Phase II Investigation
Work Plan

Area A: Parcel A7
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 A7 (the Site). Parcel A7 is comprised of approximately 22.2 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

Site characterization of Parcel A7 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 Tradepoint Atlantic property into the Maryland Department of the Environment Voluntary Cleanup Program (MDE-VCP) was submitted to MDE on September 10, 2014. The property's current and anticipated future use is Tier 3 (Industrial), and plans for the property include demolition and redevelopment over the next several years.

Parcel A7 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 (USEPA), and the Maryland Department of the Environment (MDE) (effective October 8, 1997) as documented in correspondence received from USEPA on September 12, 2014. Based on this agreement, USEPA 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 USEPA's RCRA Corrective Action authorities.

EAG has provided ARM with a proprietary site planning document which shows the proposed development for Parcel A7 and several other areas of the property. Although there are currently no existing engineered barriers in the parcel, this document indicates that portions of the complete parcel may ultimately be proposed for paving or other forms of environmental capping (as necessary).

The objective of this Phase II Investigation is to identify the presence or absence of any existing hazardous conditions for future tenants or personnel working on the Site. During the Phase II Investigation, a total of 18 soil borings, four sediment samples, and seven aqueous samples (three groundwater wells and four surface water samples) will be completed/collected and analyzed to assess the presence or absence of contamination in Parcel A7. Test pitting will also be completed at select locations to determine the composition of soil/slag berms located in the parcel. The test pitting activities may include additional sample collection depending on the field observations by the environmental professional providing oversight. Following the receipt of analytical data, a Human Health Screening Level Risk Assessment (SLRA) will be completed to evaluate the potential risk to future workers, and a Phase II Investigation Report will be prepared to summarize the findings.

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.

Groundcover at the Site is comprised of 100% natural soils 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). Parcel A7 is occupied by wooded areas and two apparent stormwater ponds, with adjacent railways to the north. There is no evidence that iron and steel industrial processes were completed within the boundary of Parcel A7.

Parcel A7 is part of the County Lands 1B (CL1B) Parcel, which is one of five areas (1A, 1B, 2, 3A, and 3B) referred to as "County Lands" in the DCC Report. The DCC Report indicates that several pits within the site may have historically been used as disposal locations for wastes, in particular open hearth slurry from wastewater treatment.

1.2.1. Background Environmental Data

Parcel A7 comprises the southeastern half of the CL1B Parcel, which was previously characterized by the Baseline Ecological Risk Assessment for On-Site Areas (BERA) Report (URS 2011) and the Sparrows Point County Lands Summary Report (Rust Environmental and Infrastructure 1996).

BERA

The BERA states that the southeastern end of the CL1B Parcel was used as a disposal area for open hearth slurry from the Humphrey Creek Wastewater Treatment Plant between 1968 and 1978. The DCC Report indicates that roughly one million tons of slurry were disposed of in this fashion. The BERA included on-site data from soil, sediment, and surface water samples.

The purpose of the BERA was to characterize risks for valued wildlife receptors to support future decisions regarding the need for, and potential extent of, on-site remediation. Samples collected as part of the BERA included surface soil (obtained from 0 to 0.5 feet below ground surface (bgs)), sediment, and surface water.

BERA soil sample locations in the CL1B Parcel consist of CL-SS-01 through CL-SS-18, and CL-SS-20. Of these, CL-SS-13 through CL-SS-18 and CL-SS-20 are located within the Parcel A7 boundary. Two ponds were investigated as part of the BERA, both located within Parcel A7. Three sediment samples were collected from the large pond and two sediment samples were collected from the small pond. Surface water samples were also collected from each pond. The analytical results for samples collected in the CL1B Parcel (for samples that were within the Parcel A7 boundary) are included as **Appendix A.** The appendix begins with the original report figures showing the sample locations.

At soil sample locations CL-SS-13 through CL-SS-17 and CL-SS-20, concentrations of arsenic exceeded the established Project Action Limit (PAL), as set forth in the Quality Assurance Project Plan (QAPP), Worksheet 15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits. Concentrations of benzo[a]pyrene exceeded the PAL in soil sample CL-SS-16. (The PALs for relevant polynuclear aromatic hydrocarbons (PAHs) have been adjusted upward based on revised toxicity data for benzo[a]pyrene published in the USEPA Integrated Risk Information System (IRIS) Recent Additions dated January 19, 2017.) The results of the BERA suggest zinc and copper as potential constituents of interest for ecological risk assessment, although the detected levels are below the PALs. Soil sample CL-SS-12 is located outside the parcel boundary (in adjacent Parcel A5), but contained copper at an elevated concentration. Since this sample may represent a constituent of potential concern, borings were proposed proximal to this location along the Parcel A7 boundary. Elevated zinc concentrations appear to be widespread in the CL1B Parcel.

In all three sediment samples collected from the large pond (CL-LP-FS-01N, CL-LP-FS-02N, CL-LP-FS-03N), arsenic exceeded the applicable PAL; however, all three of these concentrations are flagged with a "B" qualifier (indicating that they were not detected substantially above the concentration detected in an associated laboratory or field blank). Arsenic also exceeded the PAL in both sediment samples collected from the small pond (CL-SP-

FS-01, and CL-SP-FS-02). Furthermore, cyanide exceeded its established PAL in sediment sample CL-SP-FS-02. There were PAL exceedances of several metals in the surface water samples collected from the small pond. The PALs for arsenic, cadmium, lead and thallium were exceeded in CL-SP-SW-02, and cobalt and thallium (dissolved) exceeded their PALs in CL-SP-SW-01. There were no aqueous PAL exceedances in the surface water samples collected from the large pond.

It is anticipated that Parcel A7 will be developed for industrial use in the coming years, thus removing ecological habitat. While the analytical datasets from the BERA are useful for generally characterizing the CL1B Parcel, the conclusions and risks recognized in this document are not directly applicable for future development of Parcel A7. Analytical results from the samples proposed in this Work Plan will not be evaluated in the context of habitat quality, as future development of this parcel will not preserve ecological habitat. Rather, the established PALs in the QAPP Worksheet 15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits (or based on other direct guidance form the MDE) will be used as guidance for further site characterization and/or remediation activities.

County Lands Summary Report

As part of the County Lands Summary Report, soil samples B33 through B36 were collected within the Parcel A7 boundary. Of the data available for these samples, there were no PAL exceedances. A surface water sample (and duplicate) was collected from location 1B-SS-1A/1B, while groundwater samples were collected from wells MW93-001 and MW93-002. Of the aqueous data available for these samples, there were no PAL exceedances. The analytical results for samples collected as part of the County Lands Summary Report (for samples that were within the Parcel A7 boundary) are included as **Appendix B**. The appendix begins with the original report figures indicating the sample locations.

1.2.2. Current Site Conditions

A site walk of the parcel was completed by ARM staff on December 29, 2015 in order to characterize access restrictions which are likely to be encountered by Geoprobe® subcontractors and sampling personnel. These restrictions include trees and other vegetative growth, as well as topographic constraints imposed by the steep slopes of pits and/or piles. During the site walk, ARM observed slag berms and piles. In addition, the site walk confirmed the locations of several pits across the site which had been previously identified from topographic maps. ARM used the information obtained during the site walk to relocate site-wide borings to accessible areas of the site whenever possible (and recorded any new locations using a hand-held GPS for incorporation into this Work Plan), while also targeting the pits which were likely used for waste disposal purposes. The proposed sample locations were marked with fluorescent stakes during the site walk, and will be revisited using a hand-held GPS once this Work Plan is approved.

The Phase I Environmental Site Assessment (ESA) prepared by Weaver Boos Consultants dated May 19, 2014, states generically that fly dumping was known to occur outside of the main facility along roads and mainly in vacant and unmonitored areas. According to interviews conducted as part of the Phase I ESA, no hazardous materials or petroleum products were known to be dumped on the property, but the fly dumping may have included general refuse, household equipment, and boats. Dumping of household refuse was noted during the December 2015 site walk. The MDE also conducted a site visit of the periphery of Parcel A7 on May 17, 2017 with representatives from ARM, EAG, and Tradepoint Atlantic. The observations from the previous site visit were confirmed, as noted by the MDE in email correspondence on June 16, 2017:

> *The parcel was observed to be surrounded by a slag berm along the northeastern border (along the rail lines). Dumping of various household items was observed along this parcel boundary. The southern portion of the parcel is bounded by Reservoir Road and Peninsula Expressway to the west. The entire parcel is densely vegetated and will require clearing in several areas to access proposed boring locations.*

1.3. SAMPLING DESIGN AND RATIONALE

1.3.1. Soil

Parcel A7 contains a total of 22.2 acres, none of which is covered by existing engineered barriers. In accordance with the relevant sampling density requirements set forth in the QAPP Worksheet 17 – Sampling Design and Rationale, a minimum of 15 soil boring locations are required to cover an area of this size without engineered barriers. A total of 18 borings have been proposed in Parcel A7 (with four additional samples proposed for sediment characterization; discussed below). Sampling locations were selected as follows.

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. Historical maps and drawings were geospatially referenced using Geographic Information Systems (GIS) software (ArcMap Version 10.3.1), and reviewed to determine the specific sampling locations. When a sampling target was identified, at least two borings were placed at or around its location using GIS software. 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 ESA. All RECs would be targeted with at least three borings. There were no RECs identified within the Site boundaries.

Following the identification and evaluation of any 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 additional 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 investigation of all RECs, SWMUs, and AOCs, four 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 inside the boundary of Parcel A7. A list and figure of former PCB-containing transformer equipment was also reviewed for inclusion as additional targets. There were no possible PCB-contaminated equipment areas identified in the parcel based on this information. **Figures 4** through **6** show the proposed borings and the parcel boundary overlain on the 5000 Set, 5100 Set, and 5500 Set, respectively. A summary of the specific drawings covering the Site is presented in the table below:

Parcel A7 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.)	5060	2/8/1962	3/11/1982
		5061	2/8/1962	3/11/1982
		5064	2/8/1964	3/11/1982
		5065	2/8/1962	3/11/1982
Plant Index	Roads, water bodies, demolished buildings/structures, electric lines, above-ground pipelines	5160	*Unknown*	3/6/2008
		5161	*Unknown*	3/6/2008
		5164	*Unknown*	3/6/2008
		5165	*Unknown*	3/6/2008
Plant Sewer Lines	Same as above plus trenches, sumps, underground piping (includes pipe materials)	5560	2/5/1976	2/5/1976
		5561	2/5/1976	2/5/1976
		5564	2/5/1976	2/5/1976
		5565	2/10/1976	2/10/1976
Drip Legs	Coke Oven Gas Drip Legs Locations	5888	*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, no additional sampling targets

were identified in the parcel. However, a review of topographical information (along with the December 2015 site visit) revealed several pits of varying size and steepness. As indicated in the Phase I ESA and during the site visit, these pits were likely used for the disposal open hearth slurry, but may have received other unknown materials. To provide adequate coverage of the parcel, site-wide borings were located within these pits (with direct input from the MDE as a result of the May 17, 2017 site visit). Sample locations were also added to fill in large spatial gaps (as applicable) between proposed borings within the Site and to meet the sample density requirements set forth in the QAPP Worksheet 17 – Sampling Design and Rationale. The sampling summary is presented in **Appendix C**, along with the rationale for sampling in the parcel.

Figure 7 shows the proposed borings on an aerial image to indicate locations of borings with regard to physical obstructions (woods), and also shows the locations of the samples collected as part of the 2011 BERA. **Figure 8** shows the aerial image along with the locations of samples collected as part of the County Lands Summary Report. It was necessary to locate several borings within dense tree growth in order to provide adequate parcel coverage. Tradepoint Atlantic will coordinate with ARM to remove trees/brush with the use of heavy equipment to provide an access pathway for the Geoprobe®. The locations which will most likely need tree/brush clearance include A7-001-SB, A7-007-SB, A7-008-SB, A7-009-SB, and A7-014-SB. Other locations may be added as necessary on a case-by-case basis. **Figure 9** shows the site topography to indicate pits and steep slopes that may restrict access. Boring locations targeting small pits are bounded by steep slopes on all sides, and may be inaccessible to heavy equipment. If necessary, these borings will be completed with the use of a hand auger. The locations which may be completed by this method include A7-004-SB, A7-015-SB, A7-020-SB, A7-021-SB, and A7-022-SB. Other locations may be added as necessary on a case-by-case basis.

1.3.2. Sediment

Sediment samples will be collected from the two ponds (two samples in each pond) in Parcel A7 which were previously sampled as part of the BERA. **Figures 3** through **9** show the proposed sediment sample locations.

1.3.3. Slag/Soil Berm Test Pitting

Following the site walk that occurred on May 17, 2017, the MDE specified that slag/soil berms (exact composition unknown) should be investigated to determine whether the materials in these piles exhibit evidence of potential contamination. Most of the berms have steep slopes, and thus may restrict Geoprobe® access to the proposed sampling locations. Therefore, test pits will be completed for select areas of the berms to document the types of materials in the berms and to determine whether any significant contamination exists. **Figure 10** shows the proposed test pitting locations for the existing berms.

1.3.4. Aqueous Sampling

Groundwater samples will be collected from three existing wells located in, or directly adjacent to, Parcel A7 which were previously sampled as part of the County Lands Summary Report. These wells were inspected to determine if their structural condition and suitability for sampling. Well inspection forms are presented in **Appendix D**. Surface water samples will be collected from locations in the existing ponds (two samples in each pond) which were previously sampled as part of the BERA. **Figure 11** shows the proposed groundwater well samples and surface water samples on an aerial image.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1. PROJECT PERSONNEL

The site characterization of Area A: Parcel A7 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, USEPA, 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/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 Project Scientist, Mr. Nicholas Kurtz, will be responsible for coordinating field activities including the collection, preservation, documentation and shipment of samples. Mr. Kurtz 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. Kurtz 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, sediment, and groundwater at the Site, the investigation will be conducted under a Health and Safety Plan (HASP) to protect investigation workers from possible exposure to contaminated materials. The HASP to be used during the field investigation of Parcel A7 is provided 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 the attached HASP. 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 areas 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 USEPA 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, and 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., April 5, 2016).

The proposed schedule of this investigation is contained in this Work Plan (Section 8). All site characterization activities will be conducted under the HASP (**Appendix E**).

3.3. SOIL INVESTIGATION

Soil samples collected from the locations identified on **Figures 3** through **9** will be screened and analyzed in accordance with procedures referenced in the QAPP Worksheet 21 – Field SOPs (Standard Operating Procedures), SOP No. 009 – Sub-Surface Soil Sampling. If Geoprobe® access is restricted by vegetation, Tradepoint Atlantic will provide heavy equipment to clear a path to the proposed sample locations. Where access is restricted by site topography, borings will be completed at the proposed locations using a hand auger. If a hand auger is used, the boring will be completed to a total depth of 5 feet bgs.

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. If a concrete slab or slag aggregate occupies the 0 to1 foot bgs sample, the interval may be shifted to the depth of the first observed soil interval. Soil samples will be analyzed for SVOCs, TAL-Metals, Oil & Grease, TPH-DRO, TPH-GRO, hexavalent chromium, and cyanide. Samples from any depth interval with a sustained Photoionization Detector (PID) reading of greater than 10 ppm will also be analyzed for VOCs. Additionally, the soil sample collected from the shallow interval (0 to 1 foot bgs) will be analyzed for PCBs. 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. One additional sample will also be collected from the 9 to 10 foot depth interval if groundwater has not been encountered (unless using a hand auger). It should be noted that no soil samples will be collected from a depth that is below the water table.

If the PID reading from the 9 to 10 foot depth interval is less than 10 ppm, all parameters will be held by the laboratory pending the analysis of the 0 to 1 and 4 to 5 foot depth interval samples. If this depth interval exhibits a sustained PID reading of 10 ppm, it will be analyzed for VOCs, SVOCs, TPH-DRO, TPH-GRO, and Oil & Grease. However, the samples for metals and cyanide will be held by the laboratory pending the analysis of the 0 to 1 and 4 to 5 foot depth interval samples. If the analyses from the 4 to 5 foot depth interval show exceedances of PALs for any constituent, the held sample from the 9 to 10 foot depth interval will be analyzed for those constituents that exhibited PAL exceedances in the overlying 4 to 5 foot sample.

