

Lead and NAPL/Oil & Grease Delineation and Excavation Work Plan

Area A: Sub-Parcel A3-1 Tradepoint Atlantic Sparrows Point, Maryland

Prepared for:

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ARM Project 160443M-1

Respectfully Submitted,



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BACKGROUND

ARM Group Inc. (ARM), on behalf of EnviroAnalytics Group (EAG), has prepared this Work Plan to perform delineation and excavation activities associated with borings with elevated concentrations of lead and/or evidence of potentially mobile NAPL/Oil & Grease that were previously identified on a portion of the Tradepoint Atlantic property that has been designated as Area A, Sub-Parcel A3-1. Parcel A3 is approximately 64 acres of the approximately 3,100-acre former steel mill property located in Sparrows Point, Maryland, and is the location of the former Rod and Wire Mill Area. The Development Area (or Site) covered by this Work Plan consists of 54 acres designated as Sub-Parcel A3-1, which includes all of the larger Parcel A3 with the exception of 10 acres located west of Riverside Drive.

Three of the soil borings completed during the Phase II Investigation of Parcel A3 were identified as containing elevated metals warranting additional delineation. Results from location RW-021-SB indicated an arsenic concentration in soil of 492 mg/kg in the shallow (0 to 1 foot bgs) sample. A lead concentration of 44,700 mg/kg was identified in the shallow soil sample from location RW-055-SB, and boring RW-052-SB had a concentration of 16,400 mg/kg in a deeper (4 to 5 foot bgs) sample. Based on direct guidance from the Maryland Department of the Environment (MDE) and United States Environmental Protection Agency (USEPA), these boring locations were investigated for elevated levels of arsenic (RW-021-SB) and lead (RW-052-SB and RW-055-SB).

Each of the soil borings completed during the Phase II Investigation of Parcel A3 was analyzed for Oil & Grease. Based on the specific sampling plan targets, select locations were additionally analyzed for diesel range organics (DRO) and gasoline range organics (GRO). The individual validated results were compared to the project action limit (PAL) of 6,200 mg/kg, which was set to a hazard quotient (HQ) of 1. Four shallow samples (RW-025-SB-1, RW-029-SB-1, RW-033-SB-1, and RW-040-SB-1) exceeded the Oil & Grease PAL, with the highest concentration of 14,700 mg/kg in sample RW-029-SB-1. Eight subsurface samples (RW-004-SB-5, RW-010-SB-7, RW-029-SB-7, RW-041-SB-5, RW-045-SB-5, RW-047-SB-6, RW-052-SB-5, and RW-055-SB-5) exceeded the Oil & Grease PAL, with the highest concentration (39,000 mg/kg) also noted in boring RW-029-SB at a depth of 6 to 7 feet bgs.

Three soil boring locations (RW-029-SB, RW-045-SB, and RW-052-SB) had exceedances of the Oil & Grease PAL accompanied by evidence of possible non-aqueous phase liquid (NAPL) contamination in the soil cores. Also, two additional sample locations (without Oil & Grease exceedances) had visible sheens or NAPL noted in the soil cores (RW-003-SB and RW-056-SB). The physical observations of NAPL in the soil cores and relevant Oil & Grease analytical data were as follows:

- Sample location RW-003-SB had observations of NAPL in the soil core from 7.5 to 8 feet. Laboratory samples were collected from the intermediate interval in RW-003-SB from 4 to 5 feet based on the highest PID screening results. The intermediate interval (RW-003-SB-5) had an Oil & Grease detection of 360 mg/kg.
- Sample location RW-029-SB had observations of the appearance of NAPL in the soil core from 6 to 7 feet. Laboratory samples were collected within the corresponding 6 to 7 foot interval in RW-029-SB. The intermediate sample (RW-029-SB-7) had an Oil & Grease detection of 39,600 mg/kg.
- Sample location RW-045-SB had an observed sheen in the soil core from 2.7 to 3.2 feet. The 0 to 1 foot sample had a detection of 616 mg/kg of Oil & Grease, and the intermediate sample interval from 4 to 5 feet (just below the impacted interval) had an Oil & Grease detection of 6,330 mg/kg.
- Sample location RW-052-SB had the appearance of a black sheen and possible NAPL in the soil core from 3 to 5 feet. Laboratory samples were collected from 4 to 5 feet within the impacted interval. The intermediate sample (RW-052-SB-5) had an Oil & Grease detection of 7,130 mg/kg.
- Sample location RW-056-SB had the appearance of black water and potential NAPL in the soil core from 3 to 7 feet. Laboratory samples were collected from 4 to 5 feet within this interval, and the reported Oil & Grease result (1,050 mg/kg).

DELINEATION PROCEDURE

Lead and Arsenic Impacts (Completed)

Additional investigation activities were conducted between June 27 and June 29, 2016 to delineate the extent of elevated arsenic and lead concentrations identified in borings RW-021-SB (arsenic), and RW-052-SB and RW-055-SB (lead). Delineation criteria were established for the supplementary investigations for arsenic and lead as 300 mg/kg and 2,000 mg/kg, respectively. Additionally, composite soil samples were collected and analyzed for TCLP metals to characterize the soil for proper disposal in a hazardous or nonhazardous landfill.

Following the identification of all utilities in the study area, a track-mounted Geoprobe[®] direct push rig was utilized to collect continuous core soil samples based on a grid interval of 25 feet; which was centered on each of the elevated soil locations. At each location, continuous core soil samples were collected to a depth of up to 10 feet bgs and screened with a hand-held X-ray fluorescence (XRF) instrument; which provided real-time results for arsenic and lead in soil. The field operator screened each 1-foot interval of the soil core and recorded the readings for arsenic/lead. Calibration of the XRF is performed in the factory, but calibration checks were

completed in the field at the start of each testing period using a calibration clip and NIST Standard 2709a. The sampling grid was adjusted in the field based on the real-time detections reported by the XRF. After soil core screening had been concluded at a location, each hole was backfilled with bentonite chips, and down-hole soil sampling equipment was decontaminated according to procedures specified in the Quality Assurance Project Plan (QAPP) for the Tradepoint Atlantic property dated April 5, 2016.

