

Phase II Investigation Work Plan

Area A: Parcel A10 Tradepoint Atlantic Sparrows Point, Maryland

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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 A, Parcel A10 (the Site). Parcel A10 is comprised of approximately 31.7 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

Site characterization of Parcel A10 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 A10 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 approximately 95% natural soils and 5% slag 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 (DCC) Report prepared by Rust Environmental and Infrastructure, dated January 1998). The eastern areas of the parcel were formerly occupied by several lumber storage buildings and sheds. A large Nelson Box Company facility was located directly south of the lumber storage areas, and is presumed to be the former consumer of these materials. The Nelson Box Company provided wood packaging to the Bethlehem Steel Tin Mill, beginning in 1921. They started operations by producing wood pallets, cable/wire reels, and industrial packaging products. Through the years, the company expanded its operations to produce crates, corrugated products, angleboard, and slipsheets, and more recently (post 1990) metal and plastic products. ARM personnel conducted a site-visit on January 5, 2016 for the purpose of identifying which buildings were currently intact. All of the large buildings associated with lumber storage and the Nelson Box Company have been recently demolished, although they still appear on recent aerial images. Several smaller buildings associated with the Maintenance of Way Yard (ATEC Storeroom and Shop, Office, and Repair Shop) still exist at the site. These buildings were observed from a distance due to a perimeter fence which had been installed at the site, but appeared vacant and unused. ARM personnel conducted an additional site-visit on March 2, 2016 to conduct building inspections of the remaining structures. Details and findings from this event are presented in Section 1.2.2.

Railways are located directly to the north of the parcel boundary, and several rails associated with the Maintenance of Way Yard formerly occupied the majority of the parcel area to the north and west. An office and small repair shop associated with the Maintenance of Way Yard were positioned adjacent to the rails, but no longer exist. A small wooded area occupies the central portion of the Site. There is no evidence that iron and steel work processes were completed within the boundary of the Parcel A10.

1.2.2. Building Inspections

ARM mobilized to the site on March 2, 2016 to conduct building inspections of the remaining structures in Parcel A10. During this site walk, ARM was able to access each of the four remaining structures (oil house, storeroom & shop, office & hazardous storage, and repair shop) and document findings. These structures are outlined on the site-specific figures included with this work plan, and a photographic log from this event is attached as **Appendix A**. Tradepoint Atlantic plans to demolish the remaining structures in Parcel A10 within the year. Due to this planned demolition, targeted soil borings (rather than building occupancy assessments) are appropriate to characterize structures.

The oil house was observed to be vacant and abandoned, with no evidence of recent activity. The storeroom & shop appeared to be used primarily for general storage including electrical and office equipment. At the time of inspection, one room was being used as a temporary office by Tradepoint Atlantic personnel. The office is currently being emptied, with an anticipated abandonment date near the end of May. The building labelled as office & hazardous storage was divided into two distinct sections. The northern half of the building was a vacant office space, with no evidence of recent activity. The southern half of the building housed several boilers. An above-ground storage tank (AST) just outside of the building is presumed to be a former fuel supply for the boilers. Although a hazardous materials label was placed on the external door to the boiler room, there was no evidence of current hazardous materials storage within the room. The main repair shop was vacant but contained a large amount of general equipment storage. Two sets of rails entered the repair shop from the north leading to the main repair floor. One subgrade structure (approximately 20' L x 4' W x 5' D) was present below the western set of rails. Despite being marked with exterior hazardous material labels, there was no evidence of current hazardous materials storage in the building and there were no observed ASTs.

Three fuel dispensers were located outside of the repair shop, with two pumps located at the northeast corner of the structure and one additional pump present to the east. ARM observed the presence of a concrete pad 35 feet southeast of the repair shop. Based on ARM's experience, a UST may be located below this pad, which has dimensions of approximately 15 by 30 feet. Two signs indicating gasoline and/or smoking warnings were installed on the chain-link fence directly behind the pad. No apparent manholes or UST fill pipes were noted. ARM Geophysics will mobilize to the site to confirm the presence/absence of the UST by screening the pad and open area to the south of the repair shop (**Figure 3**). The investigation will use EM61 metal detectors, utility and pipe locators, and ground penetrating radar (GPR). The UST will be targeted as part of this Work Plan (see Section 1.3). The MDE had identified a possible spill of de minimis quantities of PVC glue near a vent pipe at the southeastern corner of the repair shop (February 12, 2016). The spill location was revisited by ARM, and no PVC glue or odors were noted.

1.2.3. Background Environmental Data

There were three (3) existing groundwater wells identified within Parcel A10 which provided relevant historical data and were considered for inclusion in the sampling plan. SG06-PDM001 and SW05-PZM004 are located in the shallow hydrogeologic zone, and SW05-PZM039 is located in the intermediate zone. There are no existing groundwater wells in the lower hydrogeologic zone. Groundwater samples have been collected from these wells in the past (November 2000 to 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 B**. The data indicate that historical concentrations of both iron and manganese have

exceeded the Project Action Limits (PALs) in the intermediate well SW05-PZM039. No exceedances were evident in the shallow wells. ARM completed inspections of the existing wells to determine whether they were suitable for groundwater sampling. The well inspection forms are included as **Appendix C**. SG06-PDM001 was found to be in good structural condition and suitable for sampling, while the other wells were observed to be damaged and were excluded from the sampling plan. There is no historical soil or soil gas sampling data from this parcel.

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 (2) 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. Weaver Boos made the determination to identify a feature as a REC based on historical information, observations during the site visit, and prior knowledge and experience with similar facilities. All RECs were targeted with at least three (3) borings. Based on the review of historical documents and aerial images, REC boundaries are adjusted, as appropriate, from the original positions shown on the REC Location Map. Observations during ARM's site-visit on March 2, 2016 support the revised REC boundaries. The following RECs were identified within the Site boundaries:

Hazardous Materials Storage (REC 10A, Finding 240):

During the Phase I site visit by Weaver Boos, an ATEC building was observed to contain a hazardous materials storage room. The ATEC facility was formerly responsible for roll (locomotive) repairs. The identified building held several ASTs and containers, the condition of which could not be determined due to restricted access (building locks). An additional AST with a hazardous materials label was observed along the western exterior wall. It is unknown whether any leaks or spills occurred. The location of this building and the external AST were confirmed during the ARM building inspection fieldwork completed on March 2, 2016. The interior ASTs identified by Weaver Boos may have been steam boilers.

Large Historical AST (REC 10B, Finding 241):

A large circular structure appearing to be an AST surrounded by a berm was identified on historical aerial photography. Based on the size and location, it is reasonable that the AST may have contained petroleum products. The condition of the tank and berm, as well as the exact contents and spill/leak history, are unknown.

Maintenance of Way Yard UST (REC 12A, Finding 246):

The Maintenance of Way Yard located north of the ATEC facility was identified as containing a 12,000-gallon gasoline UST, listed as permanently out of service. Additionally, three fuel dispensers were observed outside of a building in the yard. It is unknown whether the dispensers were associated with the UST, or if they had underground piping which may have leaked or spilled. The locations of the fuel dispensers were confirmed by the ARM building inspection fieldwork completed on March 2, 2016. Soil borings have been located to target the areas containing fuel pumps. ARM also noted the presence of a concrete pad which may overly the fuel tank. Signs located on the fence adjacent to the pad indicated that the UST likely contained gasoline. The pad was targeted by a soil boring and piezometer, but this location may be adjusted based on the findings of a preliminary geophysics investigation. This investigation will screen the concrete pad and other open areas near the repair shop to determine the location of the UST if it still exists. It is unknown whether this UST has been abandoned in place or removed. There was no information regarding this tank given in the Closure of Underground Storage Tanks Report prepared by Geraghty & Miller, Inc. dated June 1992. An additional soil boring is also located within the main repair shop in the center of the repair floor, as requested by the MDE (adjacent to the single subgrade structure). The spill of de minimis quantities of PVC glue noted by the MDE was also targeted with a dedicated soil boring. A total of five soil borings have been proposed within the REC 12A boundary area, inclusive of the repair shop.

Following the identification and evaluation of all RECs at the Site, SWMUs and Areas of Concern (AOCs) were identified from the DCC Report Figure 3-1. **Figure 4** 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 additional Findings, SWMUs, or AOCs that were identified at the Site, and no additional units were identified from the DCC Report Table 3-1.