After soil sampling has been concluded at a location, 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). 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. POND SEDIMENT/SURFACE WATER INVESTIGATION

Two ponds are located in the southern area of the site, adjacent to the intersection of Peninsula Expressway and Reservoir Road. The historical drawings in the 5500 set indicate that the ponds received runoff waters from the adjacent roadways. They may also have received unknown quantities and qualities of wastes from other areas of the Site. Sediment and surface water samples were collected from the ponds as part of the 2011 BERA, and indicated some PAL exceedances (see Section 1.2.1). As part of this Work Plan, sediment and surface water samples

will be collected from the ponds in order to characterize current conditions at the site. Unlike the BERA, analytical results from these samples will not be evaluated in the context of habitat quality, as the post-development use of this parcel will not represent ecological habitat.

Sediment samples will be collected at two locations within each pond in order to characterize sediment quality. At each location, a sediment sample will be collected from the top 12 inches of sediment. Surface water samples will be collected at the same locations in each pond. These sample locations (A7-016-SD/SW through A7-019-SD/SW) are shown on **Figures 3** through **11**, as applicable.

All sediment samples will be collected in accordance with the methods specified in SOP No. 003 – Sediment Sampling. Each sediment sample will be analyzed for VOCs, SVOCs, TAL-Metals, Oil & Grease, TPH-DRO, TPH-GRO, PCBs, hexavalent chromium, and cyanide. All surface water samples will be collected in accordance with the methods specified in SOP No. 004 – Surface Water Sampling. Each aqueous sample will be analyzed for VOCs, SVOCs, TAL-Metals (total), Oil & Grease, TPH-DRO, TPH-GRO, dissolved hexavalent chromium, and total 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.

3.5. SLAG/SOIL BERM TEST PITTING

The slag/soil berms located on the parcel (exact composition unknown), some of which are surrounding small pits or larger topographic depressions, should be investigated to determine whether the materials in the berms are indicative of potential contamination. Therefore, test pits will be completed for select areas of the berms to determine whether any significant contamination exists. Test pitting will be conducted in accordance with the methods specified in SOP No. 015 – Test Pitting. The environmental professional providing oversight will make a determination of the types of materials in the berms and will document the test pitting with a photograph log. The proposed locations for test pitting are included on **Figure 10**.

Analytical samples may be collected (as 10-point composites) from the spoil piles if the environmental professional observes any potential indicators of significant contamination, including but not limited to odors, elevated PID readings, staining, and/or discoloration. If indications of potential contamination are not observed, sampling will not be required. In the event that composite sampling of the spoil piles is warranted, all parameters specified in the Soil Investigation Section 3.3 (above) will be collected and analyzed (SVOCs, VOCs, TAL-Metals, Oil & Grease, TPH-DRO, TPH-GRO, PCBs, 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.

3.6. GROUNDWATER INVESTIGATION

Groundwater samples will be collected from existing wells which were previously sampled as part of the County Lands Summary Report: MW93-001, MW93-002, and W-14 (outside parcel boundary). The locations of these sampling points are shown on **Figure 11**. These wells were inspected to determine if they were in acceptable structural condition for sampling. Well inspection forms are presented as **Appendix D**. Wells MW93-001 and MW93-002 were determined to be in good structural condition and therefore will be sampled. The exterior casing of well W-14 appeared to be in good structural condition, but the well cap could not be removed. ARM will inspect this well a second time, make an attempt to remove the well cap, and inspect the interior conditions of the well. If the well is not in sufficient condition for sampling, a temporary piezometer will be installed at the nearest soil boring location, A7-005-SB, as a replacement sampling point.

All groundwater samples will be collected in accordance with the procedures referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 006 – Groundwater Sampling. Because it has been years since the existing wells have been sampled, they will be redeveloped according to procedures referenced in SOP No. 018 – Well Development. After redevelopment, ARM will record the depth to bottom in each well again to compare to the recorded original drilled depth. All groundwater samples (permanent groundwater wells and piezometers if applicable) will be analyzed for VOCs, SVOCs, TAL-Metals (dissolved), Oil & Grease, TPH-DRO, TPH-GRO, dissolved hexavalent chromium, and total cyanide. In addition, permanent monitoring wells will be sampled for TAL-Metals (total). 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 location for the presence of non-aqueous phase liquid (NAPL) using an oil-water interface probe, in accordance with methods referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 019 – Depth to Groundwater and NAPL Measurements. Each permanent groundwater well and any piezometers that may be installed will be surveyed to obtain groundwater elevation data. The elevation data from these groundwater points will be used to create a groundwater contour map indicating groundwater flow direction. Once a PVC piezometer (if applicable) 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.

3.7. NAPL DELINEATION

The MDE will be notified of any initial observation of NAPL bearing soils identified in a soil boring or test pit within 2 hours of the field observation. This notification will be provided in email format to appropriate MDE representatives. For the purposes of this notification, NAPL

bearing soil is defined as soil containing free oil (i.e., liquid oil which could potentially be drained or otherwise extracted from the soil). If minor indications of NAPL (globules or a sheen) are identified in the soil core or test pit, the NAPL will be delineated in accordance with the procedures listed below, but the initial 2-hour MDE notification will not be required (unless NAPL bearing soils are identified during the subsequent delineation). Any subsequent observations of NAPL within the same areas will not require additional redundant notifications. The presence of measureable NAPL in a permanent well or groundwater sampling piezometer will warrant the same 2-hour MDE notification and subsequent delineation. If the evidence of NAPL is limited to a trace detection, the potential impacts will be delineated but the initial 2-hour MDE notification will not be required.

In the event that NAPL and/or sheen is identified in a soil boring or test pit, a temporary piezometer will be installed according to the specifications identified in SOP No. 028 – 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. 019 – Depth to Groundwater and NAPL Measurements. Each piezometer installed to delineate the presence or absence of NAPL will be checked with an oil-water interface probe immediately after installation, 48 hours after installation, and 30 days after installation. If NAPL is not detected after 30 days of equilibration time, 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 or sheen is present in the initial piezometer or groundwater well, 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 approximately 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 NAPL is present within any of the piezometers, additional borings/piezometers will be added as necessary to complete the delineation. 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.

3.8. SAMPLE DOCUMENTATION

3.8.1. Sample Numbering

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

3.8.2. 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.

3.9. 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 C**. 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 samples will be analyzed for, as well as the quantitation limits and project action limits, is provided in Worksheet 15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

All soil, sediment, and water 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 cooler with VOC samples
  - 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, Oil & Grease, PCBs, hexavalent chromium, and cyanide
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, 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, Oil & Grease, PCBs, and hexavalent chromium
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, and hexavalent chromium
- Field Blank and Equipment Blank
  - Soil – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, hexavalent chromium, and cyanide
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, hexavalent chromium, and cyanide

The QC samples will be collected and analyzed in accordance with the QAPP Worksheet 12 – Measurement Performance Criteria, Worksheet 20 – Field Quality Control and 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. 005 – Investigation-Derived Wastes Management.

6.0 DATA VALIDATION

For this Parcel A7 Phase II Investigation, a representative 50% of the complete analytical dataset will undergo data validation. Samples will be selected in groups according to the laboratory project number assigned to each set of samples. Each laboratory project number will be assigned a sequential number (from 1, 2, 3 …n) in the order received by the lab until all sample groups for the parcel have been received by the lab. The random number function will be used to randomly order the project numbers and project numbers will be selected from top to bottom until 50% or more of the total number of samples in the parcel have been identified for 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 and the designated 50% of validated data from Area A: Parcel A7, a Phase II Investigation Report will be prepared that will document the sample collection procedures and supporting rationale, and present and interpret the analytical results. 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 the PALs specified in the QAPP (or other direct guidance from the MDE), considering appropriate land use factors and institutional controls, to identify contaminants and exposure pathways of potential concern.

The Phase II Investigation Report will include a SLRA to evaluate potential baseline risks to future workers of the Site prior to any mitigative measures. Compounds that are present at concentrations at or above the USEPA Regional Screening Levels (RSLs) set at a target cancer risk of 1E-6 or target non-cancer Hazard Quotient (HQ) of 0.1 will be identified as constituents of potential concern (COPCs) to be included in the SLRA. The Site will be analyzed as a single exposure unit (EU) based on the size of the parcel and distribution of the proposed soil borings. Exposure point concentrations (EPCs) will be estimated for each COPC dataset (surface, subsurface, and pooled surface/subsurface) in the site-wide EU using ProUCL software. The estimates of potential EPCs for the soil datasets will be compared to the RSLs for the Composite Worker scenario and to site-specific Soil Screening Levels (SSLs) for the Construction Worker scenario (calculated based on the USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites) to develop risk ratios for each COPC relative to a cancer risk of 1E-6 and non-cancer HQ of 1. The risk ratios for individual COPCs will be summed for the carcinogens and non-carcinogens (summed by target organ) to provided screening level estimates of potential cumulative risk to determine if further action is warranted. Lead, PCBs, and TPH/Oil & Grease are subject to special requirements as designated by the agencies: lead results above 10,000 mg/kg are subject to additional delineation (and possible excavation), PCB results above 50 mg/kg are subject to delineation and excavation, and TPH/Oil & Grease results above 6,200 mg/kg should be evaluated for the potential presence and mobility of NAPL in any future development planning. 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 6 months of agency approval of this Work Plan. In addition, the investigation report will be submitted to the regulatory authorities within 2 months of completion of the field activities in accordance with these approximate timeframes:

- the sample collection activities will take approximately 4 weeks to complete (including mobilization activities) once approval of the Work Plan is received;
- the soil and aqueous sample analysis, data validation, and review is expected to require an additional 6 weeks to complete; and
- the preparation of the investigation report, including an internal Quality Assurance review cycle, will require another 4 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

August 1, 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 1916

August 1, 2016

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

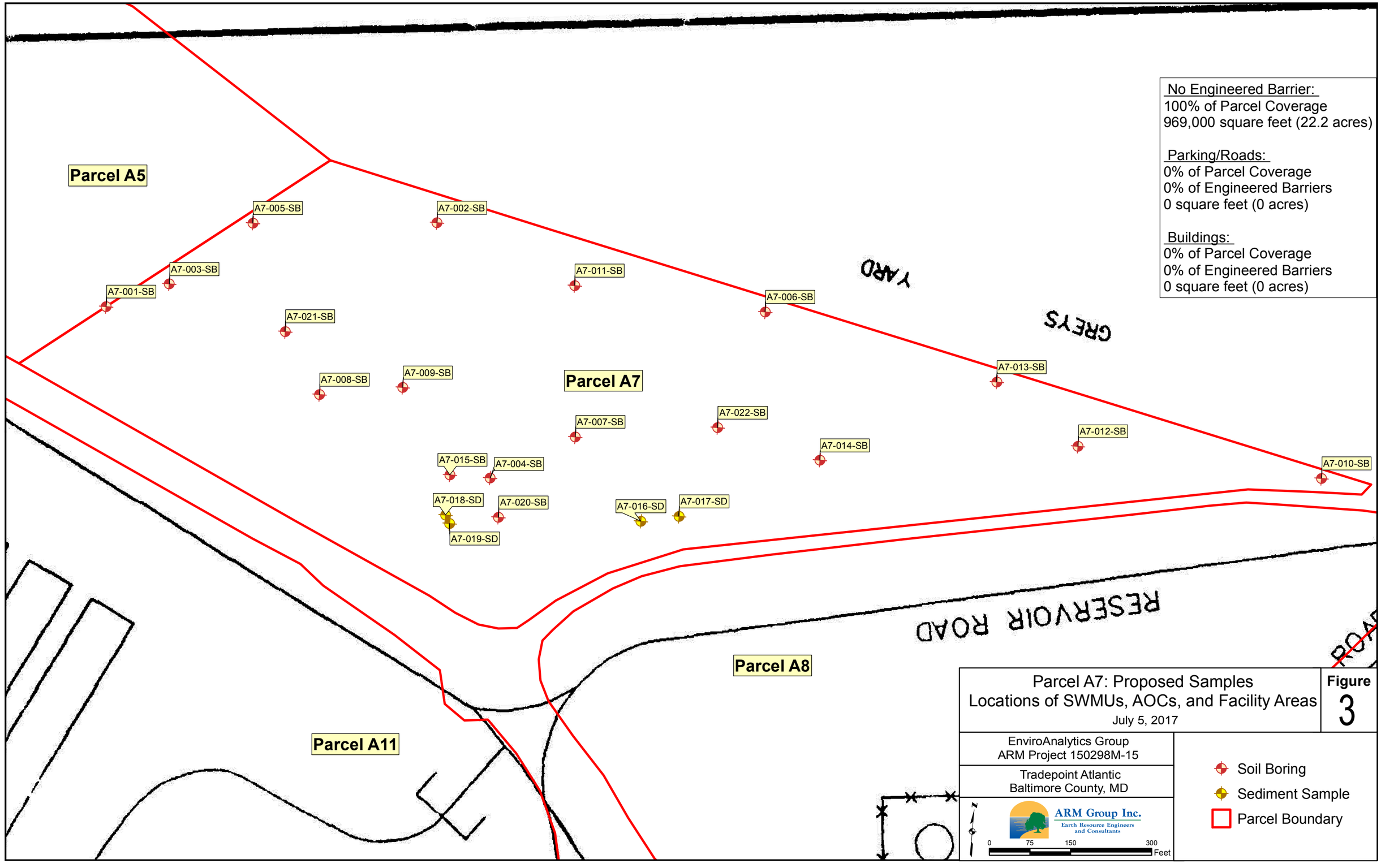
EnviroAnalytics Group

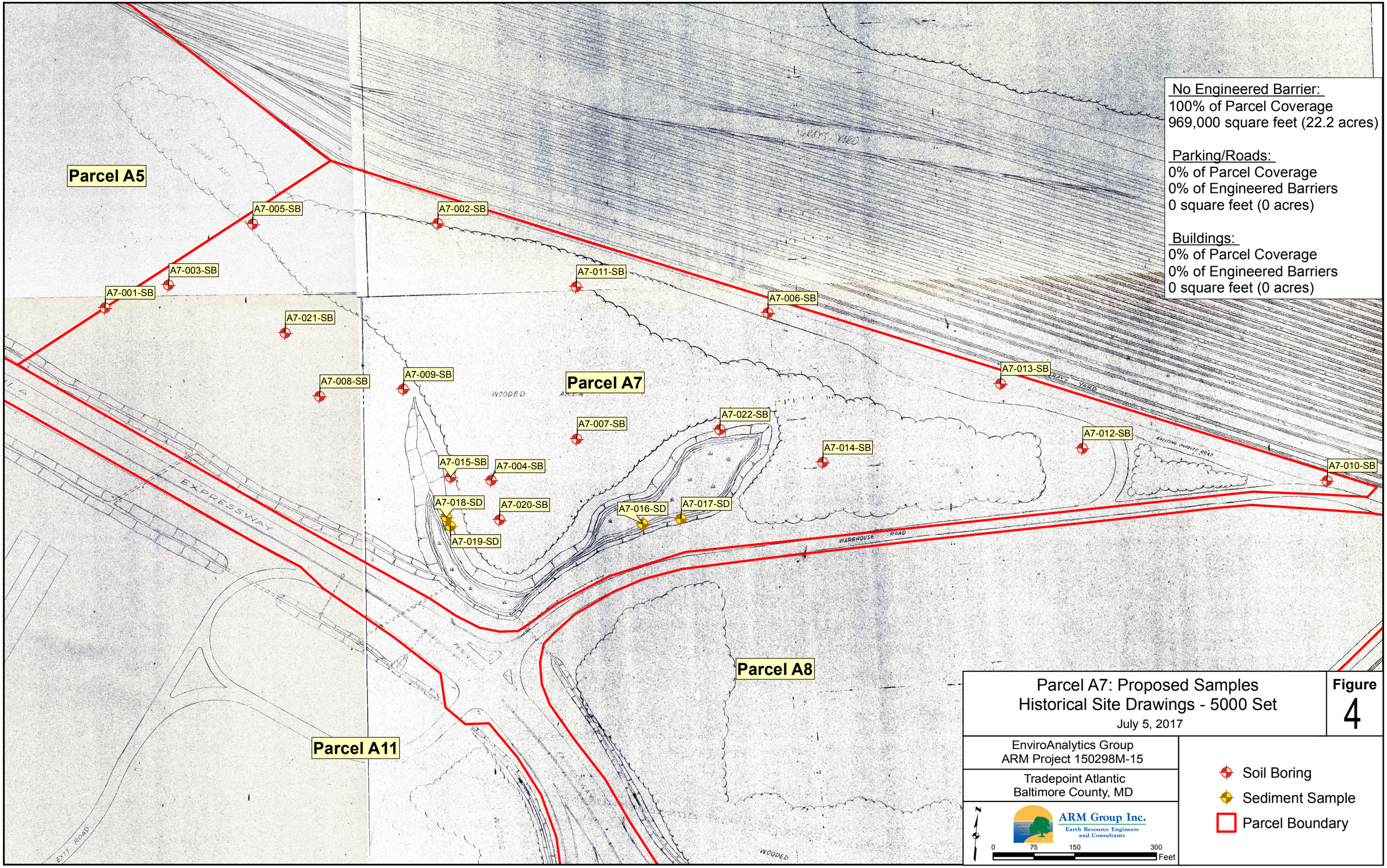
Area A: Project 150298M
Area B: Project 150300M

