Phase II Investigation
Work Plan

Area B: Parcel B13
Tradepoint Atlantic
Sparrows Point, Maryland

Prepared for:
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Revision 0
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ARM Project 150300M

Respectfully Submitted,

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1.0 INTRODUCTION

1.1. INTRODUCTION

ARM Group Inc. (ARM), on behalf of EnviroAnalytics Group (EAG), has prepared the following Work Plan to complete a Phase II site investigation on a portion of the Tradepoint Atlantic property that has been designated as Area B, Parcel B13 (the Site). Parcel B13 is comprised of approximately 243 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

Site characterization of Parcel B13 will be performed in compliance with requirements pursuant to the following:

- Administrative Consent Order (ACO) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the Maryland Department of the Environment (effective September 12, 2014); and
- Settlement Agreement and Covenant Not to Sue (SA) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the United States Environmental Protection Agency (effective November 25, 2014).

An application to enter the Site into the Maryland Department of the Environment Voluntary Cleanup Program (MDE-VCP) was submitted to MDE on September 10, 2014. The Site's current and anticipated future use is Tier 3 (Industrial), and plans for the Site include demolition and redevelopment over the next several years.

Parcel B13 is part of the acreage that was removed (Carveout Area) from inclusion in the Multimedia Consent Decree between Bethlehem Steel Corporation, the United States Environmental Protection Agency (EPA), and the Maryland Department of the Environment (MDE) (effective October 8, 1997) as documented in correspondence received from EPA on September 12, 2014. Based on this agreement, EPA has determined that no further investigation or corrective measures will be required under the terms of the Consent Decree for the Carveout Area. However, the SA reflects that the property within the Carveout Area will remain subject to the EPA's RCRA Corrective Action authorities.

1.2. SITE BACKGROUND

From the late 1800s until 2012, the production and manufacturing of steel was conducted at Sparrows Point. Iron and steel production operations and processes at Sparrows Point included raw material handling, coke production, sinter production, iron production, steel production, and semi-finished and finished product preparation. In 1970, Sparrows Point was the largest steel facility in the United States, producing hot and cold rolled sheets, coated materials, pipes, plates, and rod and wire. The steel making operations at the Facility ceased in fall 2012.

1.2.1. Historical Parcel Information

Groundcover at the Site is comprised of 100% slag fill based on the approximate shoreline of the Sparrows Point Peninsula in 1916, as shown on **Figure 2** (Adapted from Figure 2-20 on the Description of Current Conditions Report (DCC) report prepared by Rust Environmental and Infrastructure, dated January 1998). Parcel B13 was formerly occupied by the Ore Yard Material Handling area, Bedding Plant Material Handling area, and Ore Pier.

According to aerial images, the few small buildings that formerly existed in the parcel have been demolished. The concrete slabs remain on grade. There were no apparent existing pits identified from the historical documents or aerial images associated with Parcel B13. Each of the main components of Parcel B13 is discussed in greater detail below.

Ore Yard Material Handling
Raw materials were transported to the Sparrows Point facility by ship, truck, and rail and unloaded at the Ore Pier, A Pier, and car dumper. From storage the raw materials were transported by truck or conveyors to the Ore Yard for storage. The Ore Yard was divided into seven distinct storage areas (A, B, C, D, E, F, and G yards). Material stored in the Ore Yard included, but was not limited to, iron ore, ore fines, sinter, lime, limestone, and coke breeze. The B yard was used for coke storage and miscellaneous materials. The A yard (also a coke-storage area) was leased to and operated by Kinder Morgan. Raw materials were conveyed from the central unloading station to one of the yards via one of three main conveyors. The three main conveyors discharged to several distributing conveyors that fed individual piles in the yard. The raw material from the yard was sent either to the Bedding Plant or the Blast Furnace stockhouse by a series of conveyors. All transitions between conveyors were enclosed or were located inside buildings for dust control and reclamation.

Bedding Plant Material Handling
The Bedding Plant was a pre-processing operation to blend revert and recyclable materials from the iron and steel making operations so it could be reused at the blast furnace. Fines produced from screening coke, ore, sinter, and limestone along with mill scale and other recyclable iron-bearing materials comprised the majority of the mix. The plant stockpiled each component of

the mix in bins. Using belt scales and weigh feeders, material from each of the bins was measured, blended and conveyed to one of two stockpiles in proportioned amounts. When the Sinter Plant required feed material, a reclaiming machine moved through the piles to recover the blended material and convey it to the Sinter Plant. Transition points between conveyors were enclosed or inside buildings.

1.2.2. Background Environmental Data

There are two existing site-wide groundwater wells located within the Parcel B13 boundaries: SW19-PZM007 and SW19-PZM032. Groundwater samples have been collected from these wells in the past (December 2000) and analyzed for a limited set of general water quality parameters. Available analytical data from these samples were presented in the Site Wide Investigation Groundwater Study Report prepared by the Bethlehem Steel Corporation Sparrows Point Division dated December 20, 2001. The data from these samples are included as **Appendix A**. There were no exceedances of Project Action Limits (PALs) for the available groundwater data.

The two existing site-wide wells SW19-PZM007 and SW19-PZM032 were considered for inclusion in the sampling plan for Parcel B13. ARM conducted a site-visit on February 17, 2016 with the intent of inspecting the wells to determine if they were in suitable condition for sampling. Neither well was able to be located, and therefore they will not be sampled as part of the groundwater investigation at the Site. Well Inspection Forms for this event are included as **Appendix B**.

1.3. SAMPLING DESIGN AND RATIONALE

Across the whole Tradepoint Atlantic property, several buildings and facilities may have been historical sources of environmental contamination. These areas were identified as targets for sampling through a careful review of historical documents. When a sampling target was identified, at least two borings were placed at or around its location using GIS software (ArcMap Version 10.2.2). The first sampling targets to be identified were Recognized Environmental Conditions (RECs) located within the Site boundaries, as shown on the REC Location Map provided in the Phase I Environmental Site Assessment (ESA) prepared by Weaver Boos Consultants dated May 19, 2014. Weaver Boos completed site visits of Sparrows Point from February 19 through 21, 2014, for the purpose of characterizing current conditions at the former steel plant. All RECs were targeted with at least three (3) borings and one (1) piezometer. The following REC was identified within the Site boundaries:

Southern Slag Pile Demolition Debris (REC 18, Finding 262):
According to the Phase I report, slag piles along the southern property boundary were observed during the site visit to also contain unknown quantities of demolition and other debris. Based on

this information, Weaver Boos qualified the piles as a REC because the potential for a material release which could impact the environment was present.

Following the identification and evaluation of all RECs at the Site, Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) were identified from the DCC report Figure 3-1. **Figure 3** shows the proposed borings overlain on the DCC figure, which shows the SWMUs, AOCs, and main facility areas within the property boundaries. There were no SWMUs or AOCs that were identified at the Site based on this figure, and no additional units were identified from the DCC report Table 3-1.

Following the identification of all RECs, SWMUs, and AOCs, four (4) sets of historical site drawings were reviewed to identify additional sampling targets. These site drawings included the 5000 Set (Plant Arrangement), the 5100 Set (Plant Index), the 5500 Set (Plant Sewer Lines), and a set of drawings indicating coke oven gas distribution drip leg locations. Drip legs are points throughout the distribution system where coke oven gas condensate was removed from the gas pipelines. The condensate from the drip legs was typically discharged to drums, although it is possible some spilled out of the drums and on to the ground. There were no drip legs identified within the parcel boundaries based on this final drawing set. **Figures 4 through 6** show the proposed borings and the parcel boundary overlain on the 5000 Set, 5100 Set, and 5500 Set, respectively. Careful review of these geospatially referenced figures and review of other historical documents (previously discussed) yielded the proposed boring locations. A summary of the specific drawings covering the Site is presented in the table below:

Parcel B13 Historical Site Drawings Details

Set Name	Typical Features Shown	Drawing Number	Original Date Drawn	Latest Revision Date
Plant Arrangement	Roads, water bodies, building/structure footprints, electric lines, above-ground pipelines (e.g.: steam, nitrogen, etc.)	5003	10/22/1958	1/8/1982
		5004	9/7/1960	1/21/1982
		5005	3/22/1961	1/8/1982
		5009	6/25/1958	3/12/1982
		5010	9/22/1961	3/12/1982
		5011	9/25/1961	3/12/1982
		5012	7/7/1958	3/12/1982
		5016	5/28/1958	3/12/1982
		5017	7/7/1958	3/12/1982
		5018	7/7/1958	3/12/1982

Parcel B13 Historical Site Drawings Details (cont.)				
Set Name	Typical Features Shown	Drawing Number	Original Date Drawn	Latest Revision Date
Plant Index	Roads, water bodies, demolished buildings/structures, electric lines, above-ground pipelines	5103	*Unknown*	3/7/2008
		5104	*Unknown*	8/18/2008
		5105	*Unknown*	3/10/2008
		5109	*Unknown*	3/10/2008
		5110	*Unknown*	3/10/2008
		5111	*Unknown*	3/10/2008
		5112	*Unknown*	9/5/2008
		5116	*Unknown*	8/14/2008
		5117	*Unknown*	8/14/2008
		5118	*Unknown*	8/14/2008
Plant Sewer Lines	Same as above plus trenches, sumps, underground piping (includes pipe materials)	5503	5/27/1975	3/9/1982
		5504	5/30/1975	1/11/1982
		5505	5/30/1975	1/11/1982
		5509	9/11/1959	3/18/1982
		5510	*Unknown*	9/26/2008
		5511	2/16/1976	1/7/1982
		5512	2/16/1960	1/20/1982
		5516	9/1/1958	9/12/2008
		5517	8/21/1959	2/9/1982
		5518	1/21/1957	2/10/1982
Drip Legs	Coke Oven Gas Drip Legs Locations	5886B	*Unknown*	Sept. 1988

Sampling target locations were identified if the historical site drawings depicted industrial activities or a specific feature at a location that may have been a source of environmental contamination that impacted the Site. Based on this criterion, the following sampling targets were identified at the Site: Oil Houses/Buildings, Diesel Fuel Tanks, Tanks (unknown contents), Thickener Tanks, Sump Pumps, Electric Substations, Skulling Pit (old car dumper) and Slag Pits. ARM received a list of former PCB-containing transformer equipment from Tradepoint Atlantic personnel, for inclusion as additional targets. There were no PCB-contaminated areas identified in the parcel based on this information. The number of proposed borings that targeted a specific feature is directly related to the size and likely historical presence of materials that could have impacted the Site. The full list of sampling targets, along with the specific rationale for sampling each, is provided as **Appendix C**.