Following the investigation 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. The drip legs drawings did not provide coverage of Parcel A10, but based on the positions of other drip legs and known paths of coke gas lines it is highly unlikely that any drip legs were present within the parcel boundary. **Figures 5 through 7** 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 A10 Historical Site Drawings Details				
<u>Set Name</u>	<u>Typical Features Shown</u>	<u>Drawing Number</u>	<u>Original Date Drawn</u>	<u>Latest Revision Date</u>
Plant Arrangement	Roads, water bodies, building/structure footprints, electric lines, above-ground pipelines (e.g.: steam, nitrogen, etc.)	5047	1/17/1966	3/11/1958
		5047-A	1/17/1966	3/11/1982
		5052	6/30/1959	3/11/1982
		5052-A	1/17/1966	3/11/1982
Plant Index	Roads, water bodies, demolished buildings/structures, electric lines, above-ground pipelines	5147	<i>Unknown</i>	11/10/2008
		5147-A	<i>Unknown</i>	11/10/2008
		5152	<i>Unknown</i>	2/25/2008
		5152-A	<i>Unknown</i>	2/27/2008
Plant Sewer Lines	Same as above plus trenches, sumps, underground piping (includes pipe materials)	5547	9/16/1959	3/15/1976
		5547-A	4/13/1976	6/13/1989
		5552	9/16/1959	3/9/1976
		5552-A	2/22/1962	12/15/1987
Drip Legs	Coke Oven Gas Drip Legs Locations	N/A	N/A	N/A

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: Boiler House, Incinerator, Machine Shop, Maintenance of Way Repair Shop, Oil House, and Pump House/Foamite Building. The MDE has requested additional boring locations in the Main Repair Shop Interior, Lumber Storage Warehouse, and Nelson Box Company Building. The full list of sampling targets, along with the specific rationale for sampling each, is provided as **Appendix D**.

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 A10 contains a total of approximately 31.7 acres: 17.0 acres without engineered barriers and 14.6 acres with engineered barriers (roads, parking, and building slabs). In accordance with the relevant sampling density requirements, a minimum of 15 soil boring locations are required in the area without engineered barriers, and a minimum of 8 soil boring locations are required in the area with engineered barriers. A total of 15 borings have been proposed in areas without engineered barriers and a total of 18 borings have been proposed in areas with barriers. **Figure 8**

shows the proposed borings on an aerial image to indicate the boring locations with regard to physical obstructions and landmarks.

Tradepoint Atlantic has developed an initial master plan for the entire site that shows potential future development areas across the entire Tradepoint Atlantic property. This master plan is a working document and it is expected to undergo subsequent revisions in the future. In its current iteration, the plan shows that 100% of the total area within Parcel A10 is proposed for development. This development area may not require full paving coverage and may be limited to a smaller area than is currently indicated. Thus the existing engineered barriers are appropriate for determining the boring density requirements for the Site, and are more conservative. **Figure 9** shows the current and future (proposed) engineered barriers within Parcel A10.

Groundwater in the parcel will be investigated using temporary installed groundwater monitoring points (piezometers), as well as the existing well SG06-PDM001 in the shallow hydrogeologic zone. **Figure 10** shows the proposed groundwater samples on an aerial image.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1. PROJECT PERSONNEL

The site characterization of Area A Parcel A10 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 (HASP) to protect investigation workers from possible exposure to contaminated soil and groundwater. The parcel specific HASP is included as **Appendix E**.

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 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 areas that will be investigated, along with the proposed boring identification number and the analyses being performed, has been provided as **Appendix D**.

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 Health and Safety Plan (**Appendix E**).

3.3. SOIL INVESTIGATION

Soil samples will be collected from the locations identified on **Figures 4 through 9**, 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, 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 set of samples 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 to 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

There is one (1) existing well present within the boundaries of Parcel A10 which will be included in the sampling plan (SG06-PDM001). For additional sampling points, temporary piezometers will be installed at the locations identified on **Figure 10** 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: A10-002-PZ, A10-010-PZ, A10-015-PZ, A10-018-PZ, A10-020-PZ, A10-021-PZ, A10-024-PZ, A10-025-PZ, A10-027-PZ, A10-029-PZ, and A10-034-PZ. Proposed piezometers are located within each defined REC area, and are otherwise located to provide parcel coverage.

Groundwater samples will be collected from temporary piezometers and the existing well SG06-PDM001 in accordance with the procedures referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 6 – Groundwater Sampling. Because it has been years since the existing well has been sampled, it will be redeveloped according to procedures referenced in Worksheet 21 – Field SOPs, SOP No. 018 – Well Development. After redevelopment, ARM will record the depth to bottom in the well again to compare to the recorded original drilled depth. 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 piezometer 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 piezometers will also be surveyed to obtain groundwater elevation data. The elevation data from these piezometers 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 D**. 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 and groundwater 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 soil and groundwater 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 - VOC, SVOC, 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 A Parcel A10”, 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 sampling 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 three (3) 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 eight (8) 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	<ul style="list-style-type: none"> ■ Site Boundary Private Property Area A Boundaries Area B Boundaries 	Tradepoint Atlantic Area A and Area B Parcels March 2, 2016	EnviroAnalytics Group Area A: Project 150298M Area B: Project 150300M	Tradepoint Atlantic Baltimore County, MD	Figure 1
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Image courtesy of USGS Earthstar Geographics SIO © 2016 Microsoft Corporation © 2010 NAVTEQ © AND Chesapeake