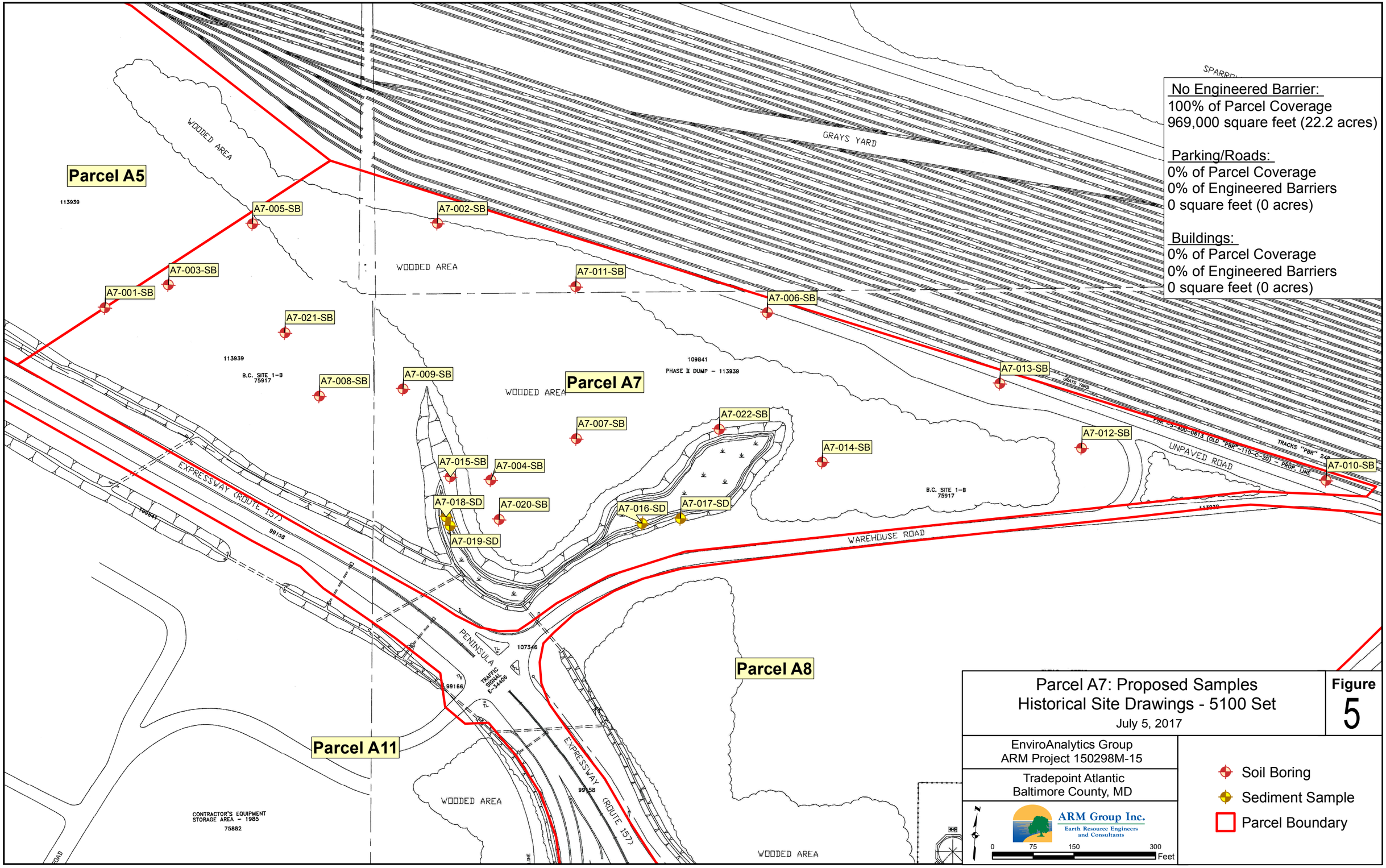
Tradepoint Atlantic

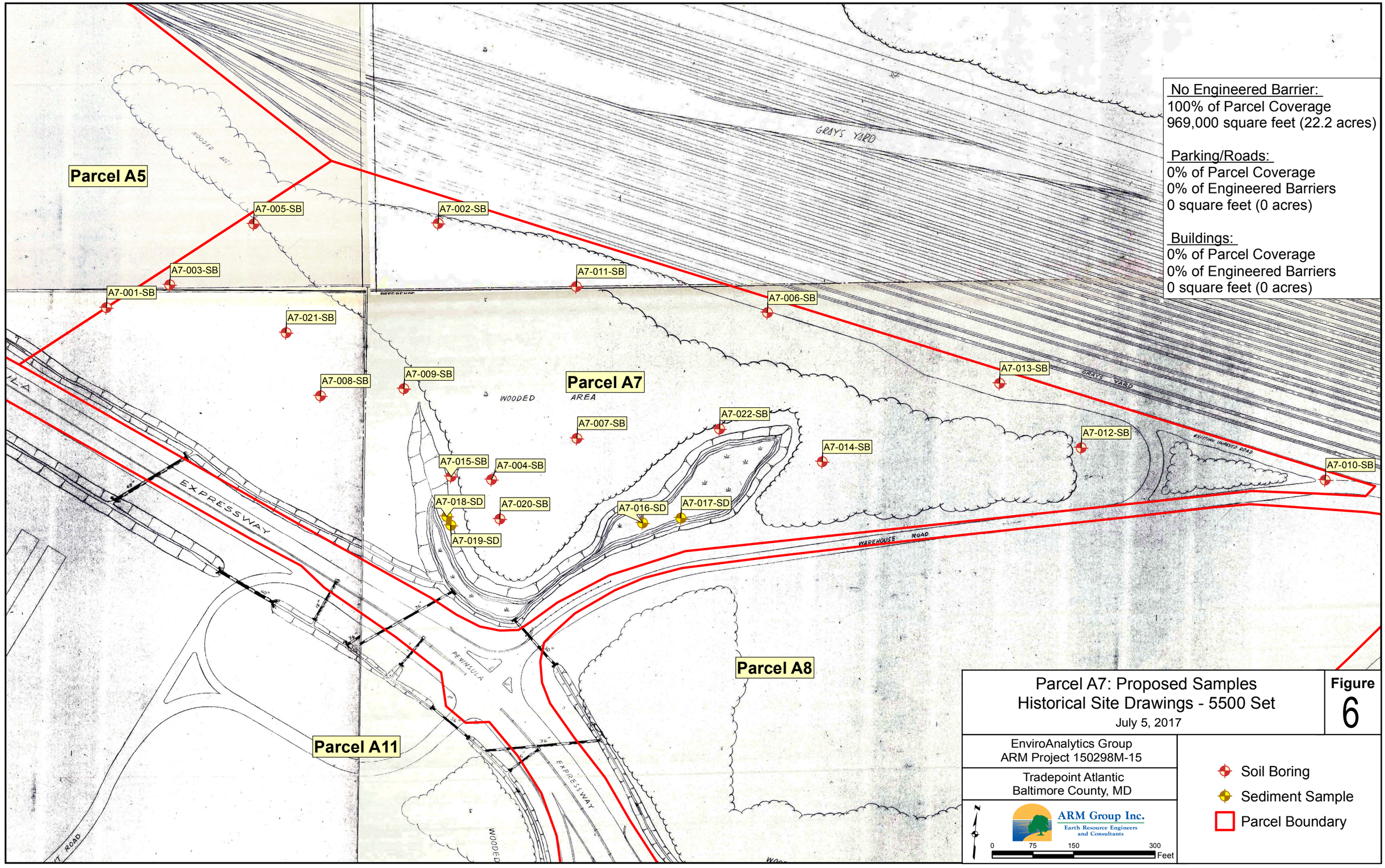
Baltimore County, MD

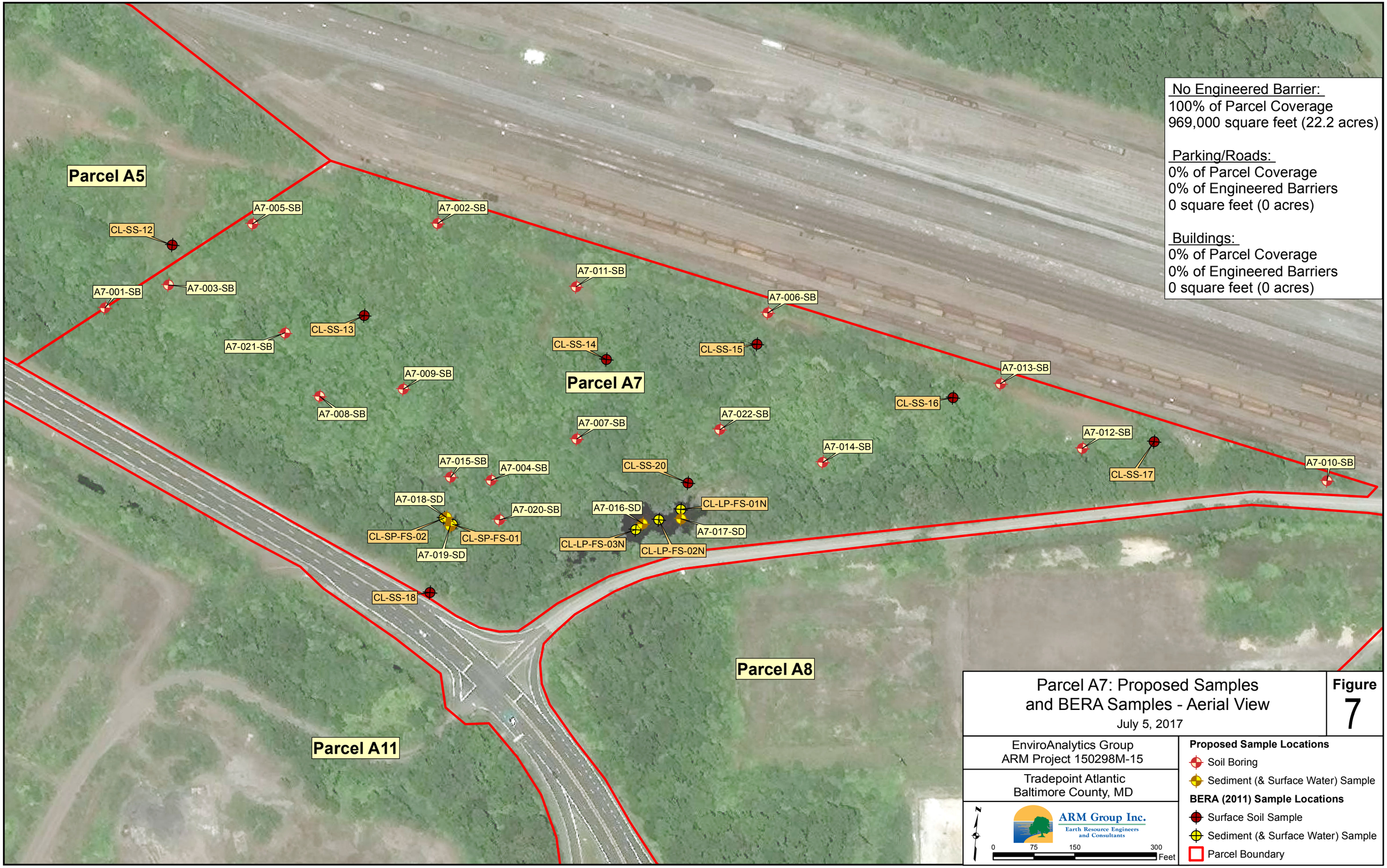
Figure 2


Parcel A5
A7-005-SB
A7-002-SB
A7-003-SB
A7-001-SB
A7-011-SB
A7-021-SB
A7-006-SB
YARD
GREYS
A7-013-SB
A7-008-SB
A7-009-SB
Parcel A7
A7-022-SB
A7-007-SB
A7-012-SB
A7-014-SB
A7-015-SB
A7-004-SB
A7-010-SB
A7-018-SD
A7-020-SB
A7-016-SD
A7-017-SD
A7-019-SD
RESERVOIR ROAD
Parcel A8
Parcel A11
No Engineered Barrier:
100% of Parcel Coverage
969,000 square feet (22.2 acres)
Parking/Roads:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Buildings:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Parcel A7: Proposed Samples
Locations of SWMUs, AOCs, and Facility Areas
July 5, 2017
Figure
3
EnviroAnalytics Group
ARM Project 150298M-15
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Soil Boring
Sediment Sample
Parcel Boundary


Parcel A5
Parcel A7
Parcel A8
Parcel A11
A7-001-SB
A7-002-SB
A7-003-SB
A7-004-SB
A7-005-SB
A7-006-SB
A7-007-SB
A7-008-SB
A7-009-SB
A7-010-SB
A7-011-SB
A7-012-SB
A7-013-SB
A7-014-SB
A7-015-SB
A7-016-SD
A7-017-SD
A7-018-SD
A7-019-SD
A7-020-SB
A7-021-SB
A7-022-SB
No Engineered Barrier:
100% of Parcel Coverage
969,000 square feet (22.2 acres)
Parking/Roads:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Buildings:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
WOODED AREA
EXPRESSWAY
WAREHOUSE ROAD
EXIT ROAD
Parcel A7: Proposed Samples
Historical Site Drawings - 5000 Set
July 5, 2017
Figure
4
EnviroAnalytics Group
ARM Project 150298M-15
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Soil Boring
Sediment Sample
Parcel Boundary


No Engineered Barrier:
100% of Parcel Coverage
969,000 square feet (22.2 acres)
Parking/Roads:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Buildings:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Parcel A5
Parcel A7
Parcel A8
Parcel A11
A7-001-SB
A7-002-SB
A7-003-SB
A7-004-SB
A7-005-SB
A7-006-SB
A7-007-SB
A7-008-SB
A7-009-SB
A7-010-SB
A7-011-SB
A7-012-SB
A7-013-SB
A7-014-SB
A7-015-SB
A7-016-SD
A7-017-SD
A7-018-SD
A7-019-SD
A7-020-SB
A7-021-SB
A7-022-SB
WOODED AREA
GRAYS YARD
EXPRESSWAY (ROUTE 157)
WAREHOUSE ROAD
UNPAVED ROAD
PENINSULA
TRAFFIC SIGNAL E-34406
B.C. SITE 1-B 75917
PHASE II DUMP - 113939
CONTRACTOR'S EQUIPMENT STORAGE AREA - 1985 75882
113939
109841
107346
99158
99166
Parcel A7: Proposed Samples
Historical Site Drawings - 5100 Set
July 5, 2017
Figure 5
EnviroAnalytics Group
ARM Project 150298M-15
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 75 150 300 Feet
Soil Boring
Sediment Sample
Parcel Boundary