Sample locations were added to fill in areas with insufficient coverage (large spatial gaps between proposed borings) within the Site and to meet the sample density requirements set forth in the Quality Assurance Project Plan (QAPP), Worksheet 17 – Sampling Design and Rationale.

Parcel B13 contains a total of 241.2 acres: 231.3 acres without engineered barriers and 9.9 acres with current engineered barriers (parking/roads). The Ore Pier at the southwestern corner of the property (approximately 2.2 acres in area) was not included in the total area calculation because the pier itself will not be investigated as part of this Work Plan. In accordance with the relevant sampling density requirements, a minimum of 77 soil boring locations are required in the areas without engineered barriers, and a minimum of 5 soil boring locations are required in the areas with current engineered barriers. A total of 77 borings have been proposed in areas without engineered barriers. A total of 5 borings have been proposed in areas with current engineered barriers.

Figure 7 shows the proposed borings on an aerial image to indicate locations of borings with regard to landmarks and physical obstructions. EAG has provided ARM with a proprietary site planning document which shows the proposed development for Parcel B13. This document indicates that the entire parcel will be used for Bulk Handling and Storage in the future (without paving). Based on the active nature of the Site, it is anticipated that the proposed borings may be relocated in the field to avoid conflicts with active work areas and/or stockpiles. **Figure 8** shows the current engineered barriers within Parcel B13 (there are no future engineered barriers currently proposed). Groundwater at the Site will be investigated using temporary installed groundwater monitoring points (piezometers). Proposed groundwater sample locations are shown on **Figure 9**.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1. PROJECT PERSONNEL

The site characterization of Area B Parcel B13 will be conducted by ARM under a contract with EAG. ARM will provide project planning, field sampling and reporting support. The required drilling, Geoprobe® and laboratory services will be contracted directly by EAG. The management, field, and laboratory responsibilities of key project personnel are defined in this section.

The ARM Project Manager, Mr. Eric Magdar is responsible for ensuring that all activities are conducted in accordance with this Work Plan and the contract requirements. Mr. Magdar will provide technical coordination with the MDE, EPA and EAG. The ARM Project Manager is responsible for managing all operations conducted for this project including:

- Ensure all personnel assigned to this project review the technical project plans before initiation of all tasks associated with the project.
- Review of project plans in a timely manner.
- Ensure proper methods and procedures are implemented to collect representative samples.
- Monitor the project budget and schedule and ensure the availability of necessary personnel, equipment, subcontractors, and other necessary services.

The lead ARM Geologist, Mr. Stewart Kabis, will be responsible for coordinating field activities including the collection, preservation, documentation and shipment of samples. Mr. Kabis will directly communicate with the ARM Project Manager and Laboratory Project Manager on issues pertaining to sample shipments, schedules, container requirements, and other necessary issues. Mr. Kabis is also responsible for ensuring the accuracy of sample documentation including the completion of the chain-of-custody (CoC) forms.

Pace Analytical Services, Inc. (PACE) of Greensburg, Pennsylvania will provide the analytical services for this project. The address for the laboratory is as follows:

Pace Analytical
1638 Roseytown Road
Greensburg, PA 15601

During the field activities, the Laboratory Project Manager will coordinate directly with the ARM Project Manager on issues regarding sample shipments, schedules, container requirements, and other field-laboratory logistics. The Laboratory Project Manager will monitor the daily activities of the laboratory, coordinate all production activities, and ensure that work is being

conducted as specified in this document. Ms. Samantha Bayura will be the Laboratory Project Manager for PACE on this project.

2.2. HEALTH AND SAFETY ISSUES

Because of the potential presence of metals, petroleum hydrocarbons and chlorinated hydrocarbons in the soil and groundwater at the Site, the investigation will be conducted under a site-specific Health and Safety Plan to protect investigation workers from possible exposure to contaminated materials. The site-specific HASP for Parcel B13 is provided as **Appendix D**.

Based on information provided to ARM, the planned site activities will be conducted under modified Level D personal protection. The requirements of the modified Level D protection are defined in ARM's site specific Health and Safety Plan. All field personnel assigned for work at the Site have been trained in accordance with the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response standard (29 CFR 1910.120) and other applicable OSHA training standards. All field staff will be experienced in hazardous waste site work, use of personal protective equipment (PPE), and emergency response procedures.

3.0 FIELD ACTIVITIES AND PROCEDURES

3.1. UTILITY CLEARANCE

ARM will take appropriate precautions to avoid subsurface utilities and structures during the site investigation. Prior to initiating any subsurface investigations, ARM will attempt to determine the location of utilities in the project area using the Miss Utility system. Additionally, any required state or local permits will be acquired prior to the commencement of site activities.

In addition to the Miss Utility system, EAG will clear each proposed boring with utility personnel currently working on the property. To facilitate this, ARM will locate with a GPS and mark all proposed boring locations in the field. ARM will coordinate the staking of borings in the field with Tradepoint Atlantic utility personnel to avoid conflicts. Historical utility drawings which may be relevant include the 5600 Set (Plant Water Lines) and 5800 Set (Plant Gas Lines).

3.2. SAMPLING PLAN

The purpose of this site characterization is to identify any existing hazardous conditions across the entire Site. A summary of the RECs and other areas of concern that will be investigated, along with the proposed boring identification number and the analyses being performed, has been provided as **Appendix C.**

This Work Plan presents the methods and protocols to be used to complete the site characterization. These methods and procedures follow the MDE-VCP and EPA guidelines. Information regarding the project organization, field activities and sampling methods, sampling equipment, sample handling and management procedures, the laboratory analytical methods and selected laboratory, quality control and quality assurance procedures, investigation-derived waste (IDW) management methods, reporting requirements are described in detail in the QAPP that has been developed to support the investigation and remediation of the Tradepoint Atlantic Site (Quality Assurance Project Plan, ARM Group Inc., October 2, 2015).

The proposed schedule of this investigation is contained in this work plan (Section 8.0). All site characterization activities will be conducted under the site-specific HASP (**Appendix D**).

3.3. SOIL INVESTIGATION

Soil samples will be collected from the locations identified on **Figures 3 through 8**, and in accordance with procedures referenced in the QAPP Worksheet 21 – Field SOPs (Standard Operating Procedures), SOP No. 009 – Sub-surface Soil Sampling. Regarding soil sampling depth, at each soil boring location, a shallow sample will be collected from the 0 to 1 foot depth interval, and a deeper sample will be collected from the 4 to 5 foot depth interval. One additional sample will also be collected from the 9 to 10 foot depth interval if groundwater has

not been encountered; however, these samples will be held by the laboratory pending the analysis of the 0 to 1 and 4 to 5 foot depth interval samples. If the PID or other field observations indicate contamination to exist at a depth greater than 3 feet bgs but less than 9 feet bgs, and is above the water table, the sample from the deeper 4-5 foot interval may be shifted to the depth interval indicated by the PID response. It should be noted that no soil samples will be collected from a depth that is below the water table.

After soil sampling has been concluded at a location, all down-hole soil sampling equipment will be decontaminated according to procedures referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 016 Equipment Decontamination. The decontamination procedures that will be used during the course of this investigation include Decontamination Area (Section 3.1 of the SOP), Decontamination of Sampling Equipment (Section 3.5), Decontamination of Measurement Devices & Monitoring Equipment (Section 3.7), Decontamination of Subsurface Drilling Equipment (Section 3.8), and Document and Record Keeping (Section 5).

All soil samples will be analyzed for TCL-VOCs, TCL-SVOCs, TAL-Metals, TPH-DRO, TPH-GRO, hexavalent chromium, and cyanide. Additionally, the shallow soil samples collected across the Site from the 0-1 foot bgs interval will also be analyzed for PCBs. Analytical methods, sample containers, preservatives, and holding times for the sample analyses are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

3.4. GROUNDWATER INVESTIGATION

For groundwater sampling points, temporary piezometers will be installed at the locations identified on **Figure 9** in accordance with the procedures referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 28 – Direct Push Installation and Construction of Temporary Groundwater Sample Collection Points. Sample locations where piezometers will be installed include: B13-001-PZ, B13-006-PZ, B13-021-PZ, B13-045-PZ, B13-047-PZ, B13-049-PZ, B13-059-PZ, B13-061-PZ, B13-066-PZ, B13-069-PZ, B13-076-PZ, and B13-078-PZ.

Groundwater samples will be collected from temporary piezometers in accordance with the procedures referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 6 – Groundwater Sampling. All groundwater samples will be analyzed for TCL-VOCs, TCL-SVOCs, TAL-Dissolved Metals, TPH-DRO, TPH-GRO, hexavalent chromium, and cyanide. Analytical methods, sample containers, preservatives, and holding times for the sample analyses are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

ARM will check each groundwater sampling point for the presence of NAPL (non-aqueous phase liquid) using an oil-water interface probe, in accordance with methods referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 19 – Depth to Groundwater and NAPL Measurements. The proposed sampling locations will also be surveyed to obtain groundwater

elevation data. The elevation data from these piezometers and wells will be used to create a groundwater contour map indicating groundwater flow direction.

Once each PVC piezometer has been sampled, surveyed and/or checked for NAPL, it will be emptied, removed and discarded. The boreholes will then be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36.