The first location to be completed for each delineation activity corresponded to the sample location collected during the Phase II Investigation (RW-021-SB, RW-052-SB, or RW-055-SB). Once a level below the delineation criterion for arsenic (300 mg/kg) and/or lead (2,000 mg/kg) was identified surrounding the initial location, the delineation was deemed to be complete. **Table 1** presents the results of the arsenic and lead concentrations recorded with the XRF instrument. The location of each completed soil boring was recorded using a hand-held GPS unit, and each location is provided on **Figure 1** and **Figure 2**. These figures show the lateral extent of the soil concentrations above the delineation levels at any sample depth.

During delineation, composite soil samples were collected from each delineation area and sent to the laboratory for analysis of TCLP metals. **Table 2** presents the results of the TCLP analysis. None of the composite samples exceeded the TCLP regulatory thresholds. Thus it is not anticipated that any material would require management under hazardous waste regulations following excavation. However, additional waste characterization samples will be collected from the excavated material stockpiles.

NAPL/Oil & Grease Impacts (Proposed)

Oil & Grease detections in excess of 6,200 mg/kg will be 1) delineated for excavation; or 2) assessed in a detailed manner relative to the development plan (plotted in comparison to all proposed utilities and water conveyance systems); and 3) evaluated for potential NAPL mobility. Each boring with Oil & Grease PAL exceedances in soil, as well as each boring where evidence of visible product was observed in the soil core, was plotted on the proposed site development plan for Sub-Parcel A3-1. Further delineation and excavation will be conducted at each location within 25 feet of proposed new utilities. Potential NAPL contamination may be evaluated both above and below the water table, and within the smear zone (if present), based on the severity of any observed soil conditions. **Figure 3** shows the locations of impacted borings evaluated as part of this Work Plan for possible delineation.

RW-025-SB with elevated Oil & Grease is located within 25 feet of proposed utilities (as shown on **Figure 3**) thus warranting additional action. Since piezometers were not installed during the Phase II Investigation for evaluation of potential NAPL mobility, four of the five locations with evidence of possible NAPL contamination in soil cores (RW-003-SB, RW-029-SB, RW-052-SB, and RW-056-SB) will also undergo further delineation. Soil boring RW-045-SB is not proposed

for additional action because the NAPL evidence at this location was limited to a slight sheen in a narrow depth interval, and relatively low analytical detections for Oil & Grease were recorded.

Delineation of potential impacts in the vicinity of RW-003-SB, RW-025-SB, RW-029-SB, RW-052-SB, and RW-056-SB will be completed using an excavator. Test pits will be installed at the initial Phase II boring locations, and each test pit will be completed to a final depth at least 1-foot below the depth at which potential NAPL had previously been observed in the associated soil core. Delineation trenches of matching depth will then be completed and inspected to the north, south, east, and west with lengths of 5 feet. At the end of each delineation trench, if no physical evidence of NAPL contamination has been observed, Oil Sticks™ screening tests will be completed at the vertical midpoint and bottom of the wall at the end of each trench. A positive Oil Sticks™ test kit screening result would indicate that extractable NAPL or elevated concentrations of Oil & Grease are present in the soil. Secondary screening using a PID may influence the selection of the screening locations if there is no additional visual/olfactory evidence of contamination. Delineation will be deemed complete if these screening tests do not indicate the presence of extractable oil or petroleum hydrocarbons. The delineation of RW-052-SB will be performed concurrent with the excavation of elevated lead impacts (described in the following section). Due to the simultaneous excavation of lead-impacted material, delineation protocols may need to be modified in the field at this location.

The Oil Sticks™ test kit provides a determination of whether hydrocarbons are present in soil and extractable (i.e. could become mobile as a NAPL). Oil Sticks™ change from a pale blue to a deep blue color when they come in contact with free product. This instantaneous change in color occurs even when miniscule amounts of free product come in contact with the strip. The sensitivity of Oil Sticks™ to determine the presence/absence of oil is reported by the manufacturer to be between 1,000 to 2,000 mg/kg for soil testing. The field test is performed by placing approximately 3 tablespoons of soil in a clean sample cup and adding enough water to cover the sample. After stirring the sample and waiting ~1 minute, the Oil Sticks™ test strip will be swished through the water, making sure to touch the strip to the sides of the cup where product may collect at the interface (meniscus) between the cup, water, and air. If the strip turns deep blue, or deep blue spots form, oil or petroleum hydrocarbons are present. This positive result would indicate the presence of impacted soils with extractable NAPL or elevated concentrations of Oil & Grease.

EXCAVATION PROCEDURE

Lead Impacts

Excavation of soil with lead impacts will be overseen by a full-time Environmental Professional. Excavations will be completed within each defined delineation area to remove lead impacts above 10,000 mg/kg. The total volume of soil to be excavated in order to remove the soil above

the lead action level of 10,000 mg/kg at all depths was conservatively estimated to be approximately 1,850 cubic yards, including the volume of soil at concentrations less than 10,000 mg/kg that must be excavated to uncover the soil with higher concentrations. The proposed preliminary excavation areas are indicated on **Figures 4 and 5**. **Figure 5** (RW-052-SB/RW-055-SB) shows the total proposed excavation area and the greatest depth of soil exceeding the 10,000 mg/kg concentration in each portion of the excavation area based on the laboratory data collected during delineation. Therefore, the excavations will extend to at least the depths shown on **Figure 5**, and will extend deeper some in areas (if necessary) as indicated by post-excavation confirmation sampling.