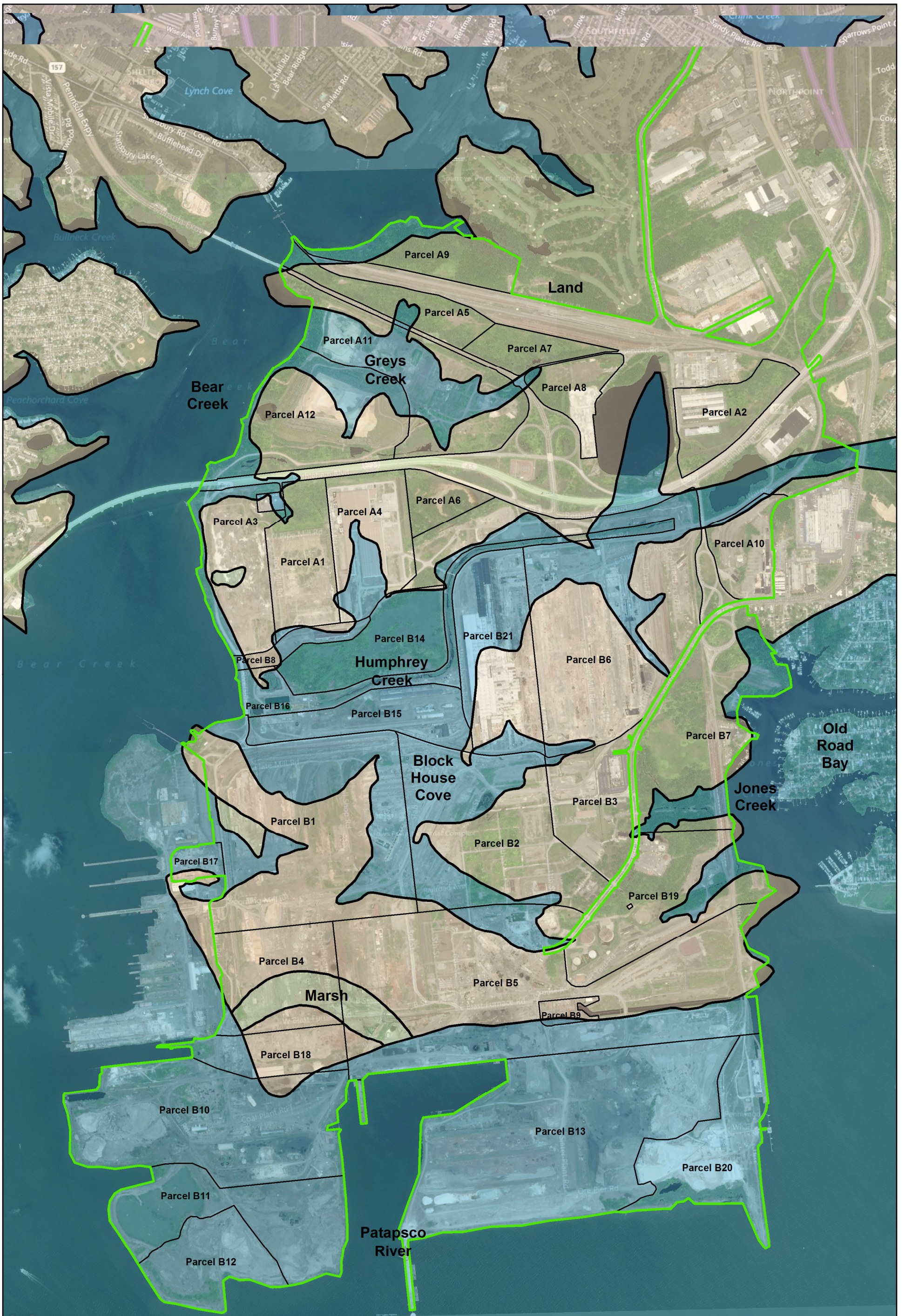







	Image courtesy of USGS Earthstar Geographics SIO © 2016 Microsoft Corporation © 2016 HERE © AND		Approximate Shoreline in 1916 March 2, 2016		EnviroAnalytics Group	Tradepoint Atlantic	Figure 2
			Adapted from Figure 2-5 of the Description of Current Conditions Report prepared by Rust Environmental and Infrastructure, dated January 1998		Area A: Project 150298M Area B: Project 150300M	Baltimore County, MD	




 **ARM Group Inc.**
Earth Resource Engineers
and Consultants

0 12.5 25 50
Feet

-  Concrete Pad
-  Screening Area
-  Building Footprint

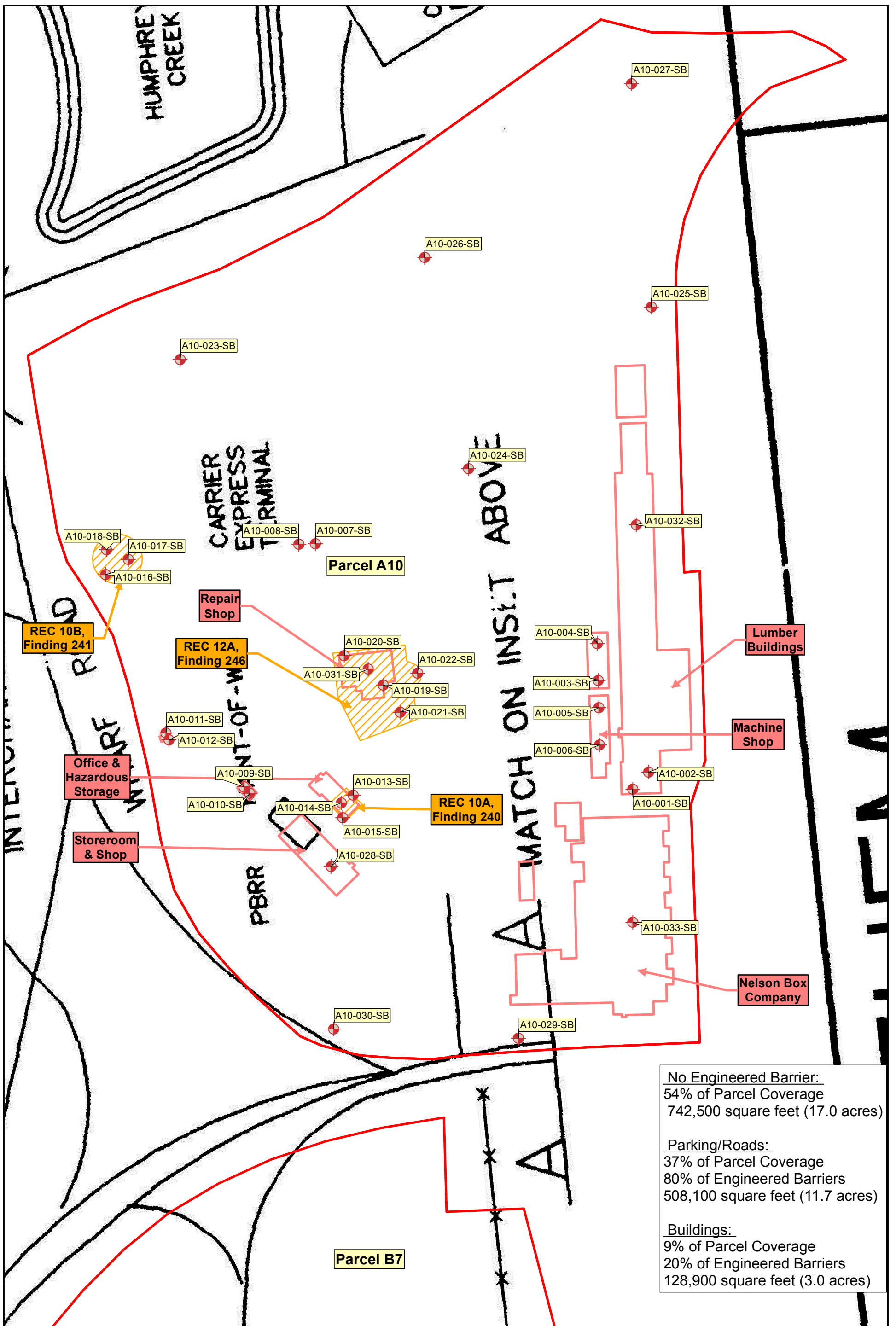
Parcel A10: Proposed Geophysics Investigation
Aerial View

April 20, 2016

EnviroAnalytics Group
ARM Project 150298M-5

Tradepoint Atlantic
Baltimore County, MD

Figure
3



No Engineered Barrier:
 54% of Parcel Coverage
 742,500 square feet (17.0 acres)

Parking/Roads:
 37% of Parcel Coverage
 80% of Engineered Barriers
 508,100 square feet (11.7 acres)

Buildings:
 9% of Parcel Coverage
 20% of Engineered Barriers
 128,900 square feet (3.0 acres)