3.5. NAPL DELINEATION

3.5.1. Proposed Piezometers

As detailed above, each groundwater sampling location in this work plan will be checked for the presence of NAPL with an oil-water interface probe immediately after installation. If NAPL is not detected, no delineation activities will be necessary. In the event that measureable petroleum/NAPL is identified within a piezometer, another measurement will be made after a 30 day (minimum) equilibration period to determine NAPL thickness. The extent of the NAPL will be delineated by the installation of additional monitoring points with the same installation specifications (SOP No. 28 – Direct Push Installation and Construction of Temporary Groundwater Sample Collection Points). ARM will remobilize (following utility clearance) to install and inspect additional soil borings and shallow, temporary piezometers to the north, south, east, and west of the detection point at distances of 25 feet. Delineation piezometers will extend into adjacent parcels (if applicable) but will not be installed off of Tradepoint Atlantic property and will only be installed up to the edge of existing buildings. At each location, continuous core soil samples will be screened with a hand-held PID and inspected for evidence of NAPL, and the additional temporary piezometers will be installed to a final depth determined by ARM personnel.

Each additional piezometer installed to delineate the NAPL will be checked for the presence of product with an oil-water interface probe immediately after installation, 48 hours after installation, and again after a 30 day equilibration period. If measureable NAPL is identified within any of the piezometers, additional borings/piezometers will be added as necessary to complete the delineation. The MDE will be notified within 48 hours if NAPL is detected within the temporary piezometers. Once the MDE has given approval to abandon the delineation piezometers, each piezometer will be emptied, removed and discarded. All boreholes will be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36. A full report documenting the results of the delineation, including NAPL thickness, will be submitted to the MDE within 30 days of completing the field activities.

3.5.2. Proposed Soil Borings

In the event that NAPL bearing soils are identified in a soil boring, a temporary piezometer will be installed according to the specifications identified in SOP No. 28 – Direct Push Installation

and Construction of Temporary Groundwater Sample Collection Points. ARM will immediately check the piezometer for the presence of NAPL using an oil-water interface probe in accordance with methods referenced in the SOP No. 19 – Depth to Groundwater and NAPL Measurements. If NAPL is not detected, the piezometer will be allowed to equilibrate for at least 48 hours prior to a second measurement. If no measureable product is detected after 48 hours, the piezometer will be emptied, removed and discarded, and the borehole will be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36. If measureable NAPL is detected during either check, another measurement will be made after a 30 day (minimum) equilibration period to determine NAPL thickness.

If measureable NAPL is present in the initial piezometer, ARM will remobilize (following utility clearance) to install and inspect additional soil borings and shallow, temporary piezometers to the north, south, east, and west of the detection point at distances of 25 feet. Delineation piezometers will extend into adjacent parcels (if applicable) but will not be installed off of Tradepoint Atlantic property and will only be installed up to the edge of existing buildings. At each location, continuous core soil samples will be screened with a hand-held PID and inspected for evidence of NAPL, and the additional temporary piezometers will be installed to a final depth determined by ARM personnel.

Each additional piezometer installed to delineate the NAPL will be checked for the presence of product with an oil-water interface probe immediately after installation, 48 hours after installation, and again after a 30 day equilibration period. If measureable NAPL is present within any of the piezometers, additional borings/piezometers will be added as necessary to complete the delineation. The MDE will be notified within 48 hours if NAPL is detected within the temporary piezometers. Once the MDE has given approval to abandon the additional piezometers, each piezometer will be emptied, removed and discarded. All boreholes will be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36. A full report documenting the results of the delineation, including NAPL thickness, will be submitted to the MDE within 30 days of completing the field activities.

3.6. SAMPLE DOCUMENTATION

3.6.1. Sample Numbering

Samples will be numbered in accordance with the QAPP Appendix C – Data Management Plan.

3.6.2. Sample Labels & Chain-of-Custody Forms

Samples will be labeled and recorded on the Chain-of-Custody form in accordance with methods referenced in the QAPP Worksheet 26 & 27 – Sample Handling, Custody and Disposal.

3.7. LABORATORY ANALYSIS

EAG has contracted PACE of Greensburg, Pennsylvania to perform the laboratory analysis for this project. All sample analyses to be performed are listed in **Appendix A**. The samples will be submitted for analysis with a standard turnaround time (approximately 5 work days). The specific list of compounds and analytes that the soil samples will be analyzed for, as well as the quantitation limits and project action limits, is provided in QAPP Worksheet 15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

All samples will be collected using dedicated equipment including new soil core liners and polyethylene tubing. Each cooler temperature will be measured and documented by the laboratory upon receipt.

Quality control (QC) samples are collected during field studies for various purposes, among which are to isolate site effects (control samples), to define background conditions (background sample), and to evaluate field/laboratory variability (spikes and blanks, trip blanks, duplicates, etc.).

The following QC samples will be submitted for analysis to support the data validation:

- Trip Blank – at a rate of one per day
  - Soil – VOCs only
  - Water – VOCs only
- Blind Field Duplicate – at a rate of one duplicate per twenty samples
  - Soil – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, PCBs, Hexavalent Chromium, and Cyanide
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Hexavalent Chromium, and Cyanide
- Matrix Spike/Matrix Spike Duplicate – at a rate of one per twenty samples
  - Soil – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, PCBs, and Hexavalent Chromium
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, and Hexavalent Chromium
- Field Blank and Equipment Blank
  - Soil – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Hexavalent Chromium, and Cyanide
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Hexavalent Chromium, and Cyanide

The QC samples will be collected and analyzed in accordance with the QAPP Worksheet 12 – Measurement Performance Criteria, QAPP Worksheet 20 – Field Quality Control, and QAPP Worksheet 28 – Analytical Quality Control and Corrective Action.

5.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

All investigation derived waste (IDW) procedures will be carried out in accordance with methods referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 5 – Investigation-Derived Wastes Management.

6.0 **DATA VALIDATION**

All data validation procedures will be carried out in accordance with the QAPP Worksheet 34 – Data Verification and Validation Inputs, QAPP Worksheet 35 – Data Verification Procedures, and QAPP Worksheet 36 – Data Validation Procedures.

7.0 REPORTING

Following the receipt of all sampling results from "Area B Parcel B13", ARM will prepare a Phase II Site Investigation Report that will document the sample collection procedures and supporting rationale, and present and interpret the analytical results. All results will be presented in tabular and graphical formats as appropriate to best summarize the data for future use. The sample results will be compared against relevant criteria such as the MDE Generic Numeric Cleanup Standards and the EPA Regional Screening Levels, considering appropriate land use factors and institutional controls, to identify contaminants and exposure pathways of potential concern. ARM will also present recommendations for any additional site investigation activities if warranted.

8.0 SCHEDULE

The field activities below (including sample analysis and data validation) are planned so that they may be completed within six (6) months of agency approval of this Work Plan. In addition, the investigation report will be submitted to the regulatory authorities within two (2) months of completion of the field activities in accordance with these approximate timeframes:

- the sample collection activities will take approximately six (6) weeks to complete (including mobilization activities) once approval of the work plan is received;
- the soil and groundwater sample analysis, data validation and review is expected to require an additional 10 weeks to complete; and
- the preparation of the investigation report, including an internal Quality Assurance Review cycle, will require another six (6) weeks.

FIGURES

ARM Group Inc.
Earth Resource Engineers and Consultants

0 375 750 1,500 Feet

- Site Boundary
- Private Property
- Area A Boundaries
- Area B Boundaries

Tradepoint Atlantic
Area A and Area B Parcels

March 25, 2016

EnviroAnalytics Group	Tradepoint Atlantic
Area A: Project 150298M Area B: Project 150300M	Baltimore County, MD

Figure 1

ARM Group Inc.
Earth Resource Engineers and Consultants

0 375 750 1,500 Feet

Site Boundary
Area A Boundaries
Area B Boundaries
Land
Marsh
Water

Approximate Shoreline in 1916

March 25, 2016

Adapted from Figure 2-5 of the Description of Current Conditions Report prepared by Rust Environmental and Infrastructure, dated January 1998