Field screening with the XRF (per SOP No. 23 in the QAPP) will be utilized in order to identify and segregate the material that exceeds the lead criterion of 10,000 mg/kg. In addition, soil that exceeds the lead criterion of 10,000 mg/kg will be treated in-situ by the addition of TerraBond[®]. TerraBond[®] reagents are primarily sulfur-based waste stabilization products which reduce the leachability of metals from soil. These pH buffered products surround and bind metal ions in the soil for long-term waste treatment. Numerous case studies demonstrate the effectiveness of TerraBond[®] to reduce the leachability of heavy metals, including lead. Soil that the field screening indicates has a lead concentration of less than 10,000 mg/kg will be staged in a separate stockpile.

Excavation will be performed as follows:

- Screening with the XRF will be conducted in 1-foot lifts. Using the excavator, a pothole sample of soil from each consecutive 1-foot interval will be collected on a grid spacing not to exceed 25 feet laterally and will be screened with the hand-held XRF. Once the entire 1-foot lift has been screened over the area shown in **Figure 5**, the identified areas of material above 10,000 mg/kg may be further refined by screening of samples on a tighter grid spacing.
- TerraBond[®] will be mixed in place within areas of impacted soil (greater than 10,000 mg/kg of lead). After mixing, the treated soil from each 1-foot lift will be excavated and placed in the stockpile designated to receive lead contaminated soil.
- The remaining soil from each 1-foot lift where the concentration of lead is less than 10,000 mg/kg level will then be excavated. This material will be placed in a stockpile designated to receive clean soil (to be used for backfill).

This process will be repeated until the depths indicated on **Figure 5** are reached and preliminary screening with the XRF indicates that the vertical and horizontal extents of lead contamination above 10,000 mg/kg have been defined.

An XRF analysis (SOP No. 23 in the QAPP) will be performed on each 200 square foot area of the excavation sidewalls (unless limited by concrete) to confirm that all soil above the action level of 10,000 mg/kg has been removed. An XRF reading will still be collected if the surface area of an independent sidewall is less than 200 square feet. XRF readings will also be collected from the bottom of each excavation (unless limited by the water table) at a minimum of one every 2,000 square feet. The location of the XRF readings will be biased to target any apparent contamination remaining in place, or will be placed in the center of the sidewall/bottom if no biased location is apparent. Confirmatory samples will be collected for fixed laboratory analysis from 30% of the XRF sidewall/bottom screening locations (randomly selected) and analyzed for lead via USEPA Method 6010C.

Excavated soils shall be placed on poly sheeting or concrete, and stockpiles will remain covered when they are not being used in order to minimize dust and prevent run-on/runoff. A weighted cover system shall be used to keep the covers in place. The stockpiles will be covered at the end of each day.

Lead contaminated soil will be tested at a rate of one sample for every 500 cubic yards for TCLP to determine if the material must be disposed of at an off-site hazardous landfill or, if non-hazardous, at the on-site landfill (Greys). Soil from the clean stockpile will be tested at a rate of one sample for every 500 cubic yards for lead via USEPA Method 6010C to determine if the material may be replaced on-site as backfill in the excavation.

Excavations will be backfilled following receipt of XRF and laboratory results confirming that the action level of 10,000 mg/kg of lead has been achieved. Notice will also be provided to the agencies prior to backfilling. Analytical data regarding any material to be replaced on-site within the excavation will be provided to the agencies for review, along with all confirmation sample and XRF screening results, locations, and depths.

NAPL/Oil & Grease Impacts

Excavation to remove identified soil with NAPL/Oil & Grease impacts will be completed concurrent with the delineation process and will be overseen by a full-time Environmental Professional. Excavation is anticipated to be completed in the vicinity of RW-003-SB, RW-025-SB, RW-029-SB, RW-052-SB, and RW-056-SB to remove soils exhibiting evidence of possible NAPL contamination, as well as Oil & Grease impacts at extractable levels (as determined by a positive Oil Sticks™ test kit screening result). Impacted soils below the water table will be considered for excavation, based on the severity of any encountered evidence of NAPL. The total volume of soil with physical evidence of NAPL or extractable Oil & Grease levels will be provided to the agencies following the completion of excavation. The final excavation areas will also be indicated on supplemental figures submitted to the agencies for their review.

Confirmation samples will be recovered from each side wall of each excavation (unless limited by concrete) if the area of the sidewall is less than 500 square feet. If the sidewall area exceeds 500 square feet, additional sidewall samples will be collected at the same frequency (i.e., 1 set for every 500 square feet). A sample will be collected from the midpoint depth and bottom depth of each interior-facing wall for each set of confirmation samples. Confirmation samples will also be collected from the bottom of each excavation at a minimum of one for every 2,000 square feet. The positions of the confirmation samples will be biased to target any suspected potential contamination remaining in place, or else will be evenly spaced on the sidewall/bottom if no biased location is apparent. Confirmation analyses will be completed in the field using the Oil Sticks™ test kit. If a sidewall or bottom sample tests positive using the Oil Sticks™ test kit, additional material will be removed and that location will be tested again. This screening method will be repeated until all samples test negative.

Excavated material will be segregated into two stockpiles located adjacent to each excavation. Segregation criteria for the impacted soil stockpile include: observed free-phase NAPL or evidence of staining, and/or strong odors. Soil in discrete areas or at depths which do not exhibit visual/olfactory evidence of NAPL contamination will be confirmed to be free of impacts via representative screening with Oil Sticks™. This non-impacted soil will be stockpiled separately to be used as backfill.

Excavated soils shall be placed on poly sheeting or concrete and stockpiles will remain covered when they are not being used in order to minimize dust and prevent run-on/runoff. The poly-lined stockpile areas will be graded such that any water from wet excavated material will drain back into the open excavation. A weighted cover system shall be used to keep the covers in place. The stockpiles will be covered at the end of each day.