Parcel A5
Parcel A7
Parcel A8
Parcel A11
A7-001-SB
A7-002-SB
A7-003-SB
A7-004-SB
A7-005-SB
A7-006-SB
A7-007-SB
A7-008-SB
A7-009-SB
A7-010-SB
A7-011-SB
A7-012-SB
A7-013-SB
A7-014-SB
A7-015-SB
A7-016-SD
A7-017-SD
A7-018-SD
A7-019-SD
A7-020-SB
A7-021-SB
A7-022-SB
GRAYS YARD
WOODED AREA
EXPRESSWAY
WAREHOUSE ROAD
EXISTING UNPAVED ROAD
PENINSULA
No Engineered Barrier:
100% of Parcel Coverage
969,000 square feet (22.2 acres)
Parking/Roads:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Buildings:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Parcel A7: Proposed Samples
Historical Site Drawings - 5500 Set
July 5, 2017
Figure
6
EnviroAnalytics Group
ARM Project 150298M-15
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Soil Boring
Sediment Sample
Parcel Boundary



Parcel A7: Proposed Samples and BERA Samples - Aerial View

July 5, 2017

Figure 7

EnviroAnalytics Group
ARM Project 150298M-15

Tradepoint Atlantic
Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300 Feet

Proposed Sample Locations
- Soil Boring
- Sediment (& Surface Water) Sample

BERA (2011) Sample Locations
- Surface Soil Sample
- Sediment (& Surface Water) Sample
- Parcel Boundary

Parcel A7: Proposed Samples and County Lands Samples - Aerial View

July 5, 2017

Figure 8

EnviroAnalytics Group
ARM Project 150298M-15

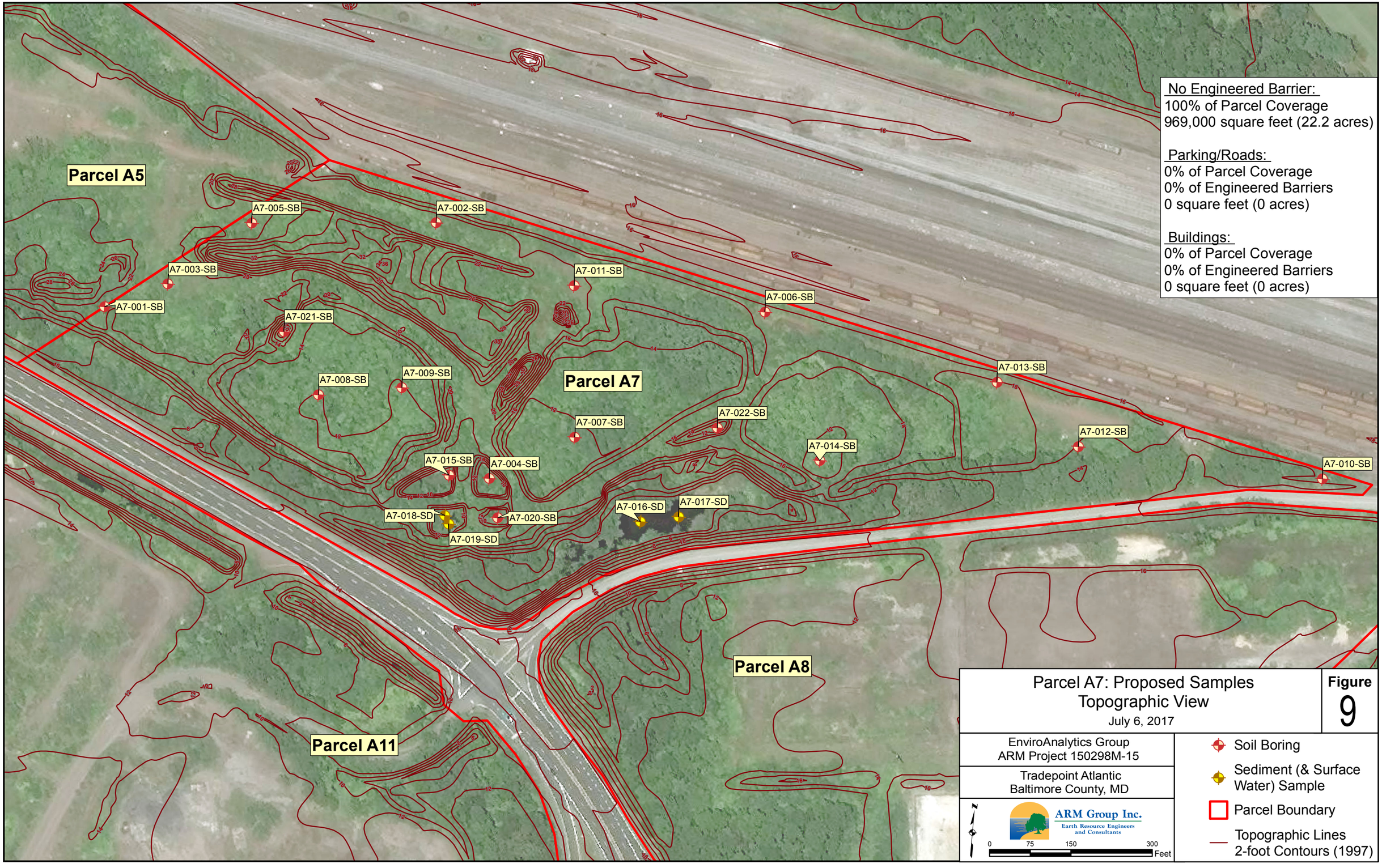
Tradepoint Atlantic
Baltimore County, MD

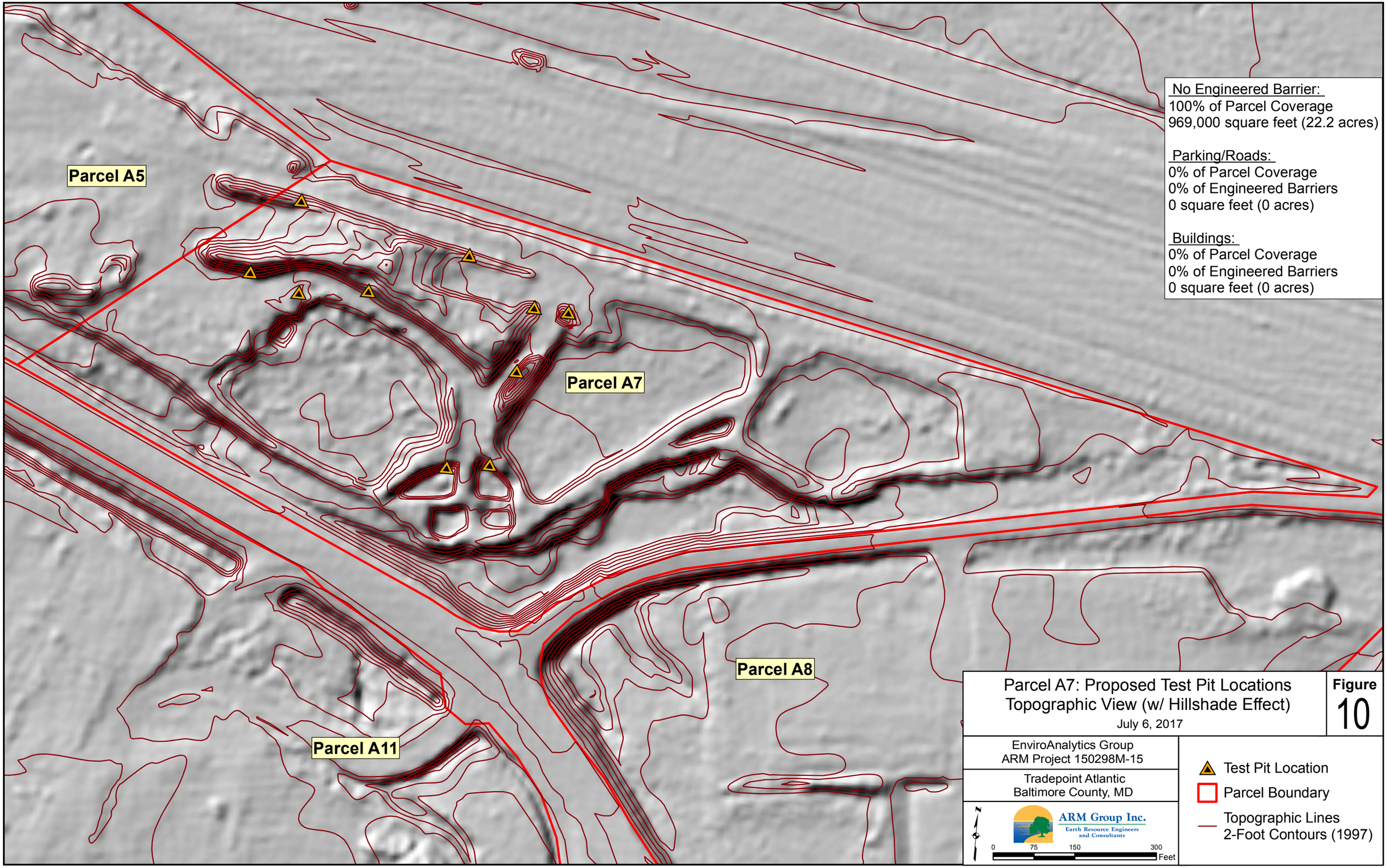
ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300 Feet

Proposed Sample Locations

- Soil Boring
- Sediment (& Surface Water) Sample
- County Lands Investigation Soil Samples
- Parcel Boundary


Parcel A5
Parcel A7
Parcel A8
Parcel A11
A7-001-SB
A7-002-SB
A7-003-SB
A7-004-SB
A7-005-SB
A7-006-SB
A7-007-SB
A7-008-SB
A7-009-SB
A7-010-SB
A7-011-SB
A7-012-SB
A7-013-SB
A7-014-SB
A7-015-SB
A7-016-SD
A7-017-SD
A7-018-SD
A7-019-SD
A7-020-SB
A7-021-SB
A7-022-SB
No Engineered Barrier:
100% of Parcel Coverage
969,000 square feet (22.2 acres)
Parking/Roads:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Buildings:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Parcel A7: Proposed Samples
Topographic View
July 6, 2017
Figure
9
EnviroAnalytics Group
ARM Project 150298M-15
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Soil Boring
Sediment (& Surface Water) Sample
Parcel Boundary
Topographic Lines
2-foot Contours (1997)


Parcel A5
Parcel A7
Parcel A8
Parcel A11
No Engineered Barrier:
100% of Parcel Coverage
969,000 square feet (22.2 acres)
Parking/Roads:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Buildings:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Parcel A7: Proposed Test Pit Locations
Topographic View (w/ Hillshade Effect)
July 6, 2017
Figure
10
EnviroAnalytics Group
ARM Project 150298M-15
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Test Pit Location
Parcel Boundary
Topographic Lines
2-Foot Contours (1997)


W-14
Parcel A5
Parcel A7
MW93-001
MW93-002
A7-018-SW
A7-019-SW
A7-016-SW
A7-017-SW
Parcel A8
Parcel A11
No Engineered Barrier:
100% of Parcel Coverage
969,000 square feet (22.2 acres)
Parking/Roads:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Buildings:
0% of Parcel Coverage
0% of Engineered Barriers
0 square feet (0 acres)
Parcel A7: Proposed Aqueous Samples
Aerial View
July 5, 2017
Figure
11
EnviroAnalytics Group
ARM Project 150298M-15
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Surface Water
Existing Well
Parcel Boundary

APPENDIX A

Legend

- Surface Soil Sample Location
- CL1B Parcel
- Sampling Grid

Key Map
Not to Scale

N

NAD 1983 StatePlane Maryland
Projection: Lambert Conformal Conic
Linear Unit: US Foot

Data Sources:
Aerial Photography - Aerials Express 2005
URS Corporation

0 250 500 1,000 Feet

1 inch = 500 feet
(when printed at 11x17)

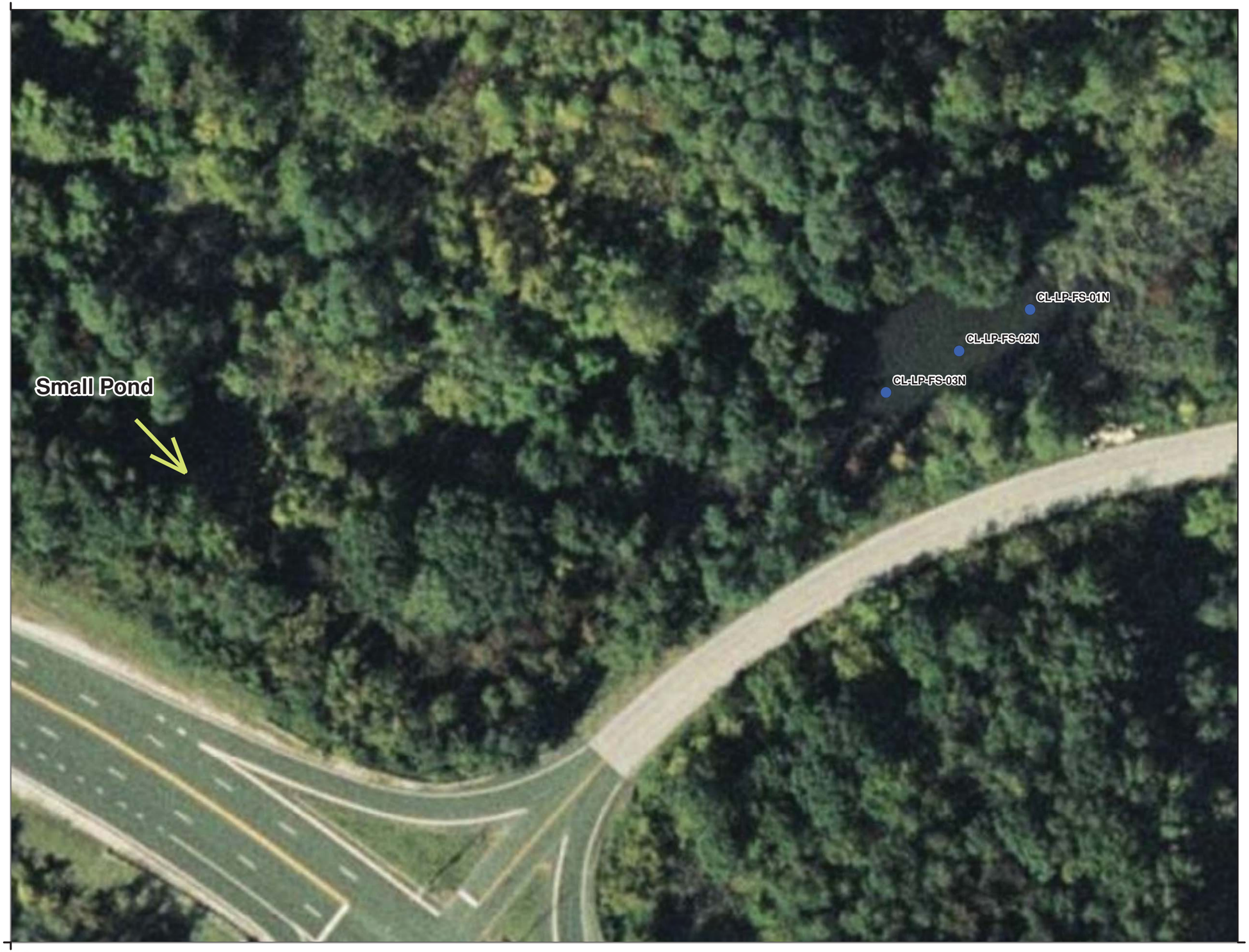
URS

Figure 5
County Lands Parcel 1B
Surface Soil Sampling Locations

RG Steel Sparrows Point
Sparrows Point, Maryland

Prepared By: BAB/RRM	Checked By: MR/CC
Job: 15302184.00002	Map: \\GIS_Data\MTTALSTEEL\Projects\Mittal Steel Samples CLP1B Figure 5.mxd

1460718



Legend

- Large Pond Sediment/Surface Water Sample Location

Note: Small pond not visible due to its size & heavy tree cover.