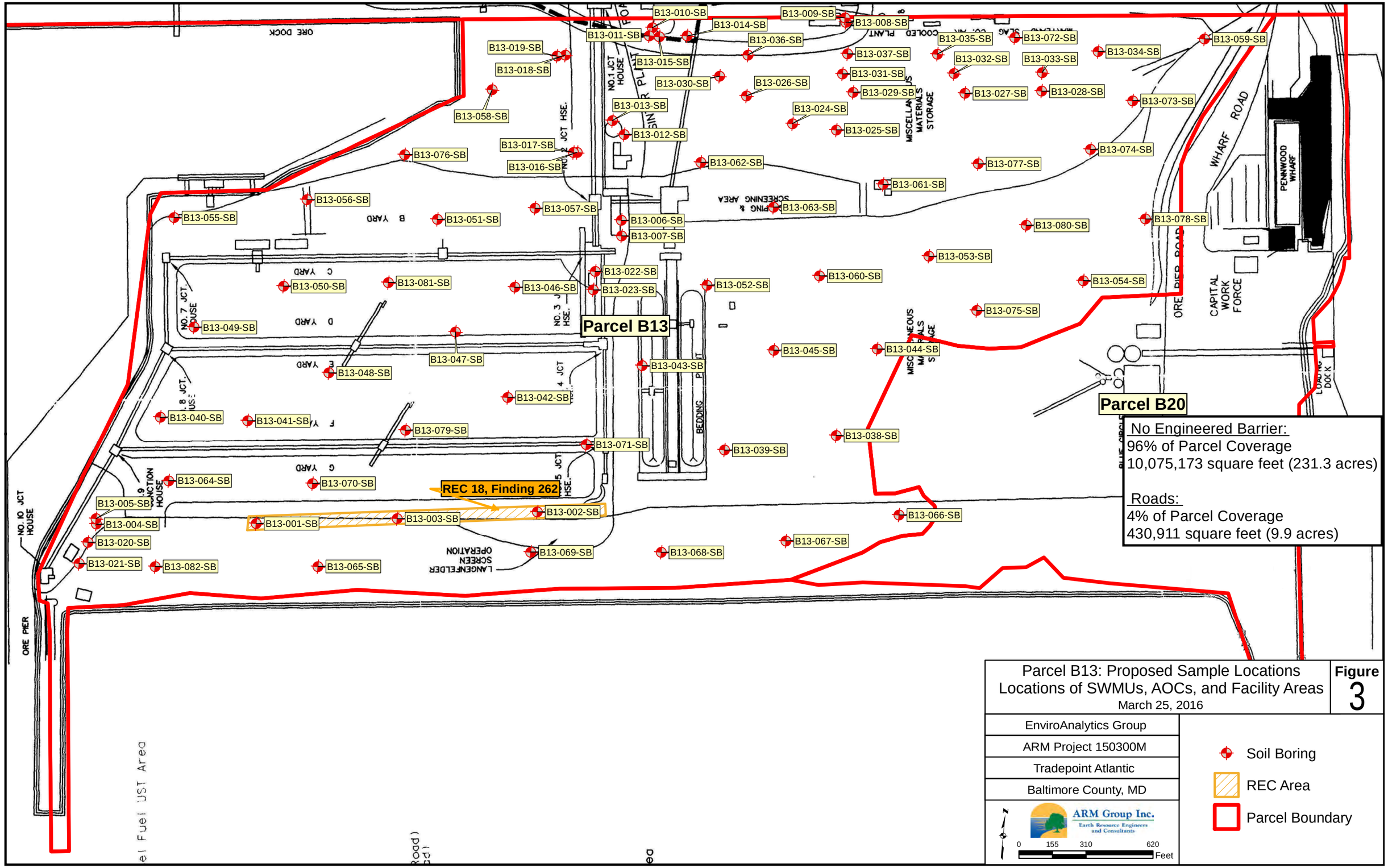
EnviroAnalytics Group

Area A: Project 150298M
Area B: Project 150300M

Tradepoint Atlantic

Baltimore County, MD

Figure 2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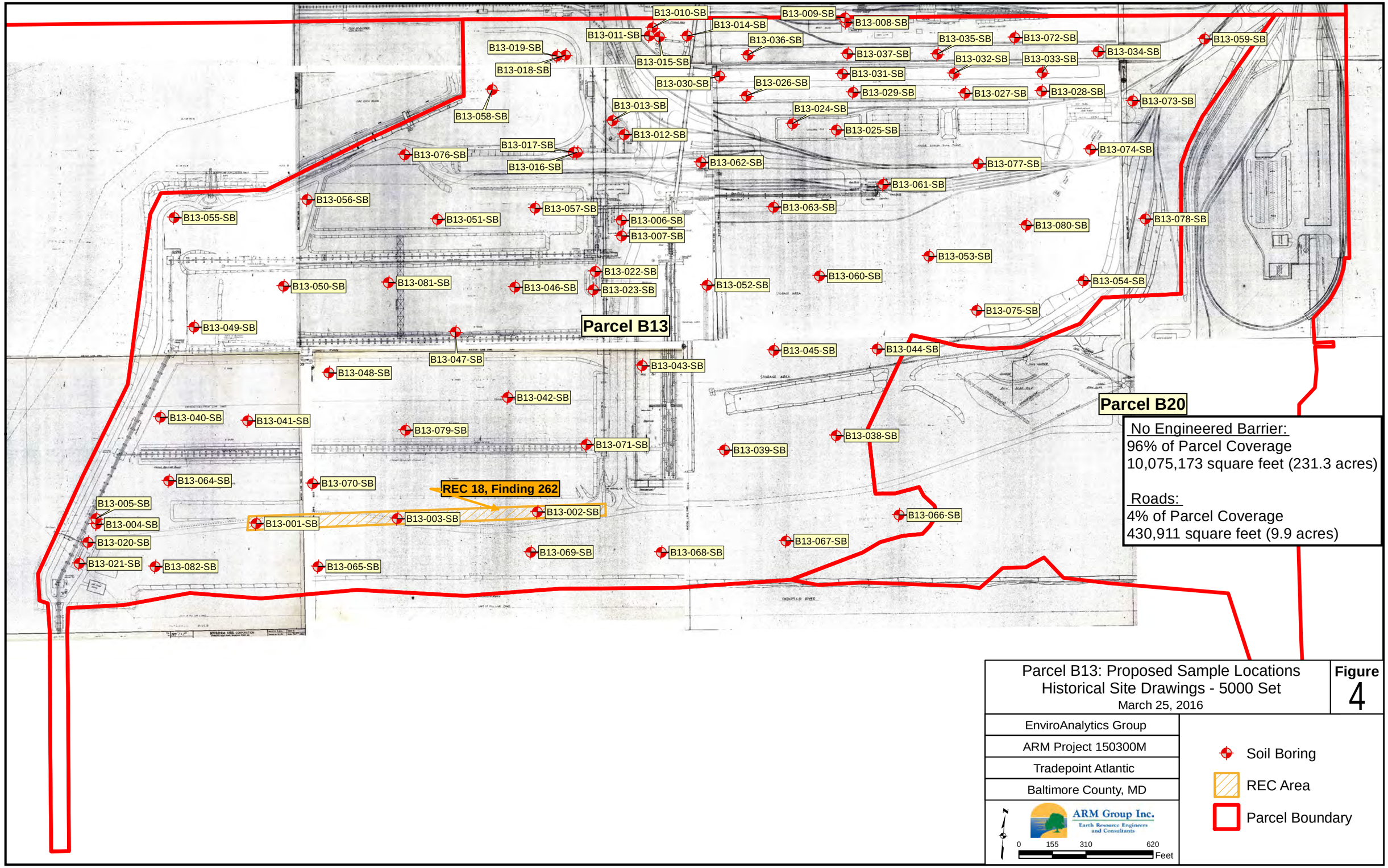
B13-069-SB
B13-068-SB
ORE PIER
WHARF ROAD
PENNWOOD WHARF
CAPITAL WORK FORCE
ORE PIER ROAD
No Engineered Barrier:
96% of Parcel Coverage
10,075,173 square feet (231.3 acres)
Roads:
4% of Parcel Coverage
430,911 square feet (9.9 acres)
Parcel B13: Proposed Sample Locations
Locations of SWMUs, AOCs, and Facility Areas
March 25, 2016
Figure 3
EnviroAnalytics Group
ARM Project 150300M
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 155 310 620
Feet
Soil Boring
REC Area
Parcel Boundary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REC 18, Finding 262
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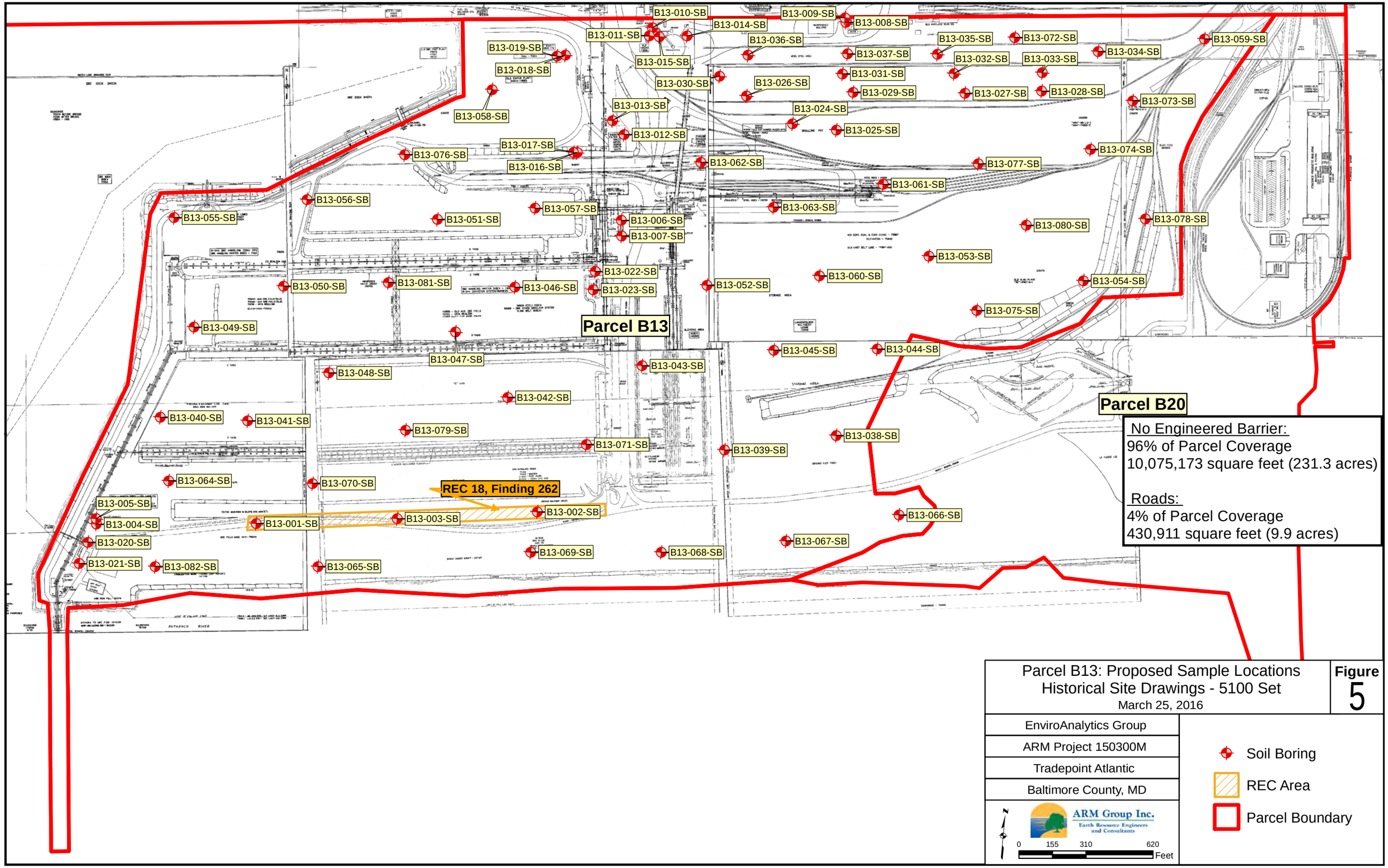
B13-082-SB
B13-065-SB
No Engineered Barrier:
96% of Parcel Coverage
10,075,173 square feet (231.3 acres)
Roads:
4% of Parcel Coverage
430,911 square feet (9.9 acres)
Parcel B13: Proposed Sample Locations
Historical Site Drawings - 5000 Set
March 25, 2016
Figure
4
EnviroAnalytics Group
ARM Project 150300M
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
155
310
620
Feet
Soil Boring
REC Area
Parcel Boundary