Soil from the impacted stockpiles will be submitted for laboratory testing at a rate of one sample for every 500 cubic yards for TCLP and PCBs to determine if the material must be disposed of at an off-site hazardous landfill or, if non-hazardous, at the on-site landfill (Greys). Soil from the clean stockpiles will be screened at a rate of one sample for every 500 cubic yards using the Oil Sticks™ test kit to determine if the material may be replaced as backfill in the excavations.

Excavations will be backfilled following the removal of soils exhibiting evidence of possible NAPL contamination and/or extractable levels of Oil & Grease. Notice will also be provided to the agencies prior to backfilling. Screening results for any material to be replaced on-site within the excavations will be provided to the agencies for review, along with all confirmation tests, locations, and depths.

ATTACHMENTS

Figure 1 – RW-021-SB Delineation Arsenic/Lead Results

Figure 2 – RW-052-SB/RW-055-SB Delineation Arsenic/Lead Results

Figure 3 – Oil & Grease PAL Exceedances and Evidence of NAPL

Figure 4 – RW-021-SB Proposed Excavation

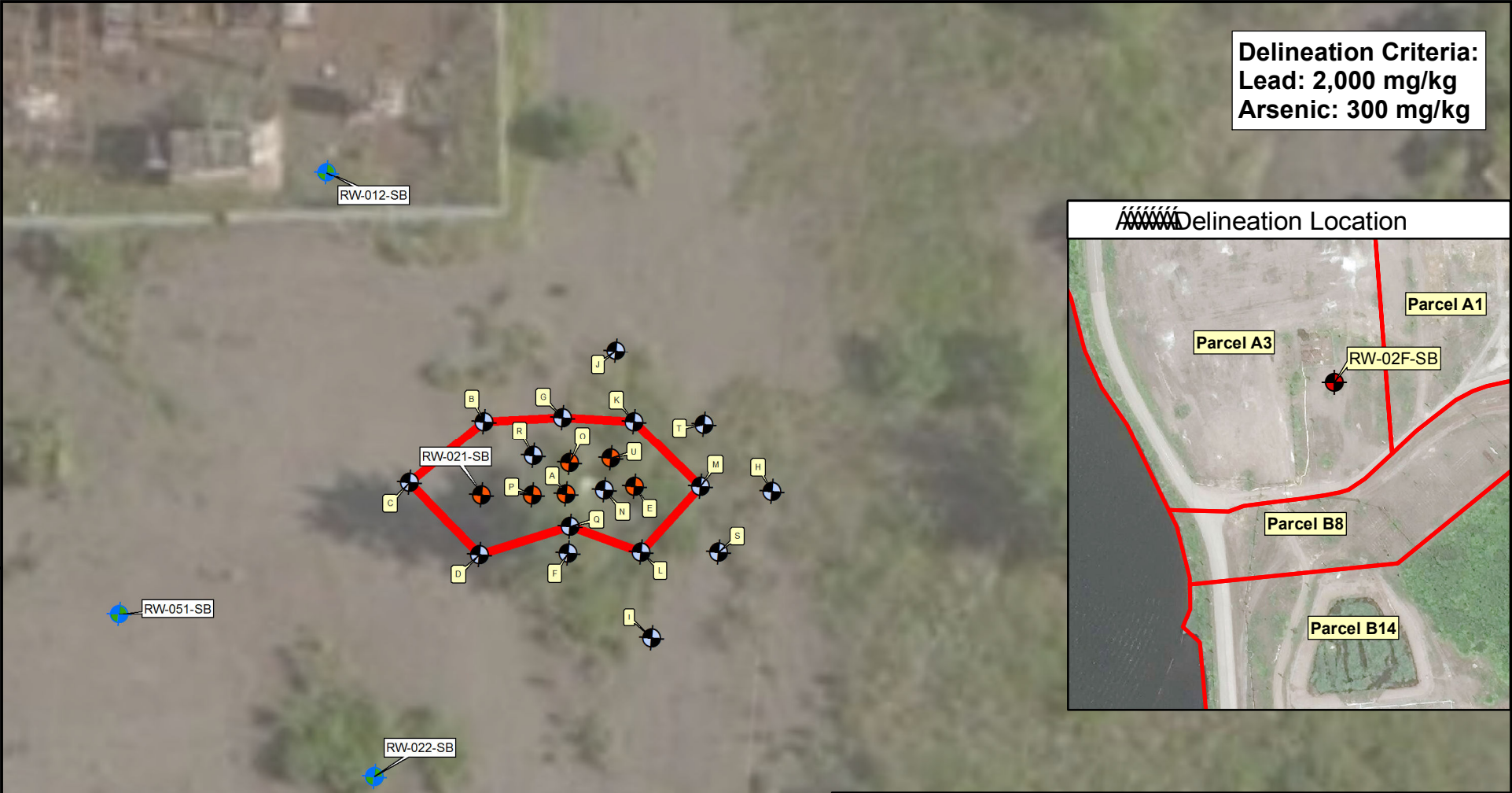
Figure 5 – RW-052-SB/RW-055-SB Proposed Excavation