ARM Group Inc.
 Earth Resource Engineers
 and Consultants

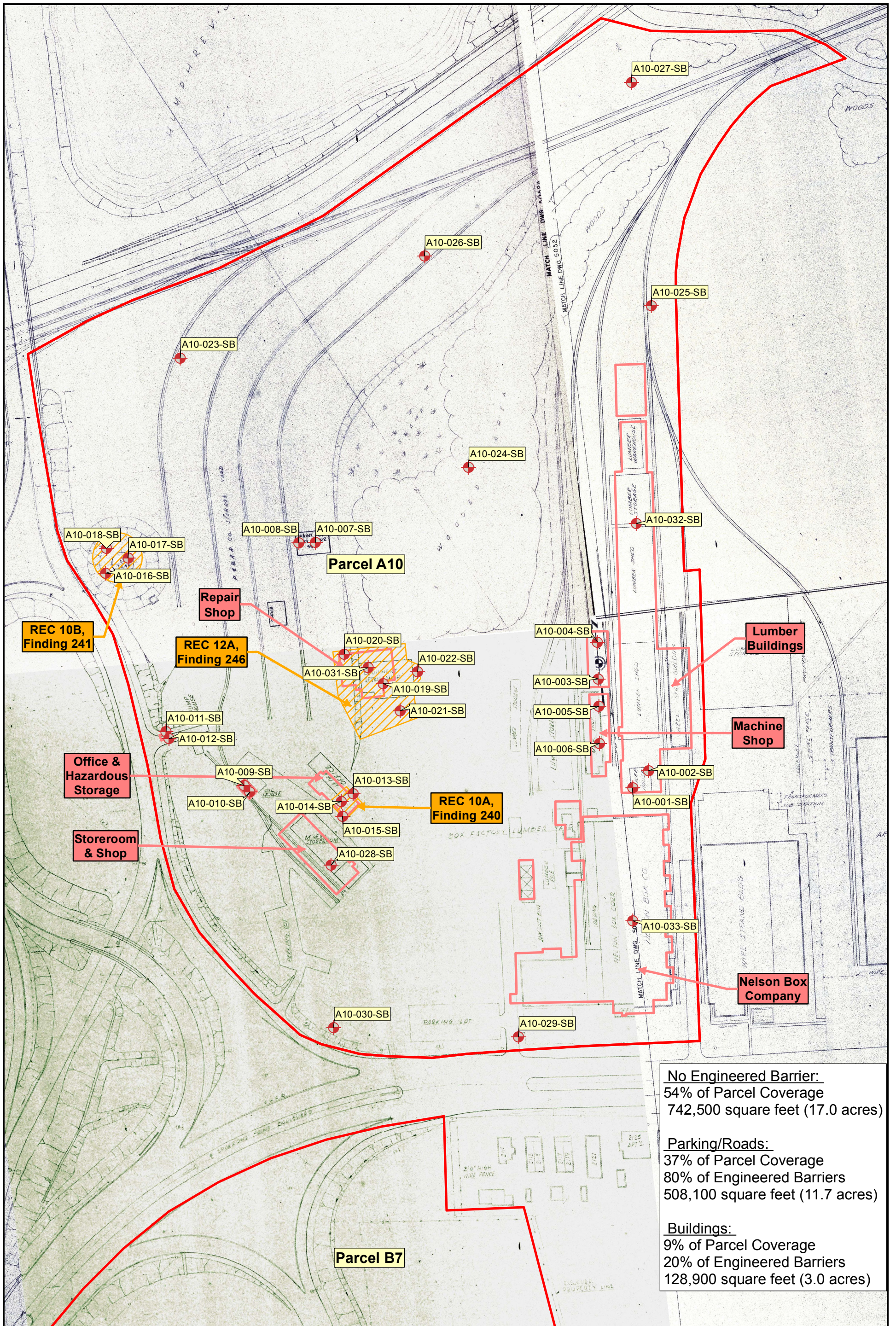
0 50 100 200
 Feet

- Soil Borings
- Building Footprints
- A10 REC Areas
- Parcel Boundary

**Parcel A10: Proposed Borings
 Locations of SWMUs, AOCs
 and Facility Areas**
 April 20, 2016

EnviroAnalytics Group
 ARM Project 150298M-5

Tradepoint Atlantic
 Baltimore County, MD



No Engineered Barrier:
 54% of Parcel Coverage
 742,500 square feet (17.0 acres)

Parking/Roads:
 37% of Parcel Coverage
 80% of Engineered Barriers
 508,100 square feet (11.7 acres)

Buildings:
 9% of Parcel Coverage
 20% of Engineered Barriers
 128,900 square feet (3.0 acres)

ARM Group Inc.
 Earth Resource Engineers
 and Consultants

0 50 100 200
 Feet

- Soil Borings
- Building Footprints
- A10 REC Areas
- Parcel Boundary

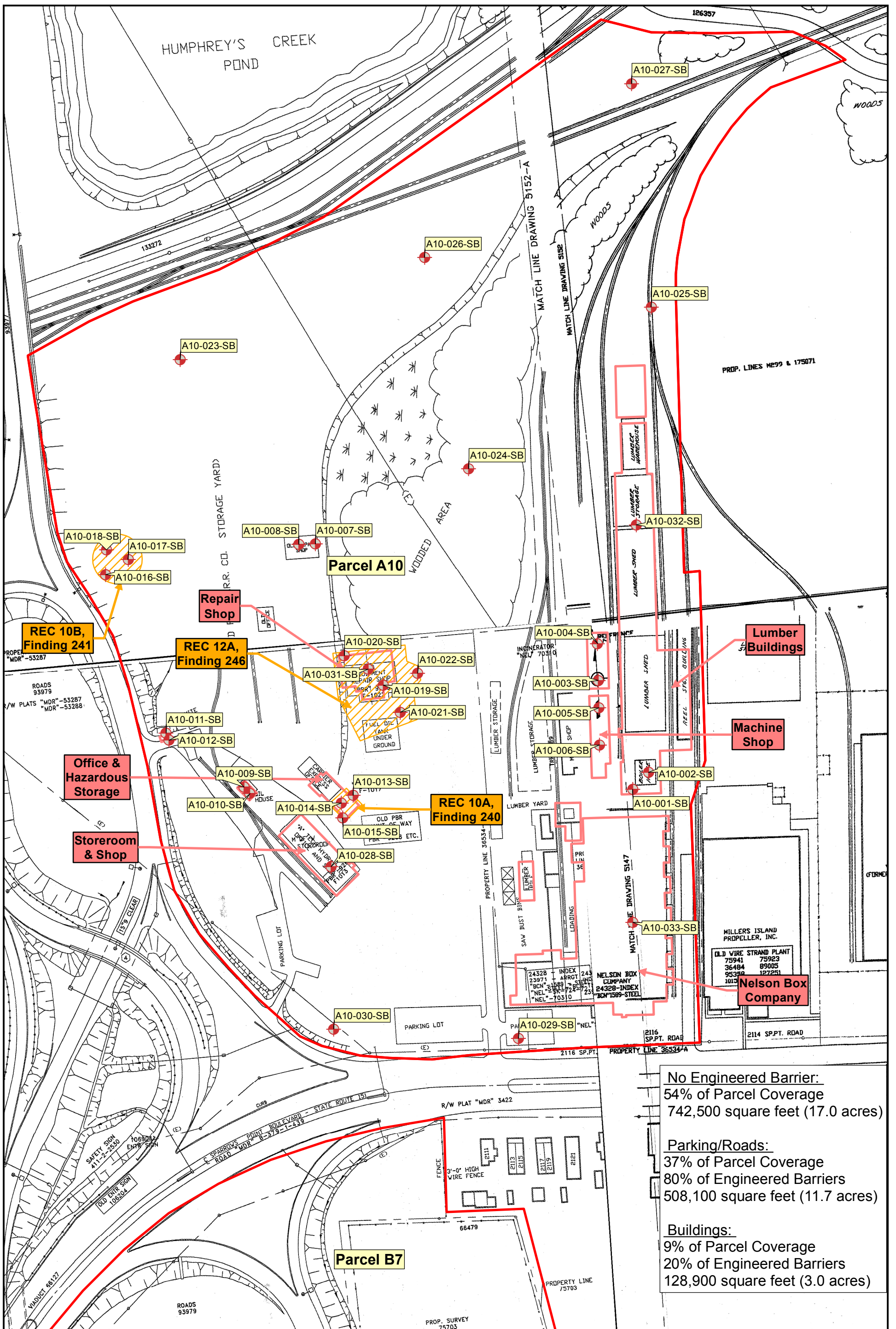
Parcel A10: Proposed Borings
 Historical Site Drawings - 5000 Set

April 20, 2016

EnviroAnalytics Group
 ARM Project 150298M-5

Tradepoint Atlantic
 Baltimore County, MD

Figure
5



No Engineered Barrier:
 54% of Parcel Coverage
 742,500 square feet (17.0 acres)

Parking/Roads:
 37% of Parcel Coverage
 80% of Engineered Barriers
 508,100 square feet (11.7 acres)

Buildings:
 9% of Parcel Coverage
 20% of Engineered Barriers
 128,900 square feet (3.0 acres)