Key Map
Not to Scale

N

NAD 1983 StatePlane Maryland
Projection: Lambert Conformal Conic
Linear Unit: US Foot

Data Sources -
Imagery provided by Bing Maps
URS Corporation

0 25 50 100 Feet

1 inch = 50 feet
(when printed at 11x17)

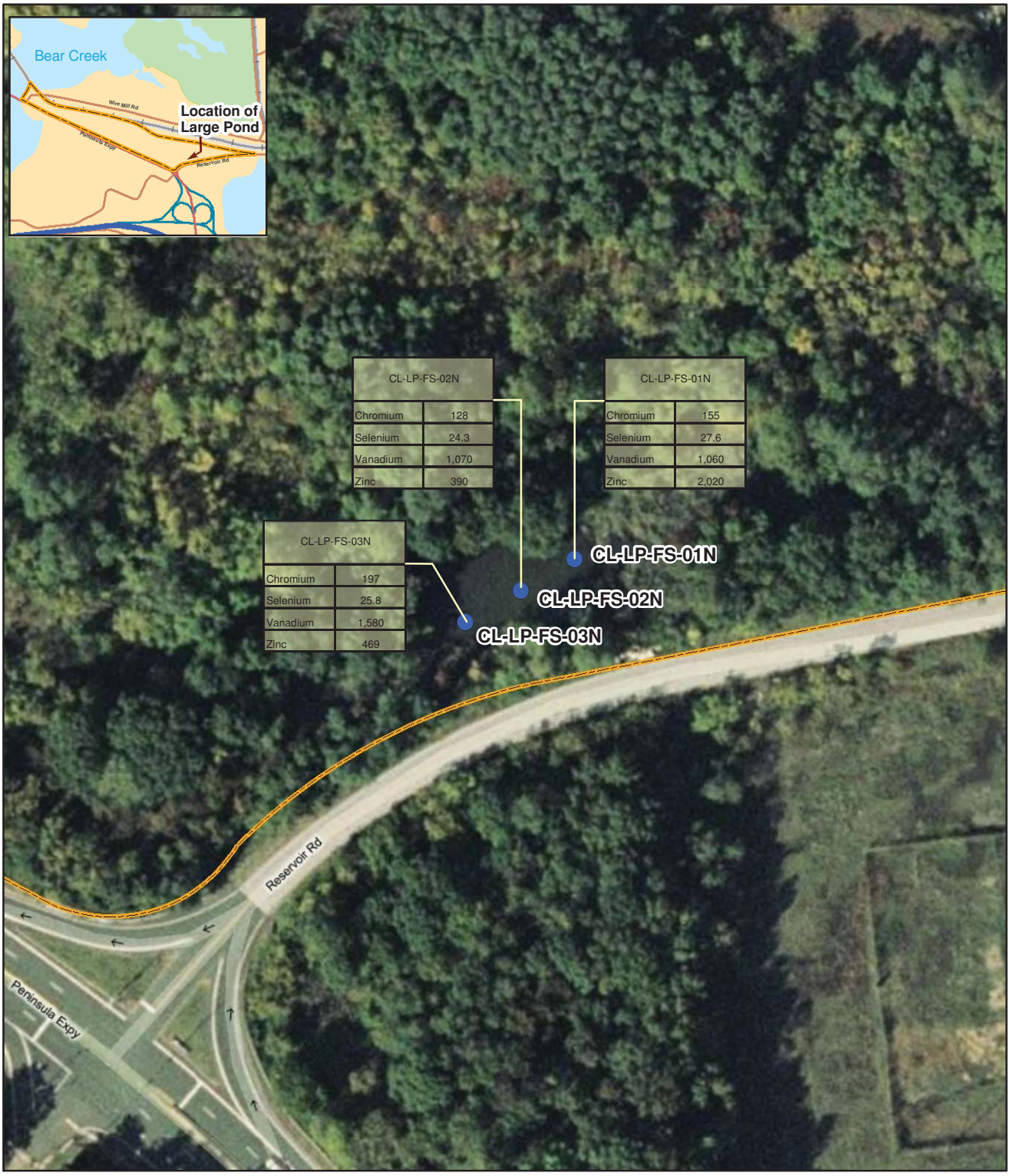
URS

Figure 9
County Lands Parcel 1B
Locations of Small and Large Ponds

RG Steel Sparrows Point
Sparrows Point, Maryland

Prepared By: PLJ	Checked By: MR
Job: 15302184.00002	Map: \\GIS_Data\MTTALSTEEL\Projects\Mittal Steel Ponds.mxd

1460718



Legend

- Sediment/Surface Water Sample Location
- CL1B Parcel

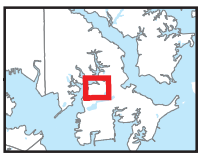
0 50 100 200 Feet

1 inch = 100 feet

(when printed at 8.5x11)

Reference:
Imagery provided by Bing Maps

NAD 1983 StatePlane Maryland
Projection: Lambert Conformal Conic
Linear Unit: US Foot



Note: Sampling locations are approximated and based on imagery. Sediment concentrations are shown in mg/kg.

URS

335 Commerce Drive, Suite 300
Fort Washington, PA 19034
Phone: (215) 367-2500 Fax: (215) 367-1000

Job:	15302184.00002
Prepared by:	PLJ
Checked by:	MR
Date:	07-09-2010

Figure 15
County Lands Parcel 1B-Large Pond
Chemical Concentrations of Risk Drivers
RG Steel Sparrows Point
Sparrows Point, Maryland

Q:\GIS_Data\MTTALSTEEL\Projects\BERA\Mittal Steel Chem Conc Large Pond Figure 15.mxd

N

Legend

- Sediment/Surface Water Sample Location
- CL1B Parcel

0 125 250 500 Feet

1 inch = 250 feet

(when printed at 8.5x11)

Reference:
Imagery obtained via field review

NAD 1983 StatePlane Maryland
Projection: Lambert Conformal Conic
Linear Unit: US Foot

Note: Sampling locations are approximated and based on imagery. Sediment concentrations are shown in mg/kg.

URS
335 Commerce Drive, Suite 300
Fort Washington, PA 19034
Phone: (215) 367-2500 Fax: (215) 367-1000

Job:	15302184.00002
Prepared by:	PLJ
Checked by:	MR
Date:	07/08/2010

Figure 16
County Lands Parcel 1B-Small Pond
Chemical Concentrations of Risk Drivers
RG Steel Sparrows Point
Sparrows Point, Maryland

Q:\GIS_Data\MTTALSTEEL\Projects\BERA\Mittal Steel Chem Conc Small Pond Figure 16.mxd

Appendix A

Analytical Data Used in the BERA

Key to Acronyms/Qualifiers:

NA = not available
Qual = validated data qualifier
RL = reporting limit
TOC = total organic carbon
B = The analyte was not detected substantially above the level reported in laboratory or field blanks
J = The analyte was positively detected; the associated numerical value is approximate
K = The analyte was positively detected; the reported value may be biased high
L = The analyte was positively detected; the reported value may be biased low
U = The analyte was not detected above the reporting limit
UJ = The analyte's reporting limit is approximate
UL = The analyte was not detected above the reporting limit; the reporting limit may be biased low
R = Rejected data

TABLE B-6
COUNTY LANDS 1B PARCEL SURFACE SOIL DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SS-11			CL-SS-12			CL-SS-13			CL-SS-14			CL-SS-15		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Inorganics (mg/kg)																
Antimony	7440-36-0	0.27	L	1.1	2.4	L	5.1		UL	12.4		UL	1.1		UL	2.2
Arsenic	7440-38-2	4.1		1.1	13.5		1	12.7		6.2	3.3		1.1	3.7		1.1
Barium	7440-39-3	42.9		22.1	74.3		20.3	44.2		24.8	211		22.2	195		22
Beryllium	7440-41-7	0.41		0.44	0.74	B	0.41	0.27	B	2.5	2.4	B	0.44	2.5	B	0.44
Cadmium	7440-43-9	0.4		0.55	3.2		2.5	5.1		6.2	0.67		0.56	2.9		1.1
Chromium	7440-47-3	26.1	K	0.55	96.6	K	2.5	212	K	6.2	27	K	0.56	223	K	1.1
Cobalt	7440-48-4	5		5.5	8.1		5.1	7.4		6.2	3.1		5.6	3.2		5.5
Copper	7440-50-8	34.1		2.8	2060		12.7	138		3.1	19.3		2.8	55.6		2.7
Cyanide, Total	57-12-5	2		0.55	1.5		0.51	13.5		0.62	2.1		0.56	0.93		0.55
Lead	7439-92-1	80.3	L	0.33	425		1.5	538		3.7	54.7		0.33	155		0.66
Mercury	7439-97-6	0.27		0.036	0.012		0.034	0.19		0.041		U	0.037		U	0.036
Nickel	7440-02-0	8.4		4.4	53.9		4.1	53.9		5	8.9		4.4	19.8		4.4
Selenium	7782-49-2	1.5		0.55	1.5		2.5	6.1		6.2	0.92		0.56		U	5.5
Silver	7440-22-4	0.19		0.55	1.5		0.51	5.4		0.62	0.61		0.56	3.2		0.55
Sulfide, Total	18496-25-8		U	33.1	73.2		30.5		U	37.1	249		33.3	290		32.9
Thallium	7440-28-0		U	1.1		U	5.1		U	12.4	1.1		1.1		U	11
Tin	7440-31-5	7.5		11	179		10.2	55.8		12.4	6.3		11.1	14.6		11
Vanadium	7440-62-2	40.6		5.5	55.7		25.4	64.3		61.9	32.4		5.6	1210		11
Zinc	7440-66-6	172		2.2	1790	K	10.2	6430	K	24.8	227	K	2.2	1390	K	4.4
PCBs (ug/kg)																
Aroclor 1016	12674-11-2		U	18		U	17		U	21		U	19		U	18
Aroclor 1221	11104-28-2		U	18		U	17		U	21		U	19		U	18
Aroclor 1232	11141-16-5		U	18		U	17		U	21		U	19		U	18
Aroclor 1242	53469-21-9		U	18		U	17		U	21		U	19		U	18
Aroclor 1248	12672-29-6		U	18		U	17		U	21		U	19		U	18
Aroclor 1254	11097-69-1		U	18		U	17		U	21		U	19		U	18
Aroclor 1260	11096-82-5	33		18		U	17		U	21		U	19		U	18

Highlighted Values Indicate PAL Exceedances

TABLE B-6
COUNTY LANDS 1B PARCEL SURFACE SOIL DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SS-16			CL-SS-17			CL-SS-18			CL-SS-20		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Inorganics (mg/kg)													
Antimony	7440-36-0	0.15	L	1.1	0.56	L	1.1	0.12	L	1.1	0.76	L	1.2
Arsenic	7440-38-2	3.8		1.1	6		1.1	2.7		1.1	5		1.2
Barium	7440-39-3	82.3		21.3	90.8		22.4	120		22.3	90.8		23.2
Beryllium	7440-41-7	0.86	B	0.43	0.58	B	0.45	0.88		0.45	0.4		0.46
Cadmium	7440-43-9	17.6		0.53	0.83		0.56	1.1		0.56	1.2		0.58
Chromium	7440-47-3	175	K	0.53	27.6	K	0.56	175	K	0.56	25.2	K	0.58
Cobalt	7440-48-4	6.3		5.3	5.6		5.6	3.8		5.6	3.8		5.8
Copper	7440-50-8	68.9		2.7	34.8		2.8	25.9		2.8	32.3		2.9
Cyanide, Total	57-12-5	0.29		0.53	0.29		0.56	0.16		0.56	0.9		0.58
Lead	7439-92-1	127		0.32	110		0.34	83.9	L	0.33	130	L	0.35
Mercury	7439-97-6	0.035		0.035	0.2		0.037	0.13		0.037	0.14		0.038
Nickel	7440-02-0	76.3		4.3	12.9		4.5	9.7		4.5	11.9		4.6
Selenium	7782-49-2	0.66		0.53	1.2		0.56		U	5.6	1.7		0.58
Silver	7440-22-4	0.65		0.53	0.38		0.56	3.5		0.56	0.41		0.58
Sulfide, Total	18496-25-8	136		31.9		U	33.6		U	33.5		U	34.7
Thallium	7440-28-0		U	1.1		U	1.1		U	11.2		U	1.2
Tin	7440-31-5	21		10.6	15.8		11.2	10.2		11.2	12.6		11.6
Vanadium	7440-62-2	81.8		5.3	46.7		5.6	548		5.6	40.2		5.8
Zinc	7440-66-6	1430	K	4.3	259	K	2.2	431		2.2	441		2.3
PCBs (ug/kg)													
Aroclor 1016	12674-11-2		U	18		U	19		U	19		U	19
Aroclor 1221	11104-28-2		U	18		U	19		U	19		U	19
Aroclor 1232	11141-16-5		U	18		U	19		U	19		U	19
Aroclor 1242	53469-21-9		U	18		U	19		U	19		U	19
Aroclor 1248	12672-29-6		U	18		U	19		U	19		U	19
Aroclor 1254	11097-69-1		U	18		U	19		U	19		U	19
Aroclor 1260	11096-82-5		U	18		U	19	79		19		U	19

Highlighted Values Indicate PAL Exceedances

TABLE B-6
COUNTY LANDS 1B PARCEL SURFACE SOIL DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SS-11			CL-SS-12			CL-SS-13			CL-SS-14			CL-SS-15		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
VOCs (ug/kg)																
1,1,1,2-Tetrachloroethane	630-20-6		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
1,1,1-Trichloroethane	71-55-6		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
1,1,2,2-Tetrachloroethane	79-34-5		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
1,1,2-Trichloroethane	79-00-5		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
1,1-Dichloroethane	75-34-3		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
1,1-Dichloroethene	75-35-4		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
1,2-Dichloroethane	107-06-2		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
1,2-Dichloropropane	78-87-5		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
2-Butanone	78-93-3		U	8.3		UJ	6.2		U	8.1	11		9.7		U	7.4
2-Hexanone	591-78-6		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
4-Methyl-2-pentanone	108-10-1		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Acetone	67-64-1		U	33	14	B	25		U	32	70	B	39		U	29
Benzene	71-43-2		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Bromoform	75-25-2		U	8.3		UJ	6.2		U	8.1		U	9.7		UJ	7.4
Carbon disulfide	75-15-0		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Carbon tetrachloride	56-23-5		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Chlorobenzene	108-90-7		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Chloroethane	75-00-3		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Chloroform	67-66-3		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
cis-1,3-Dichloropropene	10061-01-5		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Ethylbenzene	100-41-4		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Methylene chloride	75-09-2	9.4	B	8.3	2.5		6.2		U	8.1	4.4	B	9.7	3.9	B	7.4
Tetrachloroethene	127-18-4		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Toluene	108-88-3		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
trans-1,2-Dichloroethene	156-60-5		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
trans-1,3-Dichloropropene	10061-02-6		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Trichloroethene	79-01-6		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Vinyl chloride	75-01-4		U	8.3		UJ	6.2		U	8.1		U	9.7		U	7.4
Xylenes (total)	1330-20-7		U	25		U	18		U	24		U	29		U	22