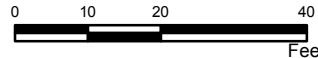




Table 1 – Soil Screening XRF Results

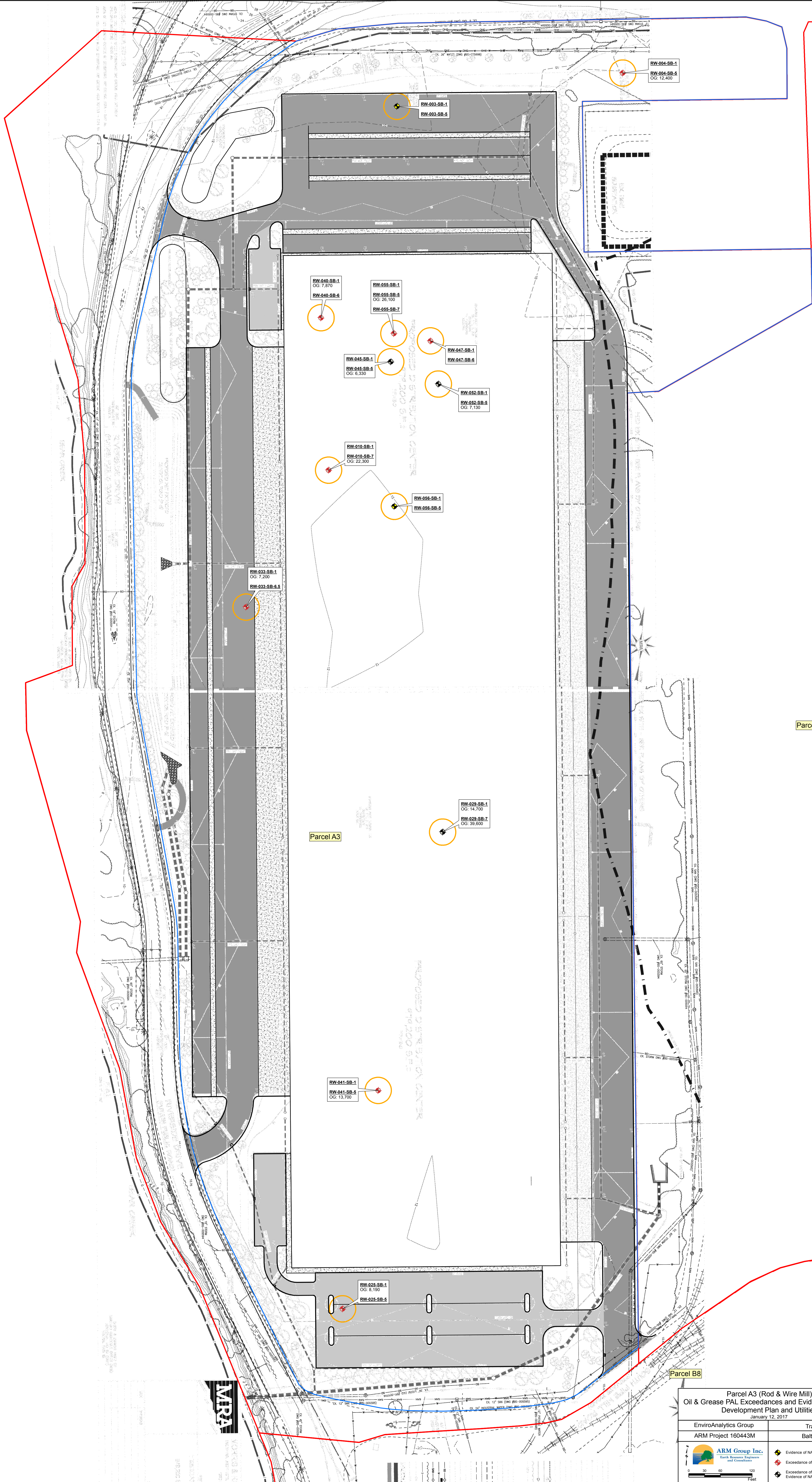
Table 2 – Soil Delineation TCLP Results

FIGURES

Delineation Criteria:
Lead: 2,000 mg/kg
Arsenic: 300 mg/kg



RW-021-SB Delineation Arsenic/Lead Results (All Screening Depths) Aerial View December 4, 2016		Figure 1
EnviroAnalytics Group	Tradepoint Atlantic	
ARM Project 150298M	Baltimore County, MD	
 	<ul style="list-style-type: none">  Above Delineation Criteria  Below Delineation Criteria  Additional Phase II Soil Boring (Below Delineation Criteria)  Delineation Boundary 	