ARM Group Inc.
 Earth Resource Engineers
 and Consultants

0 50 100 200 Feet

- Soil Borings
- Building Footprints
- A10 REC Areas
- Parcel Boundary

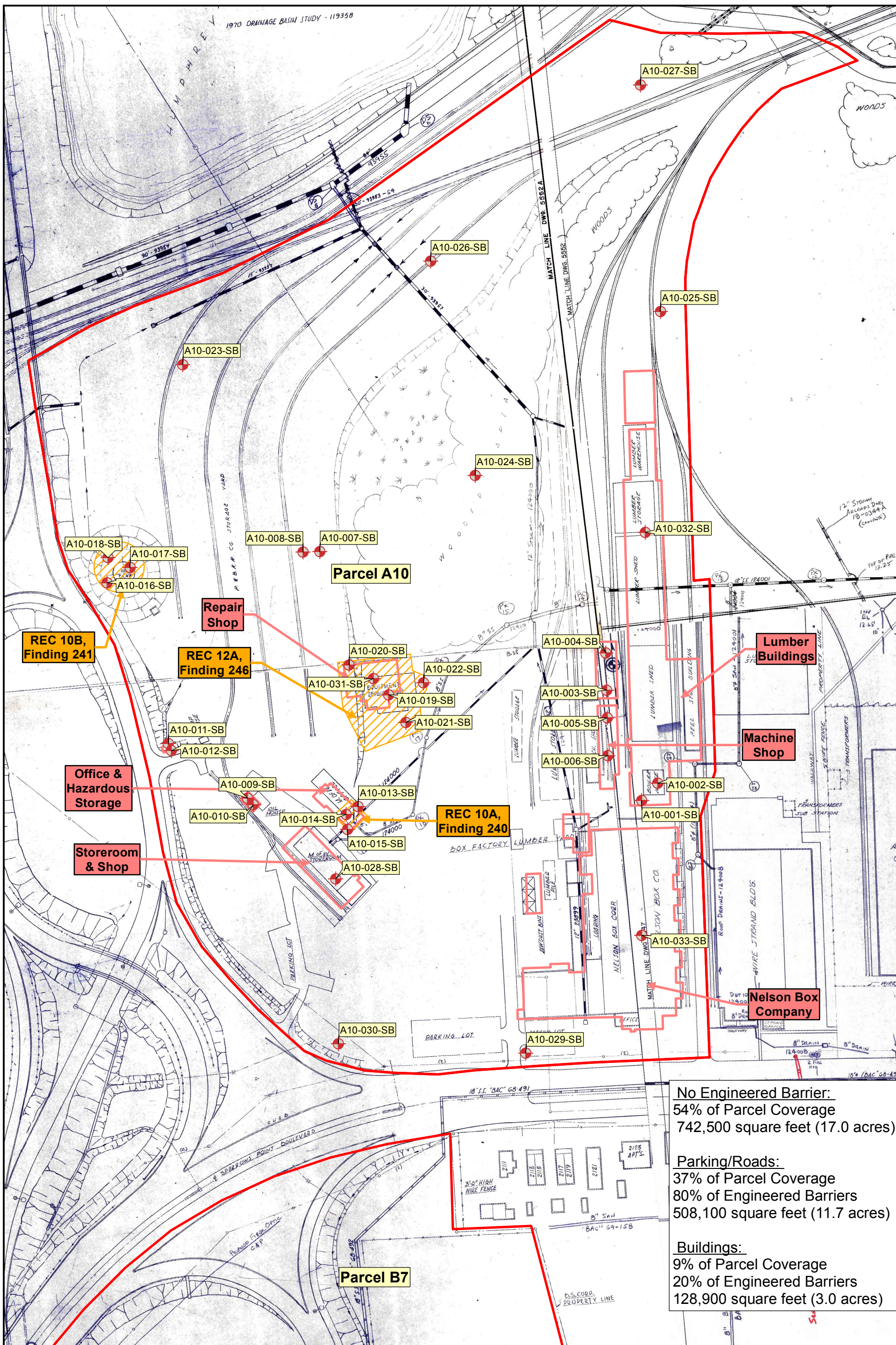
Parcel A10: Proposed Borings
Historical Site Drawings - 5100 Set

April 20, 2016

EnviroAnalytics Group
 ARM Project 150298M-5

TradePoint Atlantic
 Baltimore County, MD

Figure
6



No Engineered Barrier:
 54% of Parcel Coverage
 742,500 square feet (17.0 acres)

Parking/Roads:
 37% of Parcel Coverage
 80% of Engineered Barriers
 508,100 square feet (11.7 acres)

Buildings:
 9% of Parcel Coverage
 20% of Engineered Barriers
 128,900 square feet (3.0 acres)

ARM Group Inc.
 Earth Resource Engineers
 and Consultants

0 50 100 200 Feet

- Soil Borings
- Building Footprints
- A10 REC Areas
- Parcel Boundary

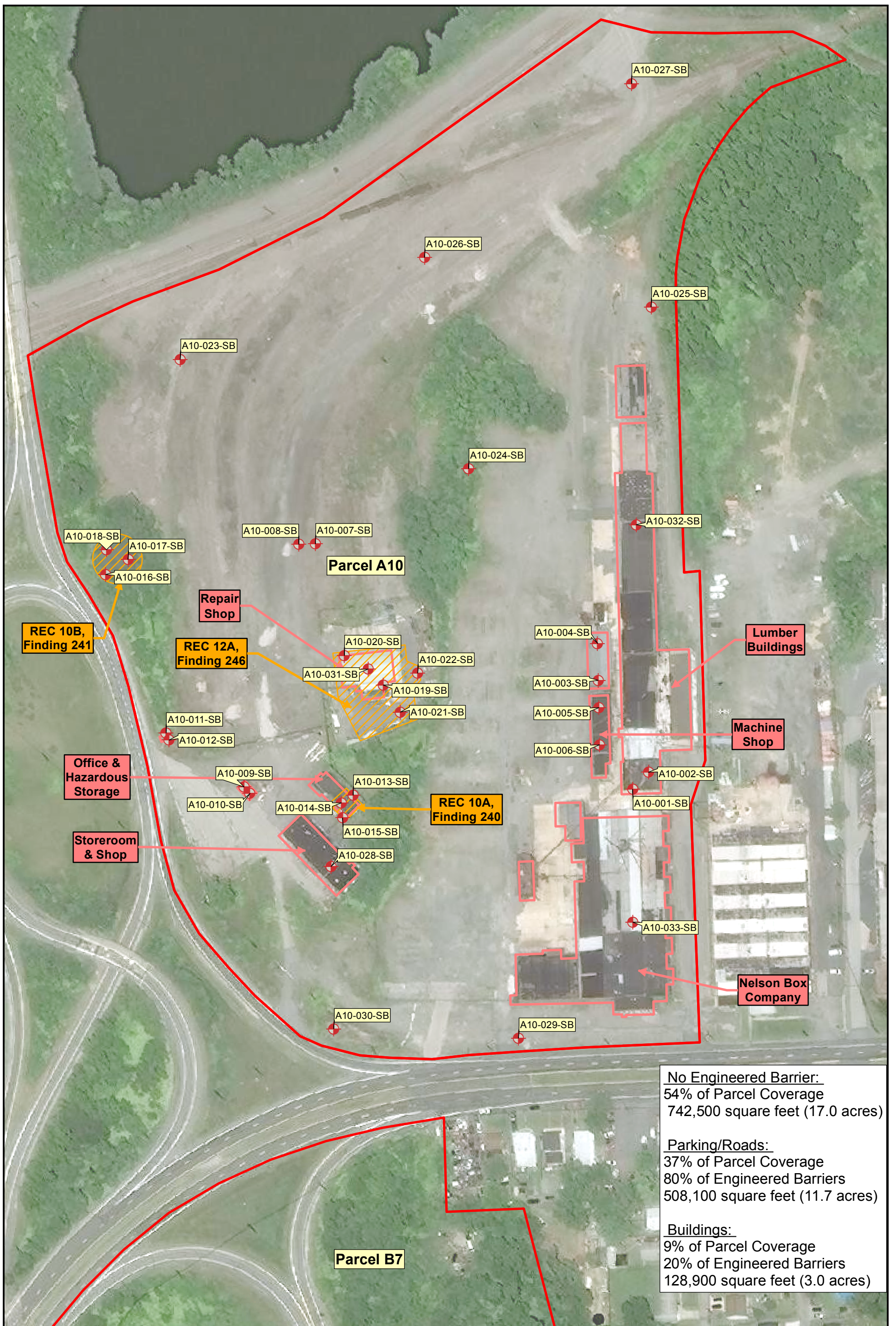
Parcel A10: Proposed Borings
 Historical Site Drawings - 5500 Set

April 20, 2016

EnviroAnalytics Group
 ARM Project 150298M-5

Tradepoint Atlantic
 Baltimore County, MD

Figure
7



No Engineered Barrier:
 54% of Parcel Coverage
 742,500 square feet (17.0 acres)

Parking/Roads:
 37% of Parcel Coverage
 80% of Engineered Barriers
 508,100 square feet (11.7 acres)

Buildings:
 9% of Parcel Coverage
 20% of Engineered Barriers
 128,900 square feet (3.0 acres)