Highlighted Values Indicate PAL Exceedances

TABLE B-6
COUNTY LANDS 1B PARCEL SURFACE SOIL DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SS-16			CL-SS-17			CL-SS-18			CL-SS-20		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
VOCs (ug/kg)													
1,1,1,2-Tetrachloroethane	630-20-6		U	6.8		U	9.6		U	8.9		U	9.7
1,1,1-Trichloroethane	71-55-6		U	6.8		U	9.6		U	8.9		U	9.7
1,1,2,2-Tetrachloroethane	79-34-5		U	6.8		U	9.6		U	8.9		U	9.7
1,1,2-Trichloroethane	79-00-5		U	6.8		U	9.6		U	8.9		U	9.7
1,1-Dichloroethane	75-34-3		U	6.8		U	9.6		U	8.9		U	9.7
1,1-Dichloroethene	75-35-4		U	6.8		U	9.6		U	8.9		U	9.7
1,2-Dichloroethane	107-06-2		U	6.8		U	9.6		U	8.9		U	9.7
1,2-Dichloropropane	78-87-5		U	6.8		U	9.6		U	8.9		U	9.7
2-Butanone	78-93-3		U	6.8	42		9.6		U	8.9		U	9.7
2-Hexanone	591-78-6		U	6.8		U	9.6		U	8.9		U	9.7
4-Methyl-2-pentanone	108-10-1		U	6.8		U	9.6		U	8.9		U	9.7
Acetone	67-64-1	9.1	B	27	240		38		U	36		U	39
Benzene	71-43-2		U	6.8		U	9.6		U	8.9		U	9.7
Bromoform	75-25-2		U	6.8		UJ	9.6		U	8.9		U	9.7
Carbon disulfide	75-15-0		U	6.8		U	9.6		U	8.9		U	9.7
Carbon tetrachloride	56-23-5		U	6.8		U	9.6		U	8.9		U	9.7
Chlorobenzene	108-90-7		U	6.8		U	9.6		U	8.9		U	9.7
Chloroethane	75-00-3		U	6.8		U	9.6		U	8.9		U	9.7
Chloroform	67-66-3		U	6.8		U	9.6		U	8.9		U	9.7
cis-1,3-Dichloropropene	10061-01-5		U	6.8		U	9.6		U	8.9		U	9.7
Ethylbenzene	100-41-4		U	6.8		U	9.6		U	8.9		U	9.7
Methylene chloride	75-09-2	1	B	6.8	3.6	B	9.6	10	B	8.9	11	B	9.7
Tetrachloroethene	127-18-4		U	6.8		U	9.6		U	8.9		U	9.7
Toluene	108-88-3		U	6.8		U	9.6		U	8.9		U	9.7
trans-1,2-Dichloroethene	156-60-5		U	6.8		U	9.6		U	8.9		U	9.7
trans-1,3-Dichloropropene	10061-02-6		U	6.8		U	9.6		U	8.9		U	9.7
Trichloroethene	79-01-6		U	6.8		U	9.6		U	8.9		U	9.7
Vinyl chloride	75-01-4		U	6.8		U	9.6		U	8.9		U	9.7
Xylenes (total)	1330-20-7		U	20		U	29		U	27		U	29

Highlighted Values Indicate PAL Exceedances

TABLE B-6
COUNTY LANDS 1B PARCEL SURFACE SOIL DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SS-11			CL-SS-12			CL-SS-13			CL-SS-14			CL-SS-15		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
PAHs (ug/kg)																
2-Methylnaphthalene	91-57-6	91		150	41		67		U	83	22		74	45		74
Acenaphthene	83-32-9	220		150		U	67		U	83	51		74	19		74
Acenaphthylene	208-96-8	5800		150	78		67		U	83	570		74	230		74
Anthracene	120-12-7	4300		150	79		67		U	83	890		74	100		74
Fluoranthene	206-44-0	29000		150	520		67	140		83	1100		74	540		74
Fluorene	86-73-7	390		150		U	67		U	83	74		74		U	74
Naphthalene	91-20-3	540		150	78		67		U	83	30		74	110		74
Phenanthrene	85-01-8	6600		150	210		67	92		83	380		74	180		74
Benzo(a)anthracene	56-55-3	15000		150	380		67	70	J	83	660		74	350		74
Benzo(a)pyrene	50-32-8	11000		150	480		67	54		83	730		74	330		74
Benzo(b)fluoranthene	205-99-2	19000		150	530		67	160		83	1400		74	500		74
Benzo(ghi)perylene	191-24-2	12000		150	450		67	120		83	1300		74	320		74
Benzo(k)fluoranthene	207-08-9	7300		150	240		67	42		83	390		74	200		74
Chrysene	218-01-9	13000		150	370		67	120		83	800		74	360		74
Dibenz(a,h)anthracene	53-70-3	3600		150	89		67		U	83	250		74	88		74
Indeno(1,2,3-cd)pyrene	193-39-5	12000		150	380		67	81		83	910		74	300		74
Pyrene	129-00-0	13000		150	360		67	79		83	780		74	290		74
Other SVOCs (ug/kg)																
1,2,4-Trichlorobenzene	120-82-1		U	730		U	330		U	410		U	370		U	360
1,2-Dichlorobenzene	95-50-1		U	150		U	67		U	83		U	74		U	74
1,3-Dichlorobenzene	541-73-1		U	150		U	67		U	83		U	74		U	74
1,4-Dichlorobenzene	106-46-7		U	150		U	67		U	83		U	74		U	74
2,2'-oxybis(1-Chloropropane)	108-60-1		U	150		U	67		U	83		U	74		U	74
2,4,5-Trichlorophenol	95-95-4		U	730		U	330		U	410		U	370		U	360
2,4,6-Trichlorophenol	88-06-2		U	730		U	330		U	410		U	370		U	360
2,4-Dichlorophenol	120-83-2		U	150		U	67		U	83		U	74		U	74
2,4-Dimethylphenol	105-67-9		U	730		U	330		U	410		U	370		U	360
2,4-Dinitrophenol	51-28-5		UJ	3300		UJ	1500		UJ	1900		UJ	1700		UJ	1600
2,4-Dinitrotoluene	121-14-2		U	730		U	330		U	410		U	370		U	360
2,6-Dinitrotoluene	606-20-2		U	730		U	330		U	410		U	370		U	360
2-Chloronaphthalene	91-58-7		U	150		U	67		U	83		U	74		U	74
2-Chlorophenol	95-57-8		U	730		U	330		U	410		U	370		U	360
2-Methylphenol	95-48-7		U	730		U	330		U	410		U	370		U	360

Highlighted Values Indicate PAL Exceedances

TABLE B-6
COUNTY LANDS 1B PARCEL SURFACE SOIL DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SS-16			CL-SS-17			CL-SS-18			CL-SS-20		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
PAHs (ug/kg)													
2-Methylnaphthalene	91-57-6	140		140		U	75	47		75		U	78
Acenaphthene	83-32-9	200		140		U	75		U	75		U	78
Acenaphthylene	208-96-8	1600		140		U	75	120		75		U	78
Anthracene	120-12-7	1700		140		U	75	66		75	24		78
Fluoranthene	206-44-0	11000		140	130		75	470		75	180		78
Fluorene	86-73-7	480		140		U	75		U	75		U	78
Naphthalene	91-20-3	180		140		U	75	49		75	21		78
Phenanthrene	85-01-8	6300		140	61	J	75	180		75	87		78
Benzo(a)anthracene	56-55-3	4400		140	61	J	75	230		75	81		78
Benzo(a)pyrene	50-32-8	3900		140	57		75	220		75	76		78
Benzo(b)fluoranthene	205-99-2	4500		140	93		75	300		75	120		78
Benzo(ghi)perylene	191-24-2	3200		140	60		75	210		75	71		78
Benzo(k)fluoranthene	207-08-9	1600		140	29		75		U	75		U	78
Chrysene	218-01-9	4200		140	88		75	230		75	100		78
Dibenz(a,h)anthracene	53-70-3	700		140		U	75	54		75		U	78
Indeno(1,2,3-cd)pyrene	193-39-5	2700		140	48		75	180		75	62		78
Pyrene	129-00-0	6700		140	71		75	230		75	98		78
Other SVOCs (ug/kg)													
1,2,4-Trichlorobenzene	120-82-1		U	700		U	370		U	370		U	380
1,2-Dichlorobenzene	95-50-1		U	140		U	75		U	75		U	78
1,3-Dichlorobenzene	541-73-1		U	140		U	75		U	75		U	78
1,4-Dichlorobenzene	106-46-7		U	140		U	75		U	75		U	78
2,2'-oxybis(1-Chloropropane)	108-60-1		U	140		U	75		U	75		U	78
2,4,5-Trichlorophenol	95-95-4		U	700		U	370		U	370		U	380
2,4,6-Trichlorophenol	88-06-2		U	700		U	370		U	370		U	380
2,4-Dichlorophenol	120-83-2		U	140		U	75		U	75		U	78
2,4-Dimethylphenol	105-67-9		U	700		U	370		U	370		U	380
2,4-Dinitrophenol	51-28-5		UJ	3200		UJ	1700		UJ	1700		UJ	1700
2,4-Dinitrotoluene	121-14-2		U	700		U	370		U	370		U	380
2,6-Dinitrotoluene	606-20-2		U	700		U	370		U	370		U	380
2-Chloronaphthalene	91-58-7		U	140		U	75		U	75		U	78
2-Chlorophenol	95-57-8		U	700		U	370		U	370		U	380
2-Methylphenol	95-48-7		U	700		U	370		U	370		U	380

Highlighted Values Indicate PAL Exceedances

TABLE B-6
COUNTY LANDS 1B PARCEL SURFACE SOIL DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SS-11			CL-SS-12			CL-SS-13			CL-SS-14			CL-SS-15		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
2-Nitrophenol	88-75-5		U	730		U	330		U	410		U	370		U	360
3,3'-Dichlorobenzidine	91-94-1		U	730		U	330		U	410		U	370		U	360
3,3'-Dimethylbenzidine	119-93-7		U	3700		U	1700		U	2100		U	1900		U	1800
3-Methylphenol & 4-Methylphenol	MEPH1314		U	730		U	330		U	410		U	370		U	360
4,6-Dinitro-2-methylphenol	534-52-1		UJ	3300		UJ	1500		UJ	1900		UJ	1700		UJ	1600
4-Bromophenyl phenyl ether	101-55-3		U	730		U	330		U	410		U	370		U	360
4-Chloro-3-methylphenol	59-50-7		U	730		U	330		U	410		U	370		U	360
4-Chlorophenyl phenyl ether	7005-72-3		U	730		U	330		U	410		U	370		U	360
4-Nitrophenol	100-02-7		U	730		U	330		U	410		U	370		U	360
bis(2-Chloroethoxy)methane	111-91-1		U	730		U	330		U	410		U	370		U	360
bis(2-Chloroethyl) ether	111-44-4		U	150		U	67		U	83		U	74		U	74
bis(2-Ethylhexyl) phthalate	117-81-7		U	730	32		330	40		410	39		370	58		360
Butyl benzyl phthalate	85-68-7		U	730		U	330		U	410		U	370		U	360
Dibenzofuran	132-64-9	230		730	28		330		U	410	43		370	36		360
Diethyl phthalate	84-66-2		U	730	56		330		U	410		U	370		U	360
Dimethyl phthalate	131-11-3		U	730		U	330		U	410		U	370		U	360
Di-n-butyl phthalate	84-74-2		U	730		U	330		U	410		U	370		U	360
Di-n-octyl phthalate	117-84-0		U	730		U	330		U	410		U	370		U	360
Hexachlorobenzene	118-74-1		U	150		U	67		U	83		U	74		U	74
Hexachlorobutadiene	87-68-3		U	150		U	67		U	83		U	74		U	74
Hexachlorocyclopentadiene	77-47-4		U	730		U	330		U	410		U	370		U	360
Hexachloroethane	67-72-1		U	730		U	330		U	410		U	370		U	360
Isophorone	78-59-1		U	730		U	330		U	410		U	370		U	360
Nitrobenzene	98-95-3		U	150		U	67		U	83		U	74		U	74
Pentachloroethane	76-01-7		U	740		U	340		U	410		U	370		U	370
Pentachlorophenol	87-86-5		U	220		U	100		U	120		U	110		U	110
Phenol	108-95-2		U	150		U	67		U	83		U	74		U	74
Pyridine	110-86-1		U	730		U	330		U	410		U	370		U	360

Highlighted Values Indicate PAL Exceedances

TABLE B-6
COUNTY LANDS 1B PARCEL SURFACE SOIL DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SS-16			CL-SS-17			CL-SS-18			CL-SS-20		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
2-Nitrophenol	88-75-5		U	700		U	370		U	370		U	380
3,3'-Dichlorobenzidine	91-94-1		U	700		U	370		U	370		U	380
3,3'-Dimethylbenzidine	119-93-7		U	3500		U	1900		U	1900		U	1900
3-Methylphenol & 4-Methylphenol	MEPH1314		U	700		U	370		U	370		U	380
4,6-Dinitro-2-methylphenol	534-52-1		UJ	3200		UJ	1700		UJ	1700		UJ	1700
4-Bromophenyl phenyl ether	101-55-3		U	700		U	370		U	370		U	380
4-Chloro-3-methylphenol	59-50-7		U	700		U	370		U	370		U	380
4-Chlorophenyl phenyl ether	7005-72-3		U	700		U	370		U	370		U	380
4-Nitrophenol	100-02-7		U	700		U	370		U	370		U	380
bis(2-Chloroethoxy)methane	111-91-1		U	700		U	370		U	370		U	380
bis(2-Chloroethyl) ether	111-44-4		U	140		U	75		U	75		U	78
bis(2-Ethylhexyl) phthalate	117-81-7	100		700	44		370	100		370	82		380
Butyl benzyl phthalate	85-68-7		U	700		U	370	49		370	37		380
Dibenzofuran	132-64-9	320		700		U	370	28		370		U	380
Diethyl phthalate	84-66-2		U	700		U	370		U	370		U	380
Dimethyl phthalate	131-11-3		U	700		U	370		U	370		U	380
Di-n-butyl phthalate	84-74-2		U	700		U	370		U	370		U	380
Di-n-octyl phthalate	117-84-0		U	700		U	370		U	370		U	380
Hexachlorobenzene	118-74-1		U	140		U	75		U	75		U	78
Hexachlorobutadiene	87-68-3		U	140		U	75		U	75		U	78
Hexachlorocyclopentadiene	77-47-4		U	700		U	370		U	370		U	380
Hexachloroethane	67-72-1		U	700		U	370		U	370		U	380
Isophorone	78-59-1		U	700		U	370		U	370		U	380
Nitrobenzene	98-95-3		U	140		U	75		U	75		U	78
Pentachloroethane	76-01-7		U	700		U	370		U	370		U	390
Pentachlorophenol	87-86-5		U	210		U	110		U	110		U	120
Phenol	108-95-2		U	140		U	75		U	75		U	78
Pyridine	110-86-1		U	700		U	370		U	370		U	380