Parcel A1

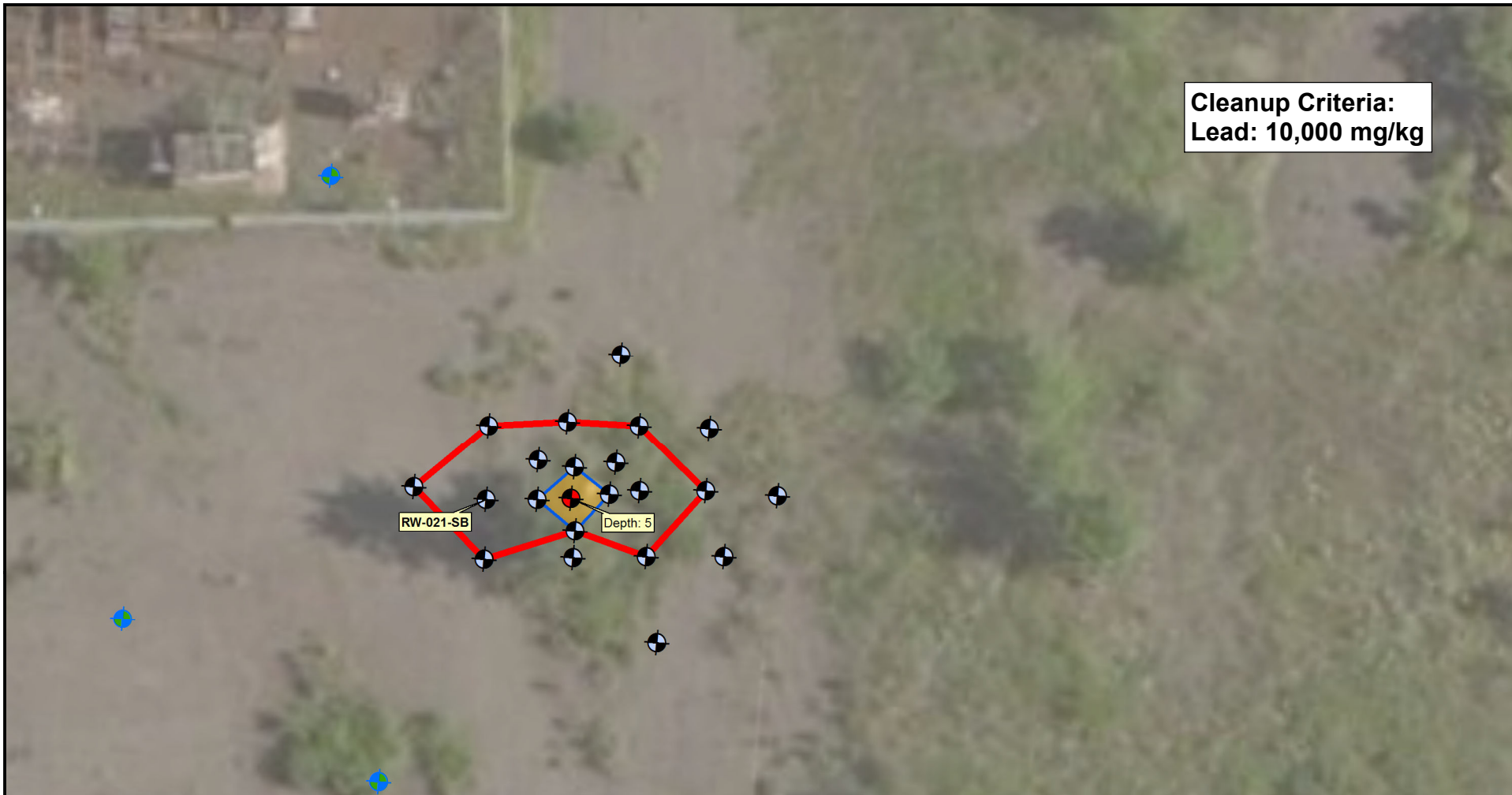
Parcel A3


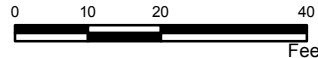






Parcel B8

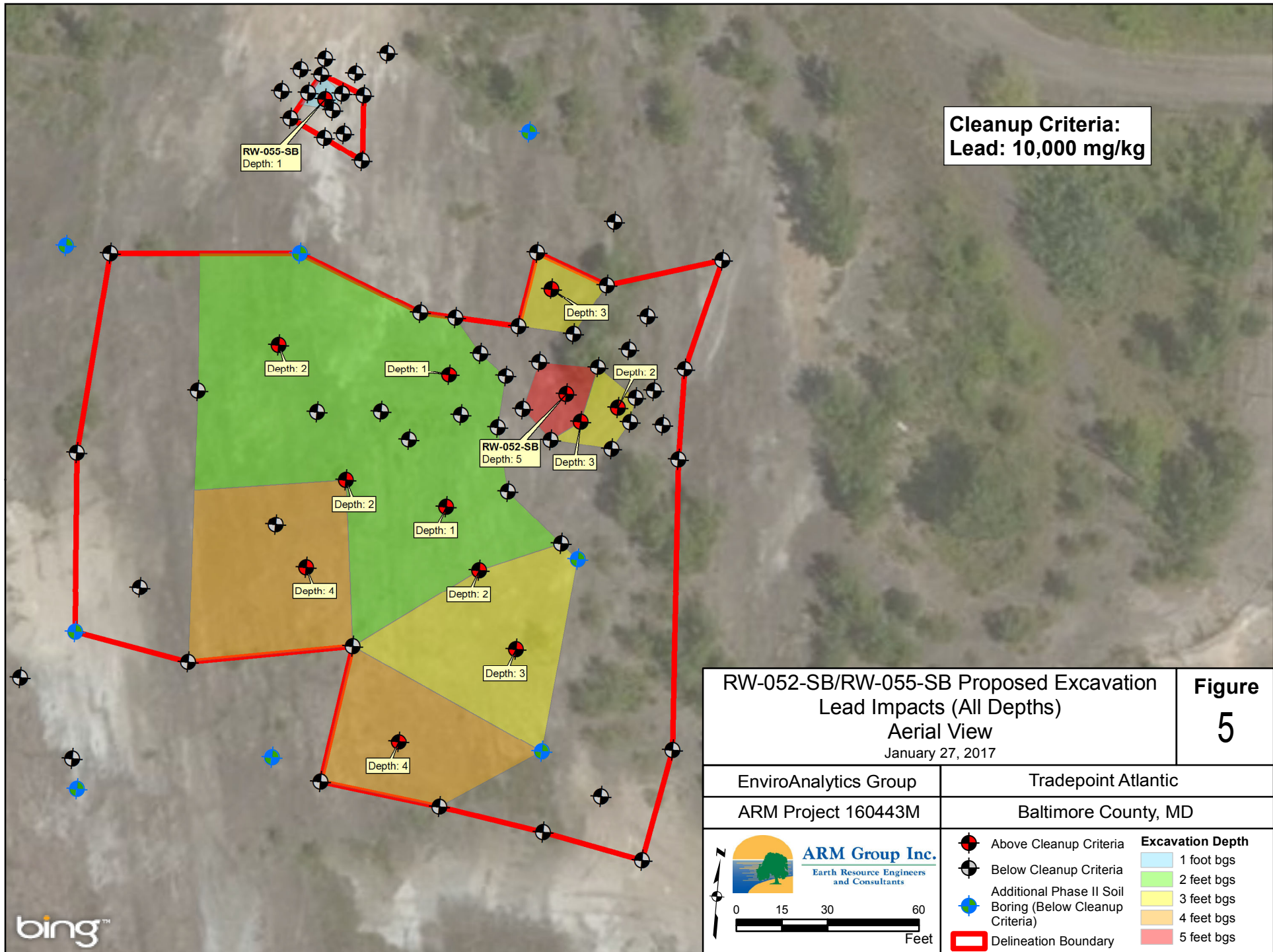
Parcel A3 (Rod & Wire Mill) Oil & Grease PAL Exceedances and Evidence of NAPL Development Plan and Utilities January 12, 2017		Figure 3
EnviroAnalytics Group ARM Project 160443M	Tradepoint Atlantic Baltimore County, MD	