ARM Group Inc.
 Earth Resource Engineers
 and Consultants

0 50 100 200
 Feet

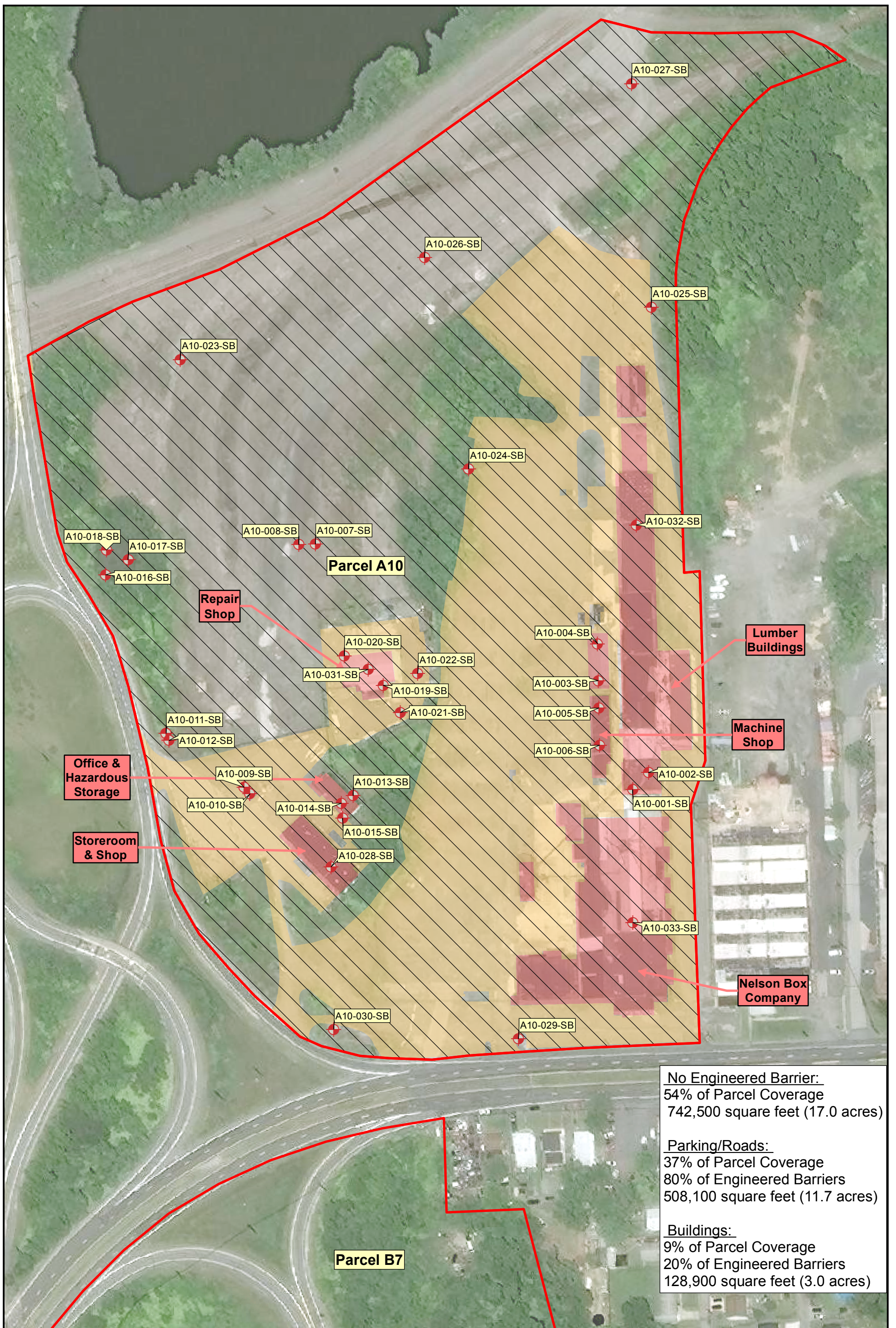
- Soil Borings
- Building Footprints
- A10 REC Areas
- Parcel Boundary

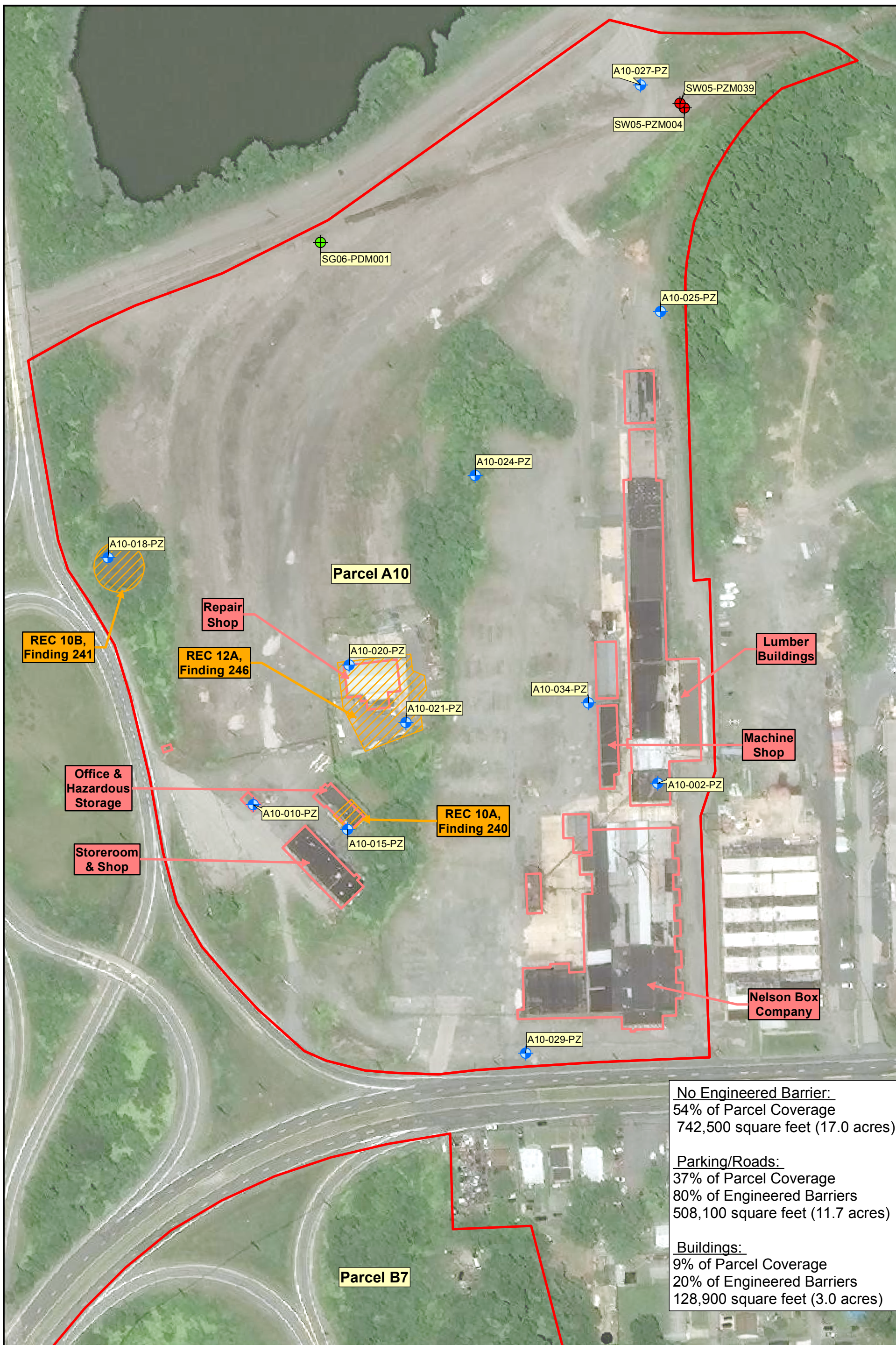
**Parcel A10: Proposed Borings
 Aerial View**

April 20, 2016

EnviroAnalytics Group
 ARM Project 150298M-5

Tradepoint Atlantic
 Baltimore County, MD





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APPENDIX A

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Parcel A10 Building Inspections Photographic Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



030216-1: Oil House. Interior view of vacant building, facing southwest.



030216-2: Storeroom & Shop. Interior office room with generic storage, facing south.



030216-3: Storeroom & Shop. Main room with generic storage (primarily electrical equipment), facing southeast.

Parcel A10 Building Inspections Photographic Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



030216-4: : Storeroom & Shop. Main room with generic storage (primarily electrical equipment), facing northwest.



030216-5: Office & Hazardous Storage. Interior office room (northern end) with generic storage, facing northeast.



030216-6: Office & Hazardous Storage. Interior room with generic storage , facing northwest.

Parcel A10 Building Inspections Photographic Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



030216-7: Office & Hazardous Storage. Interior room with generic storage , facing north.



030216-8: Office & Hazardous Storage. Exterior view of boiler room (southern end) with hazardous label, facing northeast.



030216-9: Office & Hazardous Storage. Exterior view of boiler room fuel AST, facing east.