Parcel B13: Proposed Sample Locations
Historical Site Drawings - 5100 Set
March 25, 2016

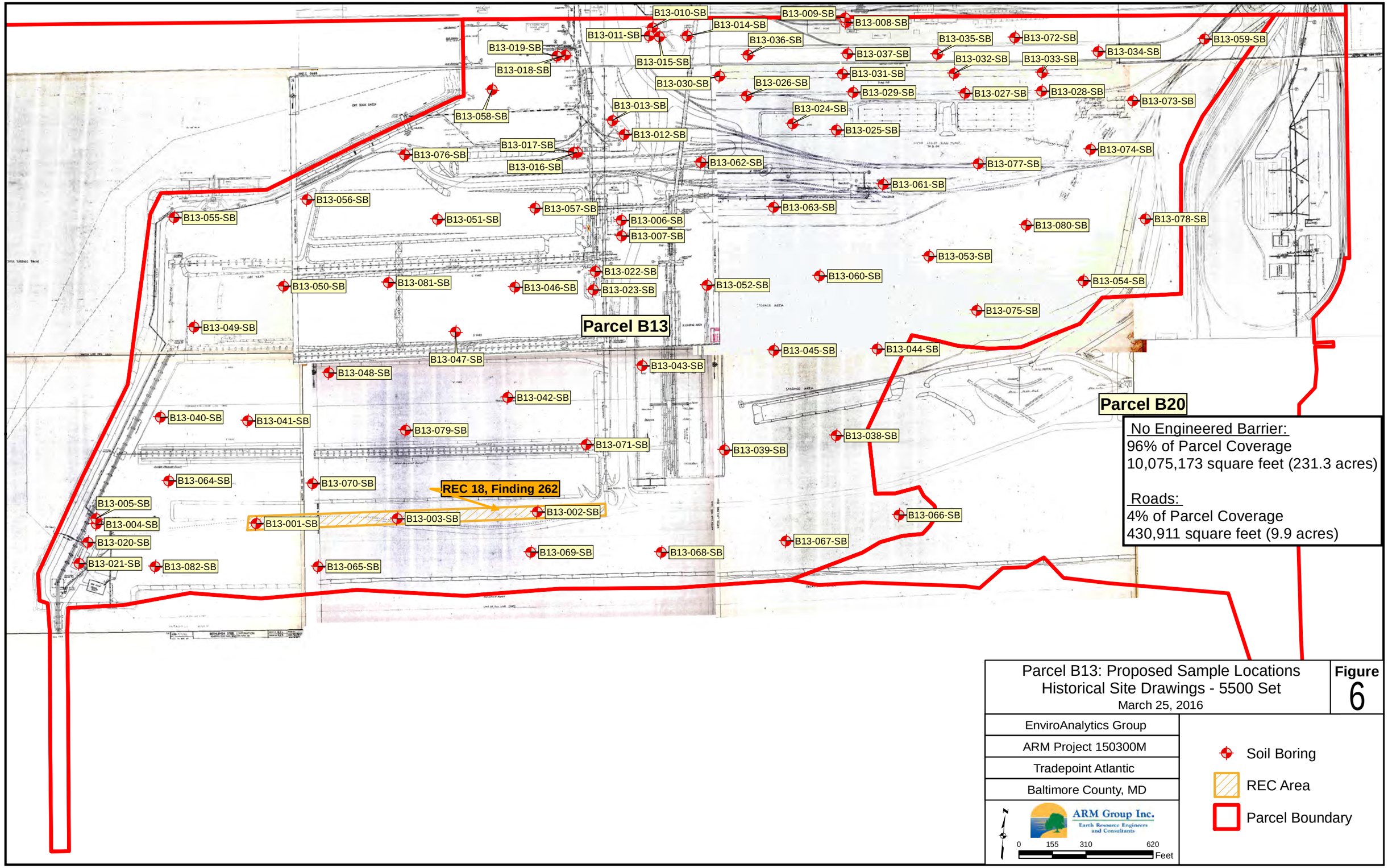
Figure 5

EnviroAnalytics Group
ARM Project 150300M
Tradepoint Atlantic
Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 155 310 620 Feet

Soil Boring
REC Area
Parcel Boundary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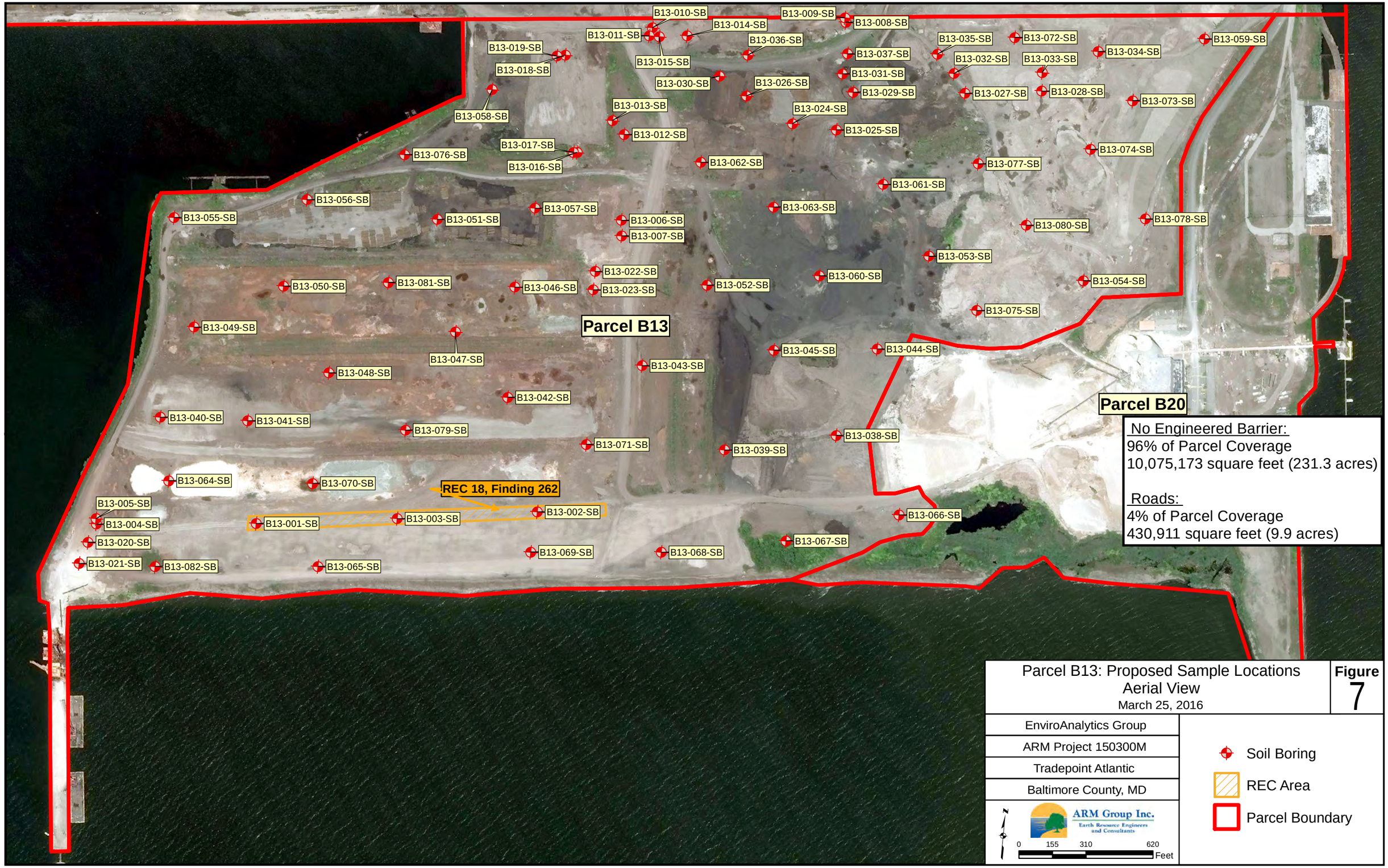
B13-065-SB
No Engineered Barrier:
96% of Parcel Coverage
10,075,173 square feet (231.3 acres)
Roads:
4% of Parcel Coverage
430,911 square feet (9.9 acres)
Parcel B13: Proposed Sample Locations
Historical Site Drawings - 5500 Set
March 25, 2016
Figure
6
EnviroAnalytics Group
ARM Project 150300M
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
155
310
620
Feet
Soil Boring
REC Area
Parcel Boundary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REC 18, Finding 262
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B13-020-SB
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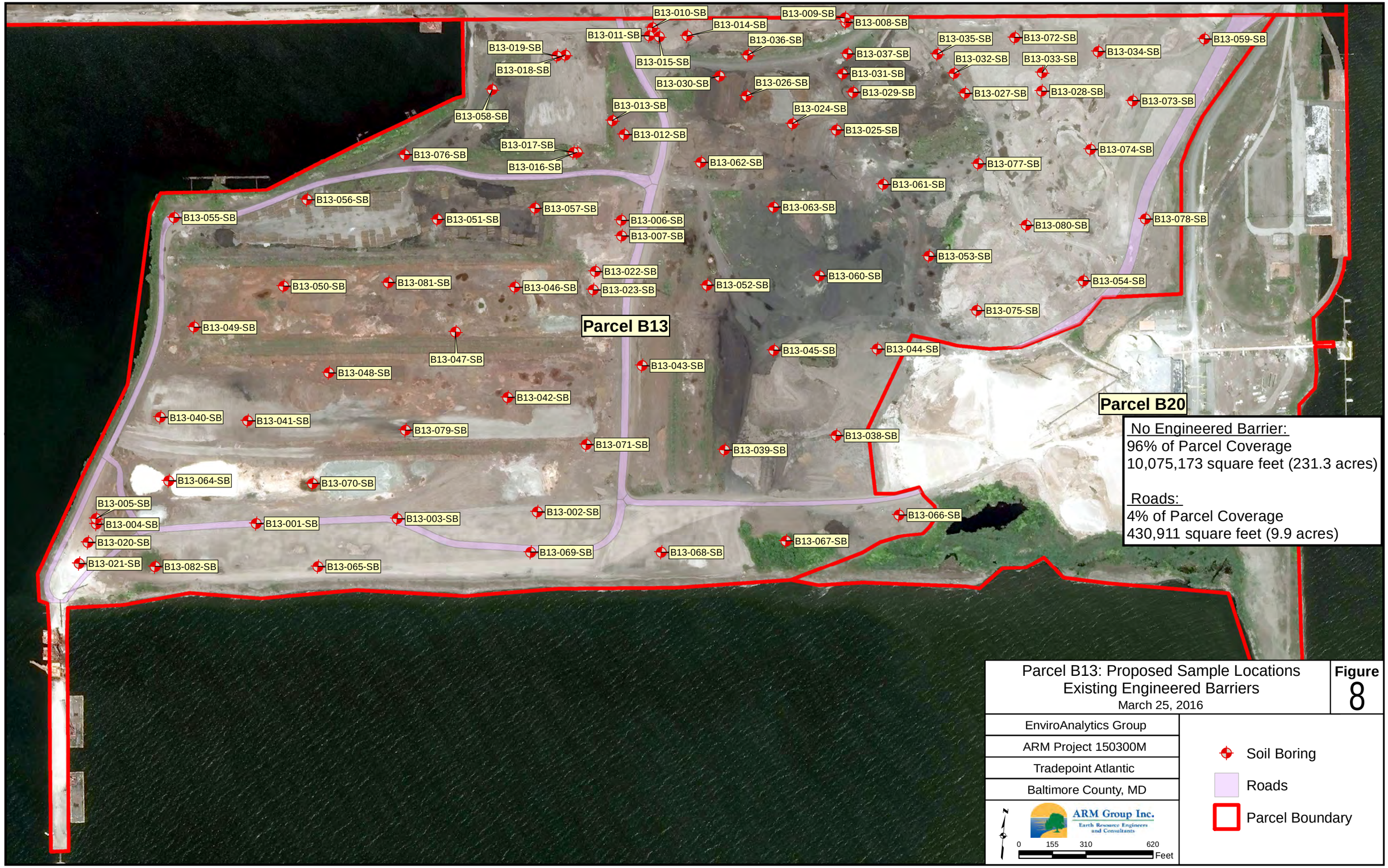
B13-021-SB
B13-082-SB
B13-065-SB
No Engineered Barrier:
96% of Parcel Coverage
10,075,173 square feet (231.3 acres)
Roads:
4% of Parcel Coverage
430,911 square feet (9.9 acres)
Parcel B13: Proposed Sample Locations
Aerial View
March 25, 2016
Figure
7
EnviroAnalytics Group
ARM Project 150300M
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
155
310
620
Feet
Soil Boring
REC Area
Parcel Boundary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B13-020-SB
B13-069-SB
B13-068-SB
B13-021-SB
B13-082-SB
B13-065-SB
No Engineered Barrier:
96% of Parcel Coverage
10,075,173 square feet (231.3 acres)
Roads:
4% of Parcel Coverage
430,911 square feet (9.9 acres)
Parcel B13: Proposed Sample Locations
Existing Engineered Barriers
March 25, 2016
Figure
8
EnviroAnalytics Group
ARM Project 150300M
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
155
310
620
Feet
Soil Boring
Roads
Parcel Boundary


