sheets.
- EP pre-con memos.
- EP daily work sheets.
- Records documenting intrusive work and proper PPE use to be provided in completion report.

Enforcement

- Non-compliance of PPE requirements will result in disciplinary action up to and including prohibition from working on Sparrows Point.

Unknown and/or Unexpected Conditions

If unknown and/or unexpected conditions are encountered during the project that the EP determines to have a reasonable potential to significantly impact construction worker health and safety, the following will be initiated:

1. Job stoppage,
2. TPA and MDE notification,
3. Re-assessment of conditions.

Work will not continue until EP has cleared the area. If hazardous waste is identified, a HAZWOPER contractor will be brought in to address. The approved contingency plan will be implemented, where appropriate.

Modified Level D PPE

Modified Level D PPE will include, at a minimum, overalls such as polyethylene-coated Tyvek or clean washable cloth overalls, latex (or similar) disposable gloves (when working in wet/chemical surroundings) or work gloves, steel-toe/steel-shank high ankle work boots with taped chemical-protective over-boots (as necessary), dust mask, hard hat, safety glasses with

side shields, and hearing protection (as necessary). If chemical-protective over-boots create increased slip/trip/fall hazardous, then standard leather or rubber work boots could be used, but visible soils from the sides and bottoms of the boots must be removed upon exiting the Exclusion Zone.

ATTACHMENT C

Attachment C: Soil Samples from June 15, 2022
SubParcel A11-2

Sample ID	Color	Depth	PID	Benzene	Benzo(a)pyrene	Naphthalene
Delineation Thresholds				**150**	**75**	**275**
B-1	Red	3.2'	1.5	0.0015	*0.16 U*	*0.2 U*
B-2	Black	3.3'	29.5	0.0013	**140**	**84**
B-3	Yellow	5.10'	1.9	0.68	0.096 J	0.066 J
B-4	Yellow	7.10'	2.9	0.0013	*0.15 U*	*0.19 U*
B-5	Black	3.0'	58.2	4.2	**150**	**610**

Results in milligrams per kilogram (mg/kg)
Bold: Detected concentration
Yellow Highlight: Concentration above the delineation threshold