**Cleanup Criteria:
Lead: 10,000 mg/kg**



RW-021-SB Proposed Excavation Lead Impacts (All Depths) Aerial View January 12, 2017		Figure 4
EnviroAnalytics Group	Tradepoint Atlantic	
ARM Project 150298M	Baltimore County, MD	
 	<ul style="list-style-type: none">  Above Cleanup Criteria  Below Cleanup Criteria  Additional Phase II Soil Boring (Below Cleanup Criteria) 	<ul style="list-style-type: none">  Delineation Boundary  Soil Excavation Boundary  5ft Excavation Area



**Cleanup Criteria:
Lead: 10,000 mg/kg**

RW-052-SB/RW-055-SB Proposed Excavation Lead Impacts (All Depths) Aerial View January 27, 2017		Figure 5
EnviroAnalytics Group	Tradepoint Atlantic	
ARM Project 160443M	Baltimore County, MD	
	<ul style="list-style-type: none"> Above Cleanup Criteria Below Cleanup Criteria Additional Phase II Soil Boring (Below Cleanup Criteria) Delineation Boundary 	Excavation Depth <ul style="list-style-type: none"> 1 foot bgs 2 feet bgs 3 feet bgs 4 feet bgs 5 feet bgs

TABLES

Table 1A
Soil Screening XRF Results (RW-021-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-021-SB		RW-021A-SB		RW-021B-SB		RW-021C-SB		RW-021D-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	108	45	144	24	78	35	240	86	37	26
2	17	12	76	19	59	154	23	18	99	26
3	39	102	21	10	27	157	19	12	107	54
4	232	41	1,913	71	27	199	15	10	214	186
5	35	28	> 10%	3,890	21	125	16	11	966	177
6			312	28						
7			145	21						
8			231	34						
9			27	11						
10			18	9						

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1A
Soil Screening XRF Results (RW-021-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-021E-SB		RW-021F-SB		RW-021G-SB		RW-021H-SB		RW-021I-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	58	23	110	25	47	21	1,210	74	1,671	109
2	15	22	154	25	40	62	983	70	31	24
3	66	22	49	18	22	35	780	62	149	25
4	190	23	302	33	49	12	18	13	134	25
5	4,742	133	340	51	55	13	51	14	26	54
6	Refusal									
7										
8										
9										
10										

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1A
Soil Screening XRF Results (RW-021-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-021J-SB		RW-021K-SB		RW-021L-SB		RW-021M-SB		RW-021N-SB		RW-021O-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	250	64	17	13	166	71	76	18	130	56	134	25
2	16	55	216	27	17	79	155	70	103	76	734	72
3	80	14	26	14	35	33	202	251	26	21	37	29
4	19	11	16	11	39	30	36	40	1,529	70	4,935	198
5	28	11	261	34	48	18	31	19	76	18	532	98
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1A
Soil Screening XRF Results (RW-021-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-021P-SB		RW-021Q-SB		RW-021R-SB		RW-021S-SB		RW-021T-SB		RW-021U-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	218	32	86	33	65	28	120	33	185	46	110	43
2	199	198	151	34	34	49	447	46	154	36	73	20
3	120	72	44	24	14	11	191	24	350	55	622	47
4	8,903	1,748	119	24	15	11	210	35	168	25	3,907	131
5	35	15	87	17	16	12	33	18	21	12	63	14
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052-SB		RW-052A-SB		RW-052AA-SB		RW-052B-SB		RW-052BB-SB		RW-052BBB-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	41	15	766	42	21	16	216	28	43	24	38	23
2	3,210	105	1,147	46	73	39	131	20	1,038	53	6,792	137
3	Concrete		Concrete		93	16	49	13	21,305	294	47	15
4			660	42	12	10	26	12	49	13	51	16
5	4,413	117	124	47	16	10	Brick/Concrete		17	9	61	18
6	Refusal						161	36				
7							287	30				
8							227	23				
9							29	13				
10							26	12				

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052C-SB		RW-052CC-SB		RW-052CCC-SB		RW-052D-SB		RW-052DD-SB		RW-052E-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	186	27	27	21	1,996	83	197	26	26	19	67	18
2	1,540	72	79	18	1,169	113	77	15	16	11	223	25
3	540	30	3,347	105	554	41	9	7	621	44	4,670	107
4	1,091	55	500	33	107	23	20	10	11	9	Concrete	
5	1,678	68	488	33	782	42	15	9	15	9	4,444	106
6											21	12
7											16	8
8											16	12
9											23	10
10											45	11

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
 Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052EE-SB		RW-052EEE-SB		RW-052F-SB		RW-052FF-SB		RW-052FFF-SB		RW-052G-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	217	39	74	21	28	15	353	31	57	16	1,715	68
2	10,431	197	108	21	63	61	6,647	203	599	37	17,920	254
3	130	19	2,940	118	13,953	197	1,219	70	23	12	5,103	122
4	77	21	11,868	355	6,123	106	3,642	245	24	16	114	22
5	13	9	303	27	7,694	173	Refusal		10	9	122	22
6					Concrete						66	16
7					107	16					Refusal	
8					144	29						
9					13	9						
10					12	19						