B13-059-PZ
B13-076-PZ
B13-061-PZ
B13-006-PZ
B13-078-PZ
Parcel B13
B13-049-PZ
B13-047-PZ
B13-045-PZ
Parcel B20
No Engineered Barrier:
96% of Parcel Coverage
10,075,173 square feet (231.3 acres)
Roads:
4% of Parcel Coverage
430,911 square feet (9.9 acres)
B13-001-PZ
REC 18, Finding 262
B13-066-PZ
B13-069-PZ
B13-021-PZ
Parcel B13: Proposed Sample Locations
Proposed Piezometers - Aerial View
March 25, 2016
Figure
9
EnviroAnalytics Group
ARM Project 150300M
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
155
310
620
Feet
Piezometer
REC Area
Parcel Boundary

APPENDIX A

Parcel B13 Historical Well Data (Site-wide Wells)
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Well		Chemical Analyte	Sampling Date	Units	Result	
Shallow Zone	SW19-PZM007	Bicarbonate	12/18/2000	mg/L	2	U
	SW19-PZM007	Calcium	12/18/2000	mg/L	200	
	SW19-PZM007	Chloride	12/18/2000	mg/L	440	
	SW19-PZM007	Iron	12/18/2000	mg/L	0.1	
	SW19-PZM007	Magnesium	12/18/2000	mg/L	0.6	
	SW19-PZM007	Manganese	12/18/2000	mg/L	0.07	
	SW19-PZM007	Potassium	12/18/2000	mg/L	71	
	SW19-PZM007	Sodium	12/18/2000	mg/L	270	
	SW19-PZM007	Sulfate	12/18/2000	mg/L	390	
	SW19-PZM007	Total dissolved solids (TDS)	12/18/2000	mg/L	1500	
Intermediate Zone	SW19-PZM032	Bicarbonate	12/18/2000	mg/L	4	U
	SW19-PZM032	Calcium	12/18/2000	mg/L	210	
	SW19-PZM032	Chloride	12/18/2000	mg/L	1100	
	SW19-PZM032	Iron	12/18/2000	mg/L	0.2	
	SW19-PZM032	Magnesium	12/18/2000	mg/L	0.98	
	SW19-PZM032	Manganese	12/18/2000	mg/L	0.05	
	SW19-PZM032	Potassium	12/18/2000	mg/L	130	
	SW19-PZM032	Sodium	12/18/2000	mg/L	620	
	SW19-PZM032	Sulfate	12/18/2000	mg/L	370	
	SW19-PZM032	Total dissolved solids (TDS)	12/18/2000	mg/L	2600	

APPENDIX B

WELL INSPECTION FORM

Site: TradePoint Atlantic Location of Well: Parcel B13

ARM Representative: LMG Date: 2/17/16 Project Number:150300M-13-3

WELL INFORMATION

Well ID: SW19-PZM007 Well Permit No.: _____

Coordinates:

Latitude/Northing 561827.1 Longitude/Easting 1460970.1

Condition of pad and/or cover: NA Flush Mount or Stick-Up? Flush Mount

Well ID Marked? NA If yes, where? _____

Locking cap? NA Lock? _____ Diameter of Well: NA

Structural integrity of well: Could not locate well

WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	NA	
Depth to Bottom (feet BGS/TOC)	NA	32' BGS

Notes: BGS = below ground surface, TOC = top of casing

Additional Comments: Could not locate well

PICTURE OF WELL DURING INSPECTION

WELL INSPECTION FORM

Site: TradePoint Atlantic Location of Well: Parcel B13

ARM Representative: LMG Date: 2/17/16 Project Number:150300M-13-3

WELL INFORMATION

Well ID: SW19-PZM032 Well Permit No.: _____

Coordinates:

Latitude/Northing 561825.6 Longitude/Easting 1460964.1

Condition of pad and/or cover: NA Flush Mount or Stick-Up? Flush Mount

Well ID Marked? NA If yes, where? _____

Locking cap? NA Lock? _____ Diameter of Well: NA

Structural integrity of well: Could not locate well

WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	NA	
Depth to Bottom (feet BGS/TOC)	NA	57' BGS

Notes: BGS = below ground surface, TOC = top of casing

Additional Comments: Could not locate well

PICTURE OF WELL DURING INSPECTION

APPENDIX C

Parcel B13 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Table 1 - Soil Samples

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	RATIONALE	Number of Locations	Sample Locations	Boring Depth	Sample Depth*	Analytical Parameters: Soil Samples
Southern Slag Pile Demolition Debris	REC 18, Finding 262	REC Location Map	According to the Phase I report, slag piles along the southern property boundary were observed during the site visit to also contain unknown quantities of demolition or other debris. Based on this information, the potential for a material release which may impact the environment is present.	3	B13-001 through B13-003	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Oil Building/Oil House		Drawings 5003 and 5010	Investigate potential impacts related to oil storage buildings (potential leaks or releases).	4	B13-004 through B13-007	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Diesel Fuel Tanks		Drawing 5017	Investigate potential impacts related to large diesel fuel tanks (potential leaks or releases).	2	B13-008 and B13-009	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Tank (Unknown contents)		Drawing 5103	Investigate potential impacts related to tanks with unknown contents (potential leaks or releases).	2	B13-010 and B13-011	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Thickener Tanks		Drawings 5010 and 5103	Investigate potential impacts related to thickener tanks (potential leaks or releases).	4	B13-012 through B13-015	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Sump Pump		Drawing 5510	Investigate potential impacts related to sump pumps (potential leaks or releases).	2	B13-016 and B13-017	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Electric sub-station		Drawings 5003, 5010, and 5016	Investigate potential impacts related to electric sub-stations (potential leaks or releases).	6	B13-018 through B13-023	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')