Highlighted Values Indicate PAL Exceedances

TABLE B-1
CL1B LARGE POND SEDIMENT DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-LP-FS-01N			CL-LP-FS-02N			CL-LP-FS-03N		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Inorganics (mg/kg)										
Antimony	7440-36-0		U	41.9		U	7.4		U	9.7
Arsenic	7440-38-2	12.8	B	41.9	6.6	B	7.4	8.2	B	9.7
Barium	7440-39-3	72.9	B	838	67.5	B	148	68.4	B	194
Beryllium	7440-41-7	21.9		16.8	12		3	13.1		3.9
Cadmium	7440-43-9		U	20.9		U	3.7	0.55	B	4.8
Chromium	7440-47-3	155	J	20.9	128	J	3.7	197	J	4.8
Cobalt	7440-48-4	10.1	B	209	4.1	B	37.1	7	B	48.4
Copper	7440-50-8	48.7	B	105	16.2	B	18.6	24.8		24.2
Cyanide, Total	57-12-5	4	B	4.2	3.6	B	3.7	3.6	B	4.8
Lead	7439-92-1	155		12.6	58.9		2.2	61.2		2.9
Mercury	7439-97-6	0.11	B	0.28	0.082	B	0.24	0.12	B	0.32
Nickel	7440-02-0	44.8	B	168	21.3	B	29.7	33.5	B	38.8
Selenium	7782-49-2	27.6		20.9	24.3		3.7	25.8		4.8
Silver	7440-22-4		U	20.9	1.1	B	3.7		U	4.8
Thallium	7440-28-0		U	41.9		U	7.4		U	9.7
Tin	7440-31-5		U	419	11	B	74.2	14.2	B	96.9
Total Sulfide	18496-25-8	17200		251	7720		223	14000		291
Vanadium	7440-62-2	1060		209	1070		37.1	1580		48.4
Zinc	7440-66-6	2020	J	83.8	390	J	14.8	469	J	19.4
PCBs (ug/kg)										
Aroclor 1016	12674-11-2		U	140		U	120		U	160
Aroclor 1221	11104-28-2		U	140		U	120		U	160
Aroclor 1232	11141-16-5		U	140		U	120		U	160
Aroclor 1242	53469-21-9		U	140		U	120		U	160
Aroclor 1248	12672-29-6		U	140		U	120		U	160
Aroclor 1254	11097-69-1		U	140		U	120		U	160
Aroclor 1260	11096-82-5		U	140		U	120		U	160
VOCs (ug/kg)										
1,1,1,2-Tetrachloroethane	630-20-6		U	140		U	120		U	160
1,1,1-Trichloroethane	71-55-6		U	42		U	37		U	48
1,1,2,2-Tetrachloroethane	79-34-5		U	42		U	37		U	48
1,1,2-Trichloroethane	79-00-5		U	42		U	37		U	48
1,1-Dichloroethane	75-34-3		U	42		U	37		U	48
1,1-Dichloroethene	75-35-4		U	42		U	37		U	48
1,2-Dichloroethane	107-06-2		U	42		U	37		U	48
1,2-Dichloropropane	78-87-5		U	42		U	37		U	48
2-Butanone	78-93-3		U	42		U	37		U	48
2-Hexanone	591-78-6		U	42		U	37		U	48
4-Methyl-2-pentanone	108-10-1		U	42		U	37		U	48
Acetone	67-64-1		U	170	83	J	150	91	J	190
Benzene	71-43-2		U	42		U	37		U	48
Bromoform	75-25-2		U	42		U	37		U	48
Carbon disulfide	75-15-0		U	42		U	37		U	48
Carbon tetrachloride	56-23-5		U	42		U	37		U	48
Chlorobenzene	108-90-7		U	42		U	37		U	48
Chloroethane	75-00-3		U	42		U	37		U	48
Chloroform	67-66-3		U	42		U	37		U	48
cis-1,3-Dichloropropene	10061-01-5		U	42		U	37		U	48
Ethylbenzene	100-41-4		U	42		U	37		U	48
Methylene chloride	75-09-2	7	J B	42		U	37		U	48
Tetrachloroethene	127-18-4		U	42		U	37		U	48
Toluene	108-88-3		U	42		U	37		U	48
trans-1,2-Dichloroethene	156-60-5		U	42		U	37		U	48
trans-1,3-Dichloropropene	10061-02-6		U	42		U	37		U	48
Trichloroethene	79-01-6		U	42		U	37		U	48
Vinyl chloride	75-01-4		U	42		U	37		U	48
Xylenes (total)	1330-20-7		U	130		U	110		U	150

Highlighted Values Indicate PAL Exceedances

TABLE B-1
CL1B LARGE POND SEDIMENT DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-LP-FS-01N			CL-LP-FS-02N			CL-LP-FS-03N		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
PAHs (ug/kg)										
2-Methylnaphthalene	91-57-6		U	560		U	500		U	640
Acenaphthene	83-32-9		U	560		U	500		U	640
Acenaphthylene	208-96-8		U	560		U	500		U	640
Anthracene	120-12-7		U	560		U	500		U	640
Benzo(a)anthracene	56-55-3		U	560		U	500		U	640
Benzo(a)pyrene	50-32-8		U	560		U	500		U	640
Benzo(b)fluoranthene	205-99-2	120	J	560	120	J	500	140	J	640
Benzo(ghi)perylene	191-24-2		U	560		U	500		U	640
Benzo(k)fluoranthene	207-08-9		U	560		U	500		U	640
Chrysene	218-01-9		U	560		U	500		U	640
Dibenz(a,h)anthracene	53-70-3		U	560		U	500		U	640
Fluoranthene	206-44-0		U	560		U	500		U	640
Fluorene	86-73-7		U	560		U	500		U	640
Indeno(1,2,3-cd)pyrene	193-39-5		U	560		U	500		U	640
Naphthalene	91-20-3		U	560		U	500		U	640
Phenanthrene	85-01-8		U	560		U	500		U	640
Pyrene	129-00-0		U	560		U	500		U	640
Other SVOCs (ug/kg)										
1,2,4-Trichlorobenzene	120-82-1		U	560		U	500		U	640
1,2-Dichlorobenzene	95-50-1		U	560		U	500		U	640
1,3-Dichlorobenzene	541-73-1		U	560		U	500		U	640
1,4-Dichlorobenzene	106-46-7		U	560		U	500		U	640
2,2'-oxybis(1-Chloropropane)	108-60-1		U	560		U	500		U	640
2,4,5-Trichlorophenol	95-95-4		U	2700		U	2400		U	3200
2,4,6-Trichlorophenol	88-06-2		U	2700		U	2400		U	3200
2,4-Dichlorophenol	120-83-2		U	560		U	500		U	640
2,4-Dimethylphenol	105-67-9		U	2700		U	2400		U	3200
2,4-Dinitrophenol	51-28-5		U	14000		U	13000		U	16000
2,4-Dinitrotoluene	121-14-2		U	2700		U	2400		U	3200
2,6-Dinitrotoluene	606-20-2		U	2700		U	2400		U	3200
2-Chloronaphthalene	91-58-7		U	560		U	500		U	640
2-Chlorophenol	95-57-8		U	2700		U	2400		U	3200
2-Methylphenol	95-48-7		U	2700		U	2400		U	3200
2-Nitrophenol	88-75-5		U	2700		U	2400		U	3200
3,3'-Dichlorobenzidine	91-94-1		U	2700		U	2400		U	3200
3,3'-Dimethylbenzidine	119-93-7		U	14000		U	13000		U	16000
3-Methylphenol & 4-Methylphenol	MEPH1314		U	2700		U	2400		U	3200
4,6-Dinitro-2-methylphenol	534-52-1		U	14000		U	13000		U	16000
4-Bromophenyl phenyl ether	101-55-3		U	2700		U	2400		U	3200
4-Chloro-3-methylphenol	59-50-7		U	2700		U	2400		U	3200
4-Chlorophenyl phenyl ether	7005-72-3		U	2700		U	2400		U	3200
4-Nitrophenol	100-02-7		U	14000		U	13000		U	16000
bis(2-Chloroethoxy)methane	111-91-1		U	2700		U	2400		U	3200
bis(2-Chloroethyl) ether	111-44-4		U	560		U	500		U	640
bis(2-Ethylhexyl) phthalate	117-81-7		U	2700		U	2400		U	3200
Butyl benzyl phthalate	85-68-7		U	2700		U	2400		U	3200
Dibenzofuran	132-64-9		U	2700		U	2400		U	3200
Diethyl phthalate	84-66-2		U	2700		U	2400		U	3200
Dimethyl phthalate	131-11-3		U	2700		U	2400		U	3200
Di-n-butyl phthalate	84-74-2		U	2700		U	2400		U	3200
Di-n-octyl phthalate	117-84-0		U	2700		U	2400		U	3200
Hexachlorobenzene	118-74-1		U	560		U	500		U	640
Hexachlorobutadiene	87-68-3		U	560		U	500		U	640
Hexachlorocyclopentadiene	77-47-4		U	2700		U	2400		U	3200
Hexachloroethane	67-72-1		U	2700		U	2400		U	3200
Isophorone	78-59-1		U	2700		U	2400		U	3200
Nitrobenzene	98-95-3		U	560		U	500		U	640
Pentachloroethane	76-01-7		U	2800		U	2500		U	3200

Highlighted Values Indicate PAL Exceedances

TABLE B-1
CL1B LARGE POND SEDIMENT DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-LP-FS-01N			CL-LP-FS-02N			CL-LP-FS-03N		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Pentachlorophenol	87-86-5		U	2700		U	2400		U	3200
Phenol	108-95-2		U	560		U	500		U	640
Pyridine	110-86-1		U	2700		U	2400		U	3200
Other										
TOC (mg/kg)	7440-44-0	43000		14300	34000	B	35700	34600	B	9610

Highlighted Values Indicate PAL Exceedances

TABLE B-2
CL1B PARCEL LARGE POND SURFACE WATER DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-LP-SW-01N			CL-LP-SW-02N			CL-LP-SW-03N		
		Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Inorganics (ug/L)										
Antimony, Dissolved	7440-36-0		U	10		U	10		U	10
Arsenic, Dissolved	7440-38-2		U	10		U	10		U	10
Barium, Dissolved	7440-39-3	41.9	B	200	57.5	B	200	42.3	B	200
Beryllium, Dissolved	7440-41-7		U	4		U	4		U	4
Cadmium, Dissolved	7440-43-9		U	5		U	5		U	5
Chromium, Dissolved	7440-47-3		U	5		U	5		U	5
Cobalt, Dissolved	7440-48-4	5.8	B	50	2.4	B	50		U	50
Copper, Dissolved	7440-50-8	1.5	B J	25	0.93	B J	25	1.4	B J	25
Lead, Dissolved	7439-92-1		U	3		U	3		U	3
Mercury, Dissolved	7439-97-6	0.089	B J	0.2	0.1	B J	0.2	0.08	B J	0.2
Nickel, Dissolved	7440-02-0	1.4	B	40		U	40		U	40
Selenium, Dissolved	7782-49-2		U	5	4.5	B	5		U	5
Silver, Dissolved	7440-22-4		U	5	0.65	B	5		U	5
Thallium, Dissolved	7440-28-0		U	10		U	10		U	10
Tin, Dissolved	7440-31-5		U	100		U	100		U	100
Vanadium, Dissolved	7440-62-2	5	B	50	10.2	B	50	4.9	B	50
Zinc, Dissolved	7440-66-6	9	B J	20	6.8	B J	20	7.1	B J	20
Antimony, Total	7440-36-0		U	10		U	10		U	10
Arsenic, Total	7440-38-2		U	10		U	10		U	10
Barium, Total	7440-39-3	44.1	B	200	67.9	B	200	45.8	B	200
Beryllium, Total	7440-41-7		U	4		U	4		U	4
Cadmium, Total	7440-43-9		U	5		U	5		U	5
Chromium, Total	7440-47-3	1.8	B	5	2.5	B	5		U	5
Cobalt, Total	7440-48-4		U	50		U	50		U	50
Copper, Total	7440-50-8	1	B	25	1.2	B	25	0.96	B	25
Cyanide, Total	57-12-5		U	10	2.6	B	10		U	10
Lead, Total	7439-92-1		U	3		U	3		U	3
Mercury, Total	7439-97-6		U	0.2		U	0.2		U	0.2
Nickel, Total	7440-02-0	1.3	B	40	1.9	B	40		U	40
Selenium, Total	7782-49-2	2.8	B	5	4.1	B	5	2.7	B	5
Silver, Total	7440-22-4		U	5	1.1	B	5		U	5
Thallium, Total	7440-28-0		U	10		U	10		U	10
Tin, Total	7440-31-5		U	100		U	100		U	100
Total Sulfide, Total	18496-25-8		U	3		U	3		U	3
Vanadium, Total	7440-62-2	14.8	B	50	19.6	B	50	7.7	B	50
Zinc, total	7440-66-6	5.9	B J	20	10.3	B J	20	8.5	B J	20
PCBs (ug/L)										
Aroclor 1016	12674-11-2		U	0.41		U	0.41		U	0.41
Aroclor 1221	11104-28-2		U	0.41		U	0.41		U	0.41
Aroclor 1232	11141-16-5		U	0.41		U	0.41		U	0.41
Aroclor 1242	53469-21-9		U	0.41		U	0.41		U	0.41
Aroclor 1248	12672-29-6		U	0.41		U	0.41		U	0.41
Aroclor 1254	11097-69-1		U	0.41		U	0.41		U	0.41
Aroclor 1260	11096-82-5		U	0.41		U	0.41		U	0.41
VOCs (ug/L)										
1,1,1,2-Tetrachloroethane	630-20-6		U	1		U	1		U	1
1,1,1-Trichloroethane	71-55-6		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane	79-34-5		U	1		U	1		U	1
1,1,2-Trichloroethane	79-00-5		U	1		U	1		U	1
1,1-Dichloroethane	75-34-3		U	1		U	1		U	1
1,1-Dichloroethene	75-35-4		U	1		U	1		U	1
1,2-Dichloroethane	107-06-2		U	1		U	1		U	1
1,2-Dichloropropane	78-87-5		U	1		U	1		U	1

Highlighted Values Indicate PAL Exceedances

TABLE B-2
CL1B PARCEL LARGE POND SURFACE WATER DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

		CL-LP-SW-01N			CL-LP-SW-02N			CL-LP-SW-03N		
Constituent	**CAS #**	**Result**	**Qual**	**RL**	**Result**	**Qual**	**RL**	**Result**	**Qual**	**RL**
2-Butanone	78-93-3		U	5	1.6	J	5	1.1	J	5
2-Hexanone	591-78-6		U	5		U	5		U	5
4-Methyl-2-pentanone	108-10-1		U	5		U	5		U	5
Acetone	67-64-1	7.4		5	7.7		5	5.5		5
Benzene	71-43-2		U	1		U	1		U	1
Bromoform	75-25-2		U	1		U	1		U	1
Carbon disulfide	75-15-0		U	1		U	1		U	1
Carbon tetrachloride	56-23-5		U	1		U	1		U	1
Chlorobenzene	108-90-7		U	1		U	1		U	1
Chloroethane	75-00-3		U	1		U	1		U	1
Chloroform	67-66-3		U	1		U	1		U	1
cis-1,3-Dichloropropene	10061-01-5		U	1		U	1		U	1
Ethylbenzene	100-41-4		U	1		U	1		U	1
Methylene chloride	75-09-2		U	1		U	1		U	1
Tetrachloroethene	127-18-4		U	1		U	1		U	1
Toluene	108-88-3		U	1	0.25	J	1		U	1
trans-1,2-Dichloroethene	156-60-5		U	1		U	1		U	1
trans-1,3-Dichloropropene	10061-02-6		U	1		U	1		U	1
Trichloroethene	79-01-6		U	1		U	1		U	1
Vinyl chloride	75-01-4		U	1		U	1		U	1
Xylenes (total)	1330-20-7		U	3		U	3		U	3
PAHs (ug/L)										
2-Methylnaphthalene	91-57-6		U	2.1		U	2.2		U	2.2
Acenaphthene	83-32-9		U	2.1		U	2.2		U	2.2
Acenaphthylene	208-96-8		U	2.1		U	2.2		U	2.2
Anthracene	120-12-7		U	2.1		U	2.2		U	2.2
Benzo(a)anthracene	56-55-3		U	2.1		U	2.2		U	2.2
Benzo(a)pyrene	50-32-8		U	2.1		U	2.2		U	2.2
Benzo(b)fluoranthene	205-99-2		U	2.1		U	2.2		U	2.2
Benzo(ghi)perylene	191-24-2		U	2.1		U	2.2		U	2.2
Benzo(k)fluoranthene	207-08-9		U	2.1		U	2.2		U	2.2
Chrysene	218-01-9		U	2.1		U	2.2		U	2.2
Dibenz(a,h)anthracene	53-70-3		U	2.1		U	2.2		U	2.2
Fluoranthene	206-44-0		U	2.1		U	2.2		U	2.2
Fluorene	86-73-7		U	2.1		U	2.2		U	2.2
Indeno(1,2,3-cd)pyrene	193-39-5		U	2.1		U	2.2		U	2.2
Naphthalene	91-20-3		U	2.1		U	2.2		U	2.2
Phenanthrene	85-01-8		U	2.1		U	2.2		U	2.2
Pyrene	129-00-0		U	2.1		U	2.2		U	2.2
Other SVOCs (ug/L)										
1,2,4-Trichlorobenzene	120-82-1		U	2.1		U	2.2		U	2.2
1,2-Dichlorobenzene	95-50-1		U	2.1		U	2.2		U	2.2
1,3-Dichlorobenzene	541-73-1		U	2.1		U	2.2		U	2.2
1,4-Dichlorobenzene	106-46-7		U	2.1		U	2.2		U	2.2
2,2'-oxybis(1-Chloropropane)	108-60-1		U	2.1		U	2.2		U	2.2
2,4,5-Trichlorophenol	95-95-4		U	10		U	11		R	11
2,4,6-Trichlorophenol	88-06-2		U	10		U	11		R	11
2,4-Dichlorophenol	120-83-2		U	2.1		U	2.2		R	2.2
2,4-Dimethylphenol	105-67-9		U	10		U	11		R	11
2,4-Dinitrophenol	51-28-5		U	52		U	56		R	56
2,4-Dinitrotoluene	121-14-2		U	10		U	11		U	11
2,6-Dinitrotoluene	606-20-2		U	10		U	11		U	11
2-Chloronaphthalene	91-58-7		U	2.1		U	2.2		U	2.2
2-Chlorophenol	95-57-8		U	10		U	11		R	11