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052GG-SB		RW-052-GGG		RW-052H-SB		RW-052HH-SB		RW-052I-SB		RW-052II-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	552	111	74	27	1,878	70	30	24	77	21	726	52
2	206	36	1,615	71	130	21	1,330	59	66	16	979	51
3	Refusal		Concrete		545	47	26,142	317	2,344	88	10	8
4			19	11	749	43	1,321	63	2,658	81	12	9
5			512	51	615	40	596	44	9,271	161	13	9
6									12	9		
7									Refusal			
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052J-SB		RW-052JJ-SB		RW-052K-SB		RW-052KK-SB		RW-052L-SB		RW-052LL-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	182	37	44	18	223	53	2,890	95	50	24	19	16
2	6,783	37	1,954	99	49	16	82	16	85	17	5,746	130
3	6,366	112	Refusal		5,013	155	71	15	486	40	4,230	107
4	602	148			2,736	92	25	11	63	18	1,134	49
5	Refusal				499	37	13	9	65	14	17	10
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
 Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052M-SB		RW-052MM-SB		RW-052N-SB		RW-052NN-SB		RW-052O-SB		RW-052OO-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	271	29	21	13	1,036	52	2,463	81	302	26	23	18
2	3,550	97	1,528	71	375	32	160	26	696	47	2,213	75
3	422	61	229	26	3,372	153	51	13	4,102	95	94	20
4	158	39	970	46	499	35	169	20	1,048	49	39	12
5	27	11	36	14	11	9	133	17	5,277	175	1,513	66
6									Refusal			
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
 Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052P-SB		RW-052PP-SB		RW-052Q-SB		RW-052QQ-SB		RW-052R-SB		RW-052RR-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	157	35	23	17	147	27	1,444	55	33,848	339	129	32
2	107	23	592	35	303	28	173	23	303	33	11	9
3	9,366	193	318	27	Concrete		54	13	440	33	Concrete	
4	151	19	157	20	34	11	66	13	1,966	71	27	11
5	257	26	86	15	25	10	36	11	240	25	36	13
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
 Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052S-SB		RW-052SS-SB		RW-052T-SB		RW-052TT-SB		RW-052U-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	22	19	166	25	1,782	72	28	20	168	31
2	51	13	1,365	92	122	22	10,094	193	1,795	68
3	1,474	59	360	35	6,404	126	Refusal		9,226	161
4	1,979	86	35	14	1,891	70			95	16
5	Refusal		66	16	895	68			103	16
6										
7										
8										
9										
10										

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052UU-SB		RW-052V-SB		RW-052VV-SB		RW-052W-SB		RW-052X-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	53	24	90	21	117	33	29,761	489	250	33
2	44	15	62,292	606	28	20	276	30	8,153	211
3	21	11	180	24	941	46	207	24	4,842	124
4	15	11	Refusal		577	67	39	10	11,436	255
5	47	14			25	11	11	9	218	23
6										
7										
8										
9										
10										

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052XX-SB		RW-052Y-SB		RW-052YY-SB		RW-052Z-SB		RW-052ZZ-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	27	18	14	12	257	31	843	48	1,990	212
2	539	54	368	108	150	32	151	20	1,148	57
3	603	151	11	9	57	17	108	17	199	24
4	24	12	18	10	29	17	196	23	204	25
5	17	11	50	13	19	11	93	16	34	14
6										
7										
8										
9										
10										

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1C
Soil Screening XRF Results (RW-055-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-055-SB 6.28.16		RW-055-SB 6.29.16		RW-055A-SB		RW-055B-SB		RW-055E-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	25	19	14	11	250	30	441	47	22	17
2	254	53	881	92	330	39	154	33	414	75
3	3,316	102	2,780	84	26	10	18	10	2,199	88
4	218	22	745	48	10	8	40	14	Refusal	
5	19	10	335	28	17	9	25	11		
6	44	14			91	27	54	14		
7	45	14			45	13	27	15		
8	30	11			11	10	17	19		
9	61	14			15	10	18	11		
10	660	54			19	9	17	9		

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1C
Soil Screening XRF Results (RW-055-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-055F-SB		RW-055G-SB		RW-055H-SB		RW-055I-SB		RW-055J-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	18	14	Poor Recovery		226	32	329	45	97	21
2	101	25			13	10	308	41	176	25
3	75	15	27	20	1,181	77	321	31	865	56
4	19	10	1,476	86	111	18	1,693	62	28	10
5	25	11	1,871	69	145	20	24	10	66	15
6			1,136	61						
7			380	32						
8			107	26						
9			44	15						
10			10	8						

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 1C
Soil Screening XRF Results (RW-055-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-055K-SB		RW-055L-SB		RW-055M-SB		RW-055N-SB		RW-055O-SB		RW-055P-SB	
	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	191	27	19	16	17	11	20	16	20	16	41	13
2	172	29	52	25	478	36	416	41	311	37	24	11
3	22	11	21	11	1,426	63	1,093	56	113	18	1,446	75
4	12	10	14	9	1,085	77	326	29	57	18	141	157
5	35	12	109	27	21	16	27	12	86	18	23	17
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 2
Soil Delineation TCLP Results
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	TCLP Criteria	Sample ID									
			021 Arsenic Waste		021 Lead Waste		052 Waste		055 Waste		RW-055-SB-1	
Arsenic	mg/L	5	0.0038	JB	0.026	JB	0.0092	JB	0.003	JB	0.0093	JB
Barium	mg/L	100	0.8	J	1		0.17	JB	0.2	JB	0.77	J
Cadmium	mg/L	1	0.077		0.31		0.0035	JB	0.05	U	0.00059	JB
Chromium	mg/L	5	0.05	U	0.0012	JB	0.05	U	0.0019	JB	0.011	JB
Lead	mg/L	5	0.92		0.4		0.94		0.014	J	0.25	U
Mercury	mg/L	0.2	0.001	U	0.00008	J	0.001	U	0.001	U	0.001	U
Selenium	mg/L	1	0.011	JB	0.013	JB	0.0047	JB	0.013	JB	0.1	U
Silver	mg/L	5	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U

Detections in bold

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

J: The positive result reported for this analyte is a quantitative estimate.

B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

NA: This parameter was not analyzed for this sample.

There were no exceedances of TCLP criteria in the results above.