Parcel B13 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	RATIONALE	Number of Locations	Sample Locations	Boring Depth	Sample Depth*	Analytical Parameters: Soil Samples
Skulling Pit (old car dumper)		Drawing 5011	Investigate potential impacts related to skulling pits (potential leaks or releases).	2	B13-024 and B13-025	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Slag Pits		Drawings 5011 and 5017	Investigate potential impacts related to slag pits (potential leaks or releases).	12	B13-026 through B13-037	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Parcel B13 Coverage			Investigate potential impacts related to any historical activities which may have occurred (potential leaks or releases).	45	B13-038 through B13-082	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
			Total:	82				

Soil Borings Sampling Density Requirements (from **Worksheet 17 - Sampling Design and Rationale**)
No Engineered Barrier (>100 acres): 1 boring per 3 acres with no less than 40.
Engineered Barrier (1-15 acres): 0.5 boring per acre with no less than 2.
No Engineered Barrier (231 acres) =**77 borings required, 77 proposed**
Engineered Barrier (10 acres) = **5 borings required, 5 proposed**
Parking/Roads (10 acres)
Buildings (0 acres)

VOCs - Volatile Organic Compounds (Target Compound List)
SVOCs - Semivolatile Organic Compounds (Target Compound List)
Metals - (Target Analyte List plus Hexavalent Chromium and Cyanide)
PCBs - Polychlorinated Biphenyls
DRO/GRO - Diesel Range Organics/Gasoline Range Organics
bgs - Below Ground Surface

Parcel B13 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Table 2 - Groundwater Samples

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	Condition of Existing Well	Number of Locations	Sample Locations	Boring Depth	Screen Interval	Analytical Parameters: Groundwater Samples†
Southern Slag Pile Demolition Debris	REC 18, Finding 262	REC Location Map	*N/A*	1	B13-001-PZ	Total depth of 7 feet below water table.	7 feet below water table to 3 feet above water table.	VOC, SVOC, Dissolved Metals, DRO/GRO
Oil House		Drawing 5010	*N/A*	1	B13-006-PZ	Total depth of 7 feet below water table.	7 feet below water table to 3 feet above water table.	VOC, SVOC, Dissolved Metals, DRO/GRO
Electric Sub-station		Drawing 5003	*N/A*	1	B13-021-PZ	Total depth of 7 feet below water table.	7 feet below water table to 3 feet above water table.	VOC, SVOC, Dissolved Metals, DRO/GRO
Parcel B13 Coverage			*N/A*	9	B13-045, B13-047, B13-049, B13-059, B13-061, B13-066, B13-069, B13-076, B13-078	Total depth of 7 feet below water table.	7 feet below water table to 3 feet above water table.	VOC, SVOC, Dissolved Metals, DRO/GRO
			Total:	12				

†Field measurements include pH, DO, ORP, conductivity, temperature.

APPENDIX D

Health and Safety Plan

Area B: Parcel B13
Tradepoint Atlantic
Sparrows Point, Maryland

Prepared for:
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Suite 230
Saint Louis, Missouri 63131

Prepared by:
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March 2016

ARM Project 150300M

Respectfully submitted,

Eric S. Magdar
Senior Geologist

T. Neil Peters
Vice President

TABLE OF CONTENTS

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared by ARM Group Inc. (ARM) to address personnel health and safety requirements for employees of ARM and its subcontractors to complete a Phase II investigation on a portion of the Tradepoint Atlantic property that has been designated as Parcel B13. The on-site activities may include the following: installation of soil borings, collection of soil samples, and installation and gauging of temporary piezometers. ARM will comply with industry-standard health and safety protocol and Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120 to prevent human exposure to volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), petroleum hydrocarbons, polychlorinated biphenyls (PCB) and metals that may be present in site soil and groundwater.

2.0 GENERAL INFORMATION

2.1 Site Description

Parcel B13, which is comprised of 243 acres of the approximately 3,100-acre former plant property, is located off of Sparrows Point Boulevard in Sparrows Point, Maryland. Parcel B13 is one of several parcels that make up a larger area, known as Area B, of the Tradepoint Atlantic facility. Area B and its parcels are shown on **Figure 1.**

From the late 1800s until 2012, the Tradepoint Atlantic property was used for the production and manufacturing of steel. Iron and steel production operations and processes at the Site included raw material handling, coke production, sinter production, iron production, steel production, and semi-finished and finished product preparation. In 1970, it was the largest steel facility in the United States, producing hot and cold rolled sheets, coated materials, pipes, plates, and rod and wire. The steel making operations at the facility ceased in fall 2012.

2.2 Site Hazards

The following is a general description of the potential site hazards.

Chemical Hazards:

- VOCs, SVOCs, PCBs, petroleum hydrocarbons, and metals potentially present in soil and groundwater.

Explosive Hazards:

- VOC and petroleum hydrocarbon vapors in boreholes, piezometers and collection containers.

Physical Hazards:

- Slipping/tripping in work area
- Stress/fatigue from heat or cold temperatures
- Traffic
- Driving on steep slopes and/or off-road conditions
- Insect and animal bites
- Hand tools

Mechanical/Electrical Hazards:

- Underground utilities
- Heavy equipment (Geoprobe)
- Noise from heavy equipment operations
- Power tools

2.3 Utilities

Prior to initiating any subsurface investigations, all underground utilities will be cleared using the Miss Utility system. Additionally, EnviroAnalytics Group (EAG) will clear each proposed boring with utility personnel currently working on the property. The ARM staff will be responsible for avoiding any above ground utilities while operating vehicles on the site.

2.4 Waste Management

A small quantity of investigation derived waste (IDW) material will be generated as a result of the planned site work. These wastes could include decontamination fluids, soil cuttings, personal protective equipment (PPE) and disposable sampling equipment. All IDW will be containerized in steel 55-gallon drums for on-site treatment or off-site disposal, pending the receipt of analytical results. Specific procedures associated with the management of the IDW have been established in SOP 005, attached in Appendix A of the EPA approved Quality Assurance Project Plan (QAPP).

2.5 Site Controls and Security

It is the responsibility of ARM staff to keep unauthorized personnel away from the work areas during site work. All equipment used at the site must be secured or taken off-site. Subsurface intrusions should be covered to reduce any hazard that may be posed. Traffic cones, caution tape, physical barriers, or other such means as necessary shall be used to ensure that no unauthorized work area entry occurs.

3.0 OPERATING PROCEDURES

3.1 Air Monitoring

Due to the nature of the site activities and materials potentially present at the site, no vapor hazards are expected. If discernable odors are noted in the breathing zone, then work will be temporarily suspended and air monitoring will be initiated using a PID or explosive gas indicator. If sustained vapor concentrations are measured at or above action levels in the breathing zone, work will immediately cease until such time as appropriate action is established. This action may require the upgrade of PPE or reevaluation of the need to proceed.

3.2 Personnel Protection

Personnel health and safety protection shall follow the guidelines provided by this HASP. Modifications to the HASP may be made by the field supervisor with the approval of the ARM Project Manager on a day-to-day basis as conditions change, based on existing conditions. Any necessary revisions must be fully documented by the field supervisor to include the specifics and rationalizations for the change.

It is anticipated that a modified Level D of personal protection will be appropriate for the anticipated site activities. PPE associated with this designated level of protection (Level D), as established by the USEPA, is listed in a later section. The PPE listed for this level of protection should be available to all personnel.

PPE will be stored in a clean, dry environment prior to it usage. Disposable equipment shall remain, in as much as possible, its original manufacturer's packaging to ensure its integrity. PPE that is assigned to a specific end user is subject to inspection by the supervisor at any time.

3.2.1 Determination of Level of Protection Requirements

The appropriate level of personnel protection must be established on the basis of ambient air monitoring responses. Air monitoring action levels should be consistent with the primary compounds of concern as listed in Table 3-1 (below). Appropriate action should be taken if total organic vapor air concentrations are sustained at a concentration equal to or greater than the PEL listed on Table 3-1.

Table 3-1

Substance	CAS #	OSHA PEL (ppm)	IDLH (ppm)
Benzene	71-43-2	10	500
Toluene	108-88-3	200	500
Ethyl benzene	100-41-4	100	800
Xylenes	1330-20-7	100	900
Naphthalene	91-20-3	10	250
Tetrachloroethylene	127-18-4	100	150
Trichloroethylene	79-01-6	100	1,000

Notes: ppm = parts per million
PEL = Permissible Exposure Limit
IDLH = Immediately Dangerous to Life or Health

This criterion will be applicable to all activities unless specific protection requirement for a certain task are addressed separately. As previously stated, it is anticipated that a modified Level D will be appropriate for the anticipated site activities; which requires a regular worker uniform, steel-toed safety shoes, hardhat, safety glasses and long pants. Level D will be considered the minimum protection level for all work on-site.

Respiratory protection against dust must also be considered during site work. The usage of dust respirators (high efficiency particulate air [HEPA] filters) or NIOSH P100 filter paired with a half-mask respirator will be determined by site conditions and judgment of the field supervisor. Sprinklers may be used to control dust during work activities.

3.2.2 Dermal Protection

In general, dermal protection levels will correspond with the respiratory protection level in use during an activity as described in other sections. For most activities on the site, Level D dermal protection will be adequate. When work tasks are such that a higher level of personal protection is required, dermal protection may be upgraded to coated Tyvek (Saranex) or chemical-resistant rain suit or Tyvek. This determination will be made by the ARM Field Supervisor as required.

Chemical and abrasion-resistant outer gloves and inner chemical-resistant disposable gloves would be required in the work zone to provide adequate protection of hands and assist in preventing transfer of contaminants. As much of the investigation may require handling of possibly contaminated equipment, groundwater, or soil, chemical-resistant gloves should be required for all on-site work with these materials. Various operations, which require dexterity and do not necessitate the abrasion-resistant feature of outer gloves, could be performed with the inner gloves only, at the direction of the ARM Field Supervisor.