Parcel A10 Building Inspections Photographic Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



030216-10: Office & Hazardous Storage. View of boilers/steam pipes, facing southeast. No hazardous materials noted.



030216-11: Repair Shop. Exterior view of shop building, facing southeast.



030216-12: Repair Shop. Exterior view of shop building, facing west. Noted location of fuel pump.

Parcel A10 Building Inspections Photographic Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



030216-13: Repair Shop. Exterior view of covered pad with generic storage, facing south. Noted location of fuel pumps.



030216-14: Repair Shop. Exterior view with hazardous label, facing west. Former location of PVC glue spill.



030216-15: Repair Shop. Exterior view of bay doors with rails (2 sets) leading into the shop, facing southeast.

Parcel A10 Building Inspections Photographic Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



030216-16: Repair Shop. View of concrete pad located southeast of main shop, facing south. Possible fuel UST location.



030216-17: Repair Shop. View from side of concrete pad towards main shop building, facing northeast.

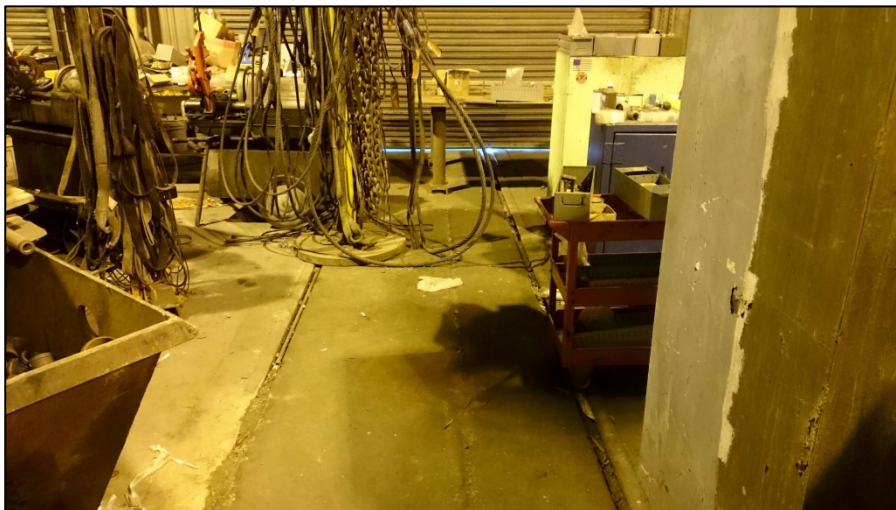


030216-18: Repair Shop. View of gasoline and no smoking signs located on fence above concrete pad, facing south.

Parcel A10 Building Inspections Photographic Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



030216-19: Repair Shop. Interior view of bay doors and generic storage, facing northwest. No hazardous materials noted.



030216-20: Repair Shop. Interior view of middle bay doors/rails, facing north. Noted floor drain in center (not shown).



030216-21: Repair Shop. Interior view of western bay doors/rails with repair pit below floor level, facing north.

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APPENDIX B

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Parcel A10 Historical Well Data
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Well	Chemical Analyte	CAS #	Sampling Date	Detection Limit	Units	Project Action Limit (PAL)	Result	
Shallow Zone	SG06-PDM001	Bicarbonate	71-52-3	11/10/2000	2	mg/L	No PAL	2 U
	SG06-PDM001	Calcium	7440-70-2	11/10/2000	0.5	mg/L	No PAL	70
	SG06-PDM001	Chloride	16887-00-6	11/10/2000	1	mg/L	No PAL	46
	SG06-PDM001	Iron	7439-89-6	11/10/2000	0.1	mg/L	14	0.1 U
	SG06-PDM001	Magnesium	7439-95-4	11/10/2000	0.1	mg/L	No PAL	0.1 U
	SG06-PDM001	Manganese	7439-96-5	11/10/2000	0.01	mg/L	0.43	0.01
	SG06-PDM001	Potassium	7440-09-7	11/10/2000	0.1	mg/L	No PAL	18
	SG06-PDM001	Sodium	7440-23-5	11/10/2000	0.5	mg/L	No PAL	50
	SG06-PDM001	Sulfate	14808-79-8	11/10/2000	10	mg/L	No PAL	260
	SG06-PDM001	Total dissolved solids (TDS)	TDS	11/10/2000	10	mg/L	No PAL	410
Shallow Zone	SW05-PZM004	Bicarbonate	71-52-3	12/12/2000	1	mg/L	No PAL	78
	SW05-PZM004	Calcium	7440-70-2	12/12/2000	0.5	mg/L	No PAL	21
	SW05-PZM004	Chloride	16887-00-6	12/12/2000	1	mg/L	No PAL	3.2
	SW05-PZM004	Iron	7439-89-6	12/12/2000	0.1	mg/L	14	1.7
	SW05-PZM004	Magnesium	7439-95-4	12/12/2000	0.1	mg/L	No PAL	19
	SW05-PZM004	Manganese	7439-96-5	12/12/2000	0.01	mg/L	0.43	0.03
	SW05-PZM004	Potassium	7440-09-7	12/12/2000	0.1	mg/L	No PAL	1.4
	SW05-PZM004	Sodium	7440-23-5	12/12/2000	0.5	mg/L	No PAL	5.3
	SW05-PZM004	Sulfate	14808-79-8	12/12/2000	2	mg/L	No PAL	40
	SW05-PZM004	Total dissolved solids (TDS)	TDS	12/12/2000	10	mg/L	No PAL	180
Intermediate Zone	SW05-PZM039	Bicarbonate	71-52-3	12/12/2000	1	mg/L	No PAL	1.5
	SW05-PZM039	Calcium	7440-70-2	12/12/2000	0.5	mg/L	No PAL	12
	SW05-PZM039	Chloride	16887-00-6	12/12/2000	2	mg/L	No PAL	140
	SW05-PZM039	Iron	7439-89-6	12/12/2000	0.1	mg/L	14	18
	SW05-PZM039	Magnesium	7439-95-4	12/12/2000	0.1	mg/L	No PAL	12
	SW05-PZM039	Manganese	7439-96-5	12/12/2000	0.01	mg/L	0.43	2.4
	SW05-PZM039	Potassium	7440-09-7	12/12/2000	0.1	mg/L	No PAL	2.8
	SW05-PZM039	Sodium	7440-23-5	12/12/2000	0.5	mg/L	No PAL	55
	SW05-PZM039	Sulfate	14808-79-8	12/12/2000	1	mg/L	No PAL	13
	SW05-PZM039	Total dissolved solids (TDS)	TDS	12/12/2000	10	mg/L	No PAL	310

Highlighted values indicate PAL exceedances.

APPENDIX C

WELL INSPECTION FORM

Site: Sparrows Point: Area A Location of Well: Parcel A10, between railroad tracks

Project Number: 150298M Date: 12/9/2015

WELL INFORMATION

Well ID: SG06-PDM001 Well Permit No.: _____

Coordinates:

Latitude/Northing 572030.464 Longitude/Easting 1464372.443

Condition of Well Pad: Good Flush Mount or Stick-Up? Flush Mount

Well ID Marked? Yes If yes, where? Locking cap

Locking cap? Yes Lock? No Diameter of Well: 2 in.

Structural integrity of well: Good

WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	8.90 TOC	
Depth to Bottom (feet BGS/TOC)	13.83 TOC	14' BGS

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

Additional Comments: _____

PICTURE OF WELL DURING INSPECTION



WELL INSPECTION FORM

Site: Sparrows Point: Area A Location of Well: Parcel A10, adjacent to railroad tracks

Project Number: 150298M Date: 12/9/2015

WELL INFORMATION

Well ID: SW05-PZM004 Well Permit No.: _____

Coordinates:

Latitude/Northing 572248.055 Longitude/Easting 1464959.571

Condition of Well Pad: Fair Flush Mount or Stick-Up? Stick-Up

Well ID Marked? Yes If yes, where? Outer casing

Locking cap? No Lock? Broken Diameter of Well: 2 in.

Structural integrity of well: Top 3 feet bent/curved

WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	10.76 TOC	
Depth to Bottom (feet BGS/TOC)	20.33 TOC	18' BGS

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

Additional Comments: Top 3 feet bent/curved, submersible pump cannot pass through curved segment of the PVC

PICTURE OF WELL DURING INSPECTION



WELL INSPECTION FORM

Site: Sparrows Point: Area A Location of Well: Parcel A10, adjacent to railroad tracks

Project Number: 150298M Date: 12/9/2015

WELL INFORMATION

Well ID: SW05-PZM039 Well Permit No.: _____

Coordinates:

Latitude/Northing 572255.254 Longitude/Easting 1464952.585

Condition of Well Pad: Destroyed Flush Mount or Stick-Up? Flush Mount

Well ID Marked? No If yes, where? _____

Locking cap? No Lock? No Diameter of Well: 0.75 in.

Structural integrity of well: Top of casing broken at grade

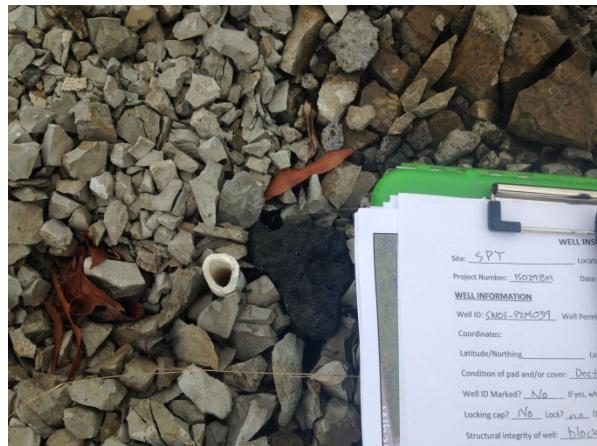
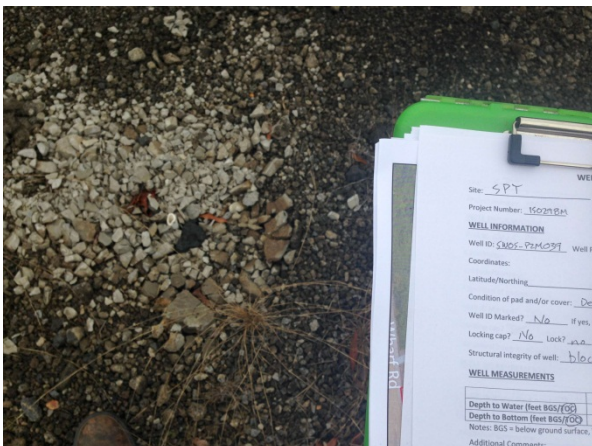
WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	8.40 TOC	
Depth to Bottom (feet BGS/TOC)	9.69 TOC	53' BGS

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

Additional Comments: Potentially block at 9.69 feet from TOC

PICTURE OF WELL DURING INSPECTION



APPENDIX D

Parcel A10 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
Boiler House		Drawing 5047-A	Investigate potential impacts related to the boiler house (potential leaks or releases).	2	A10-001 and A10-002	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')
Incinerator		Drawing 5147	Investigate potential impacts related to the incinerator (potential leaks or releases).	2	A10-003 and A10-004	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')
Machine Shop		Drawing 5147	Investigate potential impacts related to the machine shop (potential leaks or releases).	2	A10-005 and A10-006	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')
Maintenance of Way Repair Shop		Drawing 5052	Investigate potential impacts related to the maintenance of way repair shop (potential leaks or releases).	2	A10-007 and A10-008	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 House		Drawing 5147	Investigate potential impacts related to the oil house (potential leaks or releases).	2	A10-009 and A10-010	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')
Pump House/ Foamite Building		Drawings 5047 and 5147	Investigate potential impacts related to the pump house/foamite building (potential leaks or releases).	2	A10-011 and A10-012	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 A10 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
Hazardous Materials Storage	REC 10A, Finding 240	REC Location Map/ Drawing 5147	During Weaver Boos' site visit, an ATEC building was observed to contain a hazardous materials storage room. The building held several ASTs and containers, the condition of which could not be determined due to restricted access (building locks). An additional AST with a hazardous materials label was observed along the western exterior wall. It is unknown whether any leaks or spills occurred. The location of the storage room was confirmed by ARM. Several boilers were observed in the storage room ,but there was no evidence of hazardous materials.	3	A10-013 through A10-015	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')
Large Historical AST	REC 10B, Finding 241	REC Location Map/ Drawing 5052	A large circular structure appearing to be an AST surrounded by a berm was identified on historical aerial photography. Based on the size and location, it is reasonable that the AST may have contained petroleum products. The condition of the tank and berm, as well as the contents and spill/leak history, are unknown.	3	A10-016 through A10-018	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')
Maintenance of Way Yard UST (and Fuel Dispensers)	REC 12A, Finding 246	REC Location Map/ Drawing 5147	The Maintenance of Way Yard located north of the ATEC facility was identified as containing a 12,000-gallon gasoline UST, listed as permanently out of service. Additionally, three (3) fuel dispensers were observed outside of a building in the yard. It is unknown whether the dispensers were associated with the UST, or if they had underground piping which may have leaked or spilled. ARM confirmed the location of the fuel dispensers, and observed a concrete pad which may overly the UST. A spill of de minimis quantities of PVC glue was also noted by the MDE.	4	A10-019 through A10-022	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 A10 Coverage			Investigate potential impacts related to any historical activities which may have occurred (potential leaks or releases).	8	A10-023 through A10-030	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')
Repair Shop Interior		Drawing 5047	MDE Request. Investigate potential impacts related to any historical activities in the repair shop (potential leaks or releases).	1	A10-031	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 A10 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
Lumber Storage Warehouse		Drawing 5052-A	MDE Request. Investigate potential impacts related to any historical activities in the lumber storage warehouses (potential leaks or releases).	1	A10-032	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')
Nelson Box Company Building		Drawing 5047 and 5047-A	MDE Request. Investigate potential impacts related to any historical activities in the main Nelson Box Company building (potential leaks or releases).	1	A10-033	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:	33				

Soil Borings Sampling Density Requirements (from **Worksheet 17 - Sampling Design and Rationale**)

No Engineered Barrier (16-40 acres): 1 boring per 1.5 acres with no less than 15.

Engineered Barrier (1-15 acres): 0.5 boring per acre with no less than 2.

No Engineered Barrier (17.0 acres) = **15 borings required, 15 proposed**

Engineered Barrier (14.6 acres) = **8 borings required, 18 proposed**

Parking/Roads (11.7 acres)

Buildings (3.0 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 A10 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†
Boiler House		Drawing 5047-A	N/A	1	A10-002	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 5147	N/A	1	A10-010	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
Hazardous Materials Storage	REC 10A, Finding 240	REC Location Map/ Drawing 5147	N/A	1	A10-015	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
Large Historical AST	REC 10B, Finding 241	REC Location Map/ Drawing 5052	N/A	1	A10-018	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
Maintenance of Way Yard UST (and Fuel Dispensers)	REC 12A, Finding 246	REC Location Map/ Drawing 5147	N/A	2	A10-020 and A10-021	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 A10 Coverage			N/A	4	A10-024, A10-025, A10-027 and A10-029	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
Machine Shop/ Incinerator		Drawing 5147	N/A	1	A10-034*	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
Existing Groundwater Well			Good structural condition. See Appendix C for additional detail.	1	SG06- PDM001	Total depth of 14 feet bgs (historic reported)	14 to 4 feet bgs (historic reported)	VOC, SVOC, Dissolved Metals, DRO/GRO
			Total:	12				

*Piezometer only - no additional soil samples.

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

APPENDIX E

Health and Safety Plan

Area A: Parcel A10 Tradepoint Atlantic Sparrows Point, Maryland

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April 2016

ARM Project 150298M-5

Respectfully submitted,



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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 A10. The on-site activities shall include the following: installation of soil borings, collection of soil samples, installation and purging of temporary piezometers, and the collection of groundwater samples. 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 soils and groundwater.

2.0 GENERAL INFORMATION

2.1 Site Description

Parcel A10, which is comprised of 32 acres of the approximately 3,100-acre former plant property, is located off of Sparrows Point Boulevard in Sparrows Point, Maryland. Parcel A10 is one of several parcels that make up a larger area, known as Area A, of the Tradepoint Atlantic facility. Area A 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 its 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

3.3.2 Groundwater Sampling

All personnel should wear the following:

- Long pants and sleeved shirt/vest (high visibility)
- Steel toe safety boots
- Safety glasses with side shields
- 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 Worksheet 21—Field SOPs, and Appendix A of the QAPP (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