3.2.3 Eye Protection

Since many volatile contaminants are capable of penetrating skin tissues, the eyes provide a potential route of entry into the body. Typically, volatile organic vapors will be detected in the air-monitoring program. Dust and air-borne particulates will be monitored visually and nuisance dust standards will be applied. If exceeded, dust masks will be donned. Eye protection, beyond the use of safety glasses, must correspond to the respiratory protection level.

3.3 Task-Related Personnel Protection

At a minimum, all workers are required to wear long pants, steel toed shoes and a sleeved shirt at all times. Additional PPE will be required on a task-specific basis.

3.3.1 Installation of Geoprobe Soil Borings and Piezometers, Soil Logging and Soil Sampling Activities

All personnel should wear the following:

- Long pants and sleeved shirt/vest (high visibility)
- Steel toe safety boots
- Safety glasses with side shields
- Hearing protection
- Chemical resistant gloves

3.4 Explosion Prevention

Due to the potential presence of flammable materials at the site, the following safety guidelines must be followed to prevent the possibility of explosion:

a. All monitoring equipment will be intrinsically safe or explosion-proof, if used in areas of possible explosive atmospheres.

b. A fire extinguisher, first-aid kit, and an eye wash station will be located at the site within a short distance of site work.

c. Any compressed gas cylinders or bottles will be stored safely as required by the OSHA regulations. In addition, metal barriers must be provided and installed between oxygen and acetylene bottles, extending above the height of the regulators. At the end of each work shift, regulators shall be removed and replaced with protective caps.

d. No explosives, whatsoever, shall be used or stored on the premises.

e. All cleaning fluids or solvents must be stored and transported in OSHA-approved safety containers.

f. Propane, butane, or other heavier-than-air gases shall not be transported onto or used on-site unless prior approval is obtained in writing from the Project Manager and the Facility Operator.

4.0 DECONTAMINATION PROCEDURES

Decontamination procedures will be used on some field tasks, but not all, completed at the site. All decontamination operations may be performed at the sampling location unless the level of PPE is upgraded. If the level of PPE is upgraded, all decontamination operations will be performed in a central decontamination area and supervised by the ARM Field Supervisor. If necessary, a decontamination corridor will be set up adjacent to the area and equipped with brushes, plastic bags, and drum storage. Disposable outerwear and contaminated disposable equipment will be collected for future disposal. The ARM Field Supervisor would be required to inspect PPE and clothing to determine if decontamination procedures were sufficient to allow passage into the staging area.

The following decontamination facilities, as a minimum, will be provided in the staging area:

a. Hand washing facilities

b. First-aid kit

c. Eye wash station

d. Fire extinguisher

Proper on-site decontamination procedures, the use of disposable outer clothing, and field wash of hands and face as soon as possible after leaving the decontamination corridor could effectively minimize the opportunity for skin contact with contaminants.

4.1 Personnel Decontamination Procedures

Decontamination procedures should be as follows:

Level D decontamination will consist of:

1. Potable water wash and potable water rinse of boots and outer gloves (if worn).

2. Drum all visibly impacted disposable clothing.

3. Field wash of hands and face.

4.2 Equipment Decontamination

All equipment decontamination will be completed in accordance with the procedures referenced in QAPP Worksheet 21—Field SOPs, SOP No. 016 Equipment Decontamination. The decontamination procedures that will be used during the course of this investigation include Decontamination Area (Section 3.1 of the SOP), Decontamination of Sampling Equipment

(Section 3.5), Decontamination of Measurement Devices & Monitoring Equipment (Section 3.7), Decontamination of Subsurface Drilling Equipment (Section 3.8), and Document and Record Keeping (Section 5).

Level D personnel protection is required during equipment decontamination.

5.0 EMERGENCY CONTINGENCY INFORMATION

Pertinent emergency telephone numbers are listed in Table 5-1. This information must be reviewed by and provided to all personnel prior to site entry.

Table 5-1
Emergency Telephone Numbers

Facility/Title	Telephone Number
Fire and Police	911
Ambulance	911
James Calenda, EnviroAnalytics Group	(314) 620-3056
Eric Magdar, ARM Manager	Office: (410) 290-7775 Cell: (301) 529-7140
Hospital – Johns Hopkins Bayview	(410) 550-0350

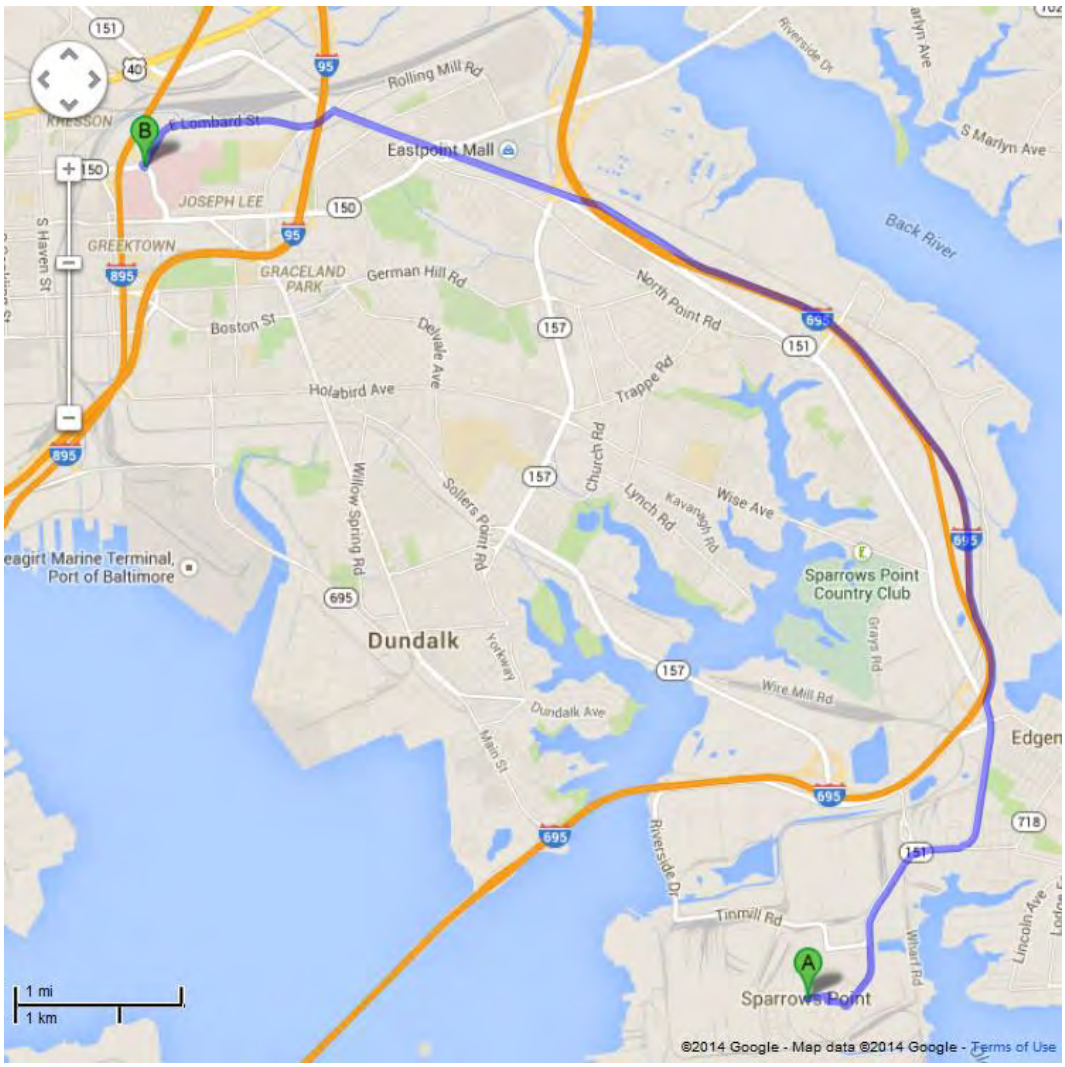
In the event of a fire or explosion, the site will be evacuated immediately and the appropriate emergency response groups notified. In the event of an environmental incident caused by spill or spread of contamination, personnel will attempt to contain the spread of contamination, if possible.

In the event of a personnel injury, emergency first aid would be applied on site by ARM as deemed necessary. The victim should be transported to the local medical facility if needed. The map to the hospital is provided below.

Hospital Route From Tradepoint Atlantic

Johns Hopkins Bayview
4940 Eastern Avenue
Baltimore, MD
(410) 550-0350

1. Start out going East on 7th Street.
2. Turn LEFT onto Sparrow Point Road.
3. Travel 1.4 miles and continue onto North Point Boulevard.
4. Travel 0.9 miles and turn slight right to merge onto I-695 North/Baltimore Beltway toward Essex.
5. Travel 3.4 miles and take EXIT 40 for MD-151/N. Pt. Blvd. N toward MD-150/East. Blvd W/Baltimore.
6. Travel 0.5 miles and merge onto MD-151 N/North Point Blvd.
7. Travel 2.0 miles and turn LEFT onto Kane Street.
8. Travel 0.2 miles and turn slight right onto E. Lombard Street.
9. Travel 1.2 miles and turn left onto Bayview Blvd.
10. Make a left at the emergency room of the hospital



6.0 ACKNOWLEDGEMENT OF PLAN

All site personnel are required to read and comply with the HASP. The following safety compliance affidavit should be signed and dated by each person directed to work on-site.

I have read this HASP and agree to conduct all on-site work in conformity with the requirements of the HASP. I acknowledge that failure to comply with the designated procedures in the HASP may lead to my removal from the site, and appropriate disciplinary actions by my employer.

Title and Company	Name	Signature	Date