Highlighted Values Indicate PAL Exceedances

TABLE B-2
CL1B PARCEL LARGE POND SURFACE WATER DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

		CL-LP-SW-01N			CL-LP-SW-02N			CL-LP-SW-03N		
Constituent	**CAS #**	**Result**	**Qual**	**RL**	**Result**	**Qual**	**RL**	**Result**	**Qual**	**RL**
2-Methylphenol	95-48-7		U	10		U	11		R	11
2-Nitrophenol	88-75-5		U	10		U	11		R	11
3,3'-Dichlorobenzidine	91-94-1		U	10		U	11		U	11
3,3'-Dimethylbenzidine	119-93-7		U	100		U	110		U	110
3-Methylphenol & 4-Methylphenol	MEPH1314		U	10		U	11		R	11
4,6-Dinitro-2-methylphenol	534-52-1		U	52		U	56		R	56
4-Bromophenyl phenyl ether	101-55-3		U	10		U	11		U	11
4-Chloro-3-methylphenol	59-50-7		U	10		U	11		R	11
4-Chlorophenyl phenyl ether	7005-72-3		U	10		U	11		R	11
4-Nitrophenol	100-02-7		U	52		U	56		R	56
bis(2-Chloroethoxy)methane	111-91-1		U	10		U	11		U	11
bis(2-Chloroethyl) ether	111-44-4		U	2.1		U	2.2		U	2.2
bis(2-Ethylhexyl) phthalate	117-81-7		U	10		U	11		U	11
Butyl benzyl phthalate	85-68-7		U	10		U	11		U	11
Dibenzofuran	132-64-9		U	10		U	11		U	11
Diethyl phthalate	84-66-2		U	10		U	11		U	11
Dimethyl phthalate	131-11-3		U	10		U	11		U	11
Di-n-butyl phthalate	84-74-2		U	10		U	11		U	11
Di-n-octyl phthalate	117-84-0		U	10		U	11		U	11
Hexachlorobenzene	118-74-1		U	2.1		U	2.2		U	2.2
Hexachlorobutadiene	87-68-3		U	2.1		U	2.2		U	2.2
Hexachlorocyclopentadiene	77-47-4		U	10		U	11		U	11
Hexachloroethane	67-72-1		U	10		U	11		U	11
Isophorone	78-59-1		U	10		U	11		U	11
Pentachloroethane	76-01-7		U	21		U	22		U	22
Pentachlorophenol	87-86-5		U	10		U	11		R	11
Phenol	108-95-2		U	2.1		U	2.2		U	2.2
Pyridine	110-86-1		U	10		U	11		U	11
Other (mg/L)										
Hardness, as CaCO3	HARDNESS	282		5	372		10	296		5

Highlighted Values Indicate PAL Exceedances

TABLE B-3
CL1B PARCEL SMALL POND SEDIMENT DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-FS-02			CL-SP-FS-01		
		Result	Qual	RL	Result	Qual	RL
Inorganics (mg/kg)							
Antimony	7440-36-0	1.2		7.8		U	5.1
Arsenic	7440-38-2	29.1		7.8	14		5.1
Barium	7440-39-3	167		156	82.5	B	102
Beryllium	7440-41-7	1.2		3.1	1.2	B	2
Cadmium	7440-43-9	191		3.9	68.2		2.5
Chromium	7440-47-3	36.3		3.9	53	J	2.5
Cobalt	7440-48-4	9.4		39.1	8.8	B	25.4
Copper	7440-50-8	277		19.6	231		12.7
Cyanide, Total	57-12-5	417		97.8	3.8		2.5
Lead	7439-92-1	115		2.3	116		1.5
Mercury	7439-97-6	0.2		0.26	0.28		0.17
Nickel	7440-02-0	24.4		31.3	26.7		20.4
Selenium	7782-49-2	114		3.9	74		2.5
Silver	7440-22-4	1.7	L	3.9	2.2	B	2.5
Thallium	7440-28-0	4		7.8	5.1	J	5.1
Tin	7440-31-5	17.4		78.2	19	B	50.9
Total Sulfide	18496-25-8	22200		235	4720		153
Vanadium	7440-62-2	50		39.1	51.9		25.4
Zinc	7440-66-6	22400		78.2	14500	J	102
PCBs (ug/kg)							
Aroclor 1016	12674-11-2		U	130		U	85
Aroclor 1221	11104-28-2		U	130		U	85
Aroclor 1232	11141-16-5		U	130		U	85
Aroclor 1242	53469-21-9		U	130		U	85
Aroclor 1248	12672-29-6		U	130		U	85
Aroclor 1254	11097-69-1		U	130		U	85
Aroclor 1260	11096-82-5	44		130		U	85
VOCs (ug/kg)							
1,1,1,2-Tetrachloroethane	630-20-6		U	39		U	25
1,1,1-Trichloroethane	71-55-6		U	39		U	25
1,1,2,2-Tetrachloroethane	79-34-5		U	39		U	25
1,1,2-Trichloroethane	79-00-5		U	39		U	25
1,1-Dichloroethane	75-34-3		U	39		U	25
1,1-Dichloroethene	75-35-4		U	39		U	25
1,2-Dichloroethane	107-06-2		U	39		U	25
1,2-Dichloropropane	78-87-5		U	39		U	25
2-Butanone	78-93-3	32		39		U	25
2-Hexanone	591-78-6		U	39		U	25
4-Methyl-2-pentanone	108-10-1		U	39		U	25
Acetone	67-64-1	96	J	160		U	100
Benzene	71-43-2		U	39		U	25
Bromoform	75-25-2		U	39		U	25
Carbon disulfide	75-15-0		U	39		U	25
Carbon tetrachloride	56-23-5		U	39		U	25
Chlorobenzene	108-90-7		U	39		U	25

Highlighted Values Indicate PAL Exceedances

TABLE B-3
CL1B PARCEL SMALL POND SEDIMENT DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-FS-02			CL-SP-FS-01		
		Result	Qual	RL	Result	Qual	RL
Chloroethane	75-00-3		U	39		U	25
Chloroform	67-66-3		U	39		U	25
cis-1,3-Dichloropropene	10061-01-5		U	39		U	25
Ethylbenzene	100-41-4		U	39		U	25
Methylene chloride	75-09-2	22		39		U	25
Tetrachloroethene	127-18-4		U	39		U	25
Toluene	108-88-3		U	39		U	25
trans-1,2-Dichloroethene	156-60-5		U	39		U	25
trans-1,3-Dichloropropene	10061-02-6		U	39		U	25
Trichloroethene	79-01-6		U	39		U	25
Vinyl chloride	75-01-4		U	39		U	25
Xylenes (total)	1330-20-7		U	120		U	76
PAHs (ug/kg)							
2-Methylnaphthalene	91-57-6		U	520		U	3400
Acenaphthene	83-32-9		U	520		U	3400
Acenaphthylene	208-96-8		U	520		U	3400
Anthracene	120-12-7		U	520		U	3400
Benzo(a)anthracene	56-55-3		U	520		U	3400
Benzo(a)pyrene	50-32-8		U	520		U	3400
Benzo(b)fluoranthene	205-99-2		U	520		U	3400
Benzo(ghi)perylene	191-24-2		U	520		U	3400
Benzo(k)fluoranthene	207-08-9		U	520		U	3400
Chrysene	218-01-9		U	520		U	3400
Dibenz(a,h)anthracene	53-70-3		U	520		U	3400
Fluoranthene	206-44-0		U	520		U	3400
Fluorene	86-73-7		U	520		U	3400
Indeno(1,2,3-cd)pyrene	193-39-5		U	520		U	3400
Naphthalene	91-20-3		U	520		U	3400
Phenanthrene	85-01-8		U	520		U	3400
Pyrene	129-00-0		U	520		U	3400
Other SVOCs (ug/kg)							
1,2,4-Trichlorobenzene	120-82-1		U	2600		U	3400
1,2-Dichlorobenzene	95-50-1		U	520		U	3400
1,3-Dichlorobenzene	541-73-1		U	520		U	3400
1,4-Dichlorobenzene	106-46-7		U	520		U	3400
2,2'-oxybis(1-Chloropropane)	108-60-1		U	520		U	3400
2,4,5-Trichlorophenol	95-95-4		U	2600		U	17000
2,4,6-Trichlorophenol	88-06-2		U	2600		U	17000
2,4-Dichlorophenol	120-83-2		U	520		U	3400
2,4-Dimethylphenol	105-67-9		U	2600		U	17000
2,4-Dinitrophenol	51-28-5		U	12000		U	87000
2,4-Dinitrotoluene	121-14-2		U	2600		U	17000
2,6-Dinitrotoluene	606-20-2		U	2600		U	17000
2-Chloronaphthalene	91-58-7		U	520		U	3400
2-Chlorophenol	95-57-8		U	2600		U	17000
2-Methylphenol	95-48-7		U	2600		U	17000

Highlighted Values Indicate PAL Exceedances

TABLE B-3
CL1B PARCEL SMALL POND SEDIMENT DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-FS-02			CL-SP-FS-01		
		Result	Qual	RL	Result	Qual	RL
2-Nitrophenol	88-75-5		U	2600		U	17000
3,3'-Dichlorobenzidine	91-94-1		U	2600		U	17000
3,3'-Dimethylbenzidine	119-93-7		U	13000		U	87000
3-Methylphenol & 4-Methylphenol	MEPH1314		U	2600		U	17000
4,6-Dinitro-2-methylphenol	534-52-1		U	12000		U	87000
4-Bromophenyl phenyl ether	101-55-3		U	2600		U	17000
4-Chloro-3-methylphenol	59-50-7		U	2600		U	17000
4-Chlorophenyl phenyl ether	7005-72-3		U	2600		U	17000
4-Nitrophenol	100-02-7		U	2600		U	87000
bis(2-Chloroethoxy)methane	111-91-1		U	2600		U	17000
bis(2-Chloroethyl) ether	111-44-4		U	520		U	3400
bis(2-Ethylhexyl) phthalate	117-81-7		U	2600		U	17000
Butyl benzyl phthalate	85-68-7		U	2600		U	17000
Dibenzofuran	132-64-9		U	2600		U	17000
Diethyl phthalate	84-66-2		U	2600		U	17000
Dimethyl phthalate	131-11-3		U	2600		U	17000
Di-n-butyl phthalate	84-74-2		U	2600		U	17000
Di-n-octyl phthalate	117-84-0		U	2600		U	17000
Hexachlorobenzene	118-74-1		U	520		U	3400
Hexachlorobutadiene	87-68-3		U	520		U	3400
Hexachlorocyclopentadiene	77-47-4		U	2600		U	17000
Hexachloroethane	67-72-1		U	2600		U	17000
Isophorone	78-59-1		U	2600		U	17000
Nitrobenzene	98-95-3		U	520		U	3400
Pentachloroethane	76-01-7		U	2600		U	17000
Pentachlorophenol	87-86-5		U	770		U	17000
Phenol	108-95-2		U	520		U	3400
Pyridine	110-86-1		U	2600		U	17000
Other							
TOC (mg/kg)	7440-44-0	129000		39100	94700		39800

Highlighted Values Indicate PAL Exceedances

TABLE B-4
CL1B PARCEL SMALL POND SURFACE WATER DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SW-02			CL-SP-SW-01		
		Result	Qual	RL	Result	Qual	RL
Inorganics (ug/L)							
Antimony, Dissolved	7440-36-0		U	10		U	10
Arsenic, Dissolved	7440-38-2	4.5	B	10		U	10
Barium, Dissolved	7440-39-3	54.1		200	32.9	B	200
Beryllium, Dissolved	7440-41-7		U	4		U	4
Cadmium, Dissolved	7440-43-9	1.1		5	2.2	B	5
Chromium, Dissolved	7440-47-3		U	5		U	5
Cobalt, Dissolved	7440-48-4		U	50	11.1	B	50
Copper, Dissolved	7440-50-8	2.8		25	3	B J	25
Lead, Dissolved	7439-92-1		U	3		U	3
Mercury, Dissolved	7439-97-6		U	0.2	0.081	B J	0.2
Nickel, Dissolved	7440-02-0	3.6	B	40	14	B	40
Selenium, Dissolved	7782-49-2	8.3		5	16.6		5
Silver, Dissolved	7440-22-4		U	5	1	B	5
Thallium, Dissolved	7440-28-0		U	10	4.3	B	10
Tin, Dissolved	7440-31-5	4.7	B	100		U	100
Vanadium, Dissolved	7440-62-2	10.1		50	3.1	B	50
Zinc, Dissolved	7440-66-6	166		20	5850	J	20
Antimony, Total	7440-36-0		U	10		U	10
Arsenic, Total	7440-38-2	10.1	B	10		U	10
Barium, Total	7440-39-3	101		200	36.3	B	200
Beryllium, Total	7440-41-7		U	4		U	4
Cadmium, Total	7440-43-9	29.6		5	1.4	B	5
Chromium, Total	7440-47-3	8.3		5		U	5
Cobalt, Total	7440-48-4	1.6		50	11.3	B	50
Copper, Total	7440-50-8	51.3		25	3.8	B	25
Cyanide, Total	57-12-5	3.2		10	2.1	B	10
Lead, Total	7439-92-1	21.5		3		U	3
Mercury, Total	7439-97-6		U	0.2		U	0.2
Nickel, Total	7440-02-0	8.5		40	14.9	B	40
Selenium, Total	7782-49-2	24.6		5	16.5		5
Silver, Total	7440-22-4		U	5	1.2	B	5
Thallium, Total	7440-28-0	3.8		10		U	10
Tin, Total	7440-31-5	7	B	100		U	100
Total Sulfide, Total	18496-25-8		U	3		U	3
Vanadium, Total	7440-62-2	17.2		50	2	B	50
Zinc, total	7440-66-6	4170		20	5850	J	20
PCBs (ug/L)							
Aroclor 1016	12674-11-2		U	0.41		U	0.41
Aroclor 1221	11104-28-2		U	0.41		U	0.41
Aroclor 1232	11141-16-5		U	0.41		U	0.41
Aroclor 1242	53469-21-9		U	0.41		U	0.41
Aroclor 1248	12672-29-6		U	0.41		U	0.41
Aroclor 1254	11097-69-1		U	0.41		U	0.41
Aroclor 1260	11096-82-5		U	0.41		U	0.41

Highlighted Values Indicate PAL Exceedances

TABLE B-4
CL1B PARCEL SMALL POND SURFACE WATER DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SW-02			CL-SP-SW-01		
		Result	Qual	RL	Result	Qual	RL
VOCs (ug/L)							
1,1,1,2-Tetrachloroethane	630-20-6		U	1		U	1
1,1,1-Trichloroethane	71-55-6		U	1		U	1
1,1,2,2-Tetrachloroethane	79-34-5		U	1		U	1
1,1,2-Trichloroethane	79-00-5		U	1		U	1
1,1-Dichloroethane	75-34-3		U	1		U	1
1,1-Dichloroethene	75-35-4		U	1	0.26	J	1
1,2-Dichloroethane	107-06-2		U	1		U	1
1,2-Dichloropropane	78-87-5		U	1		U	1
2-Butanone	78-93-3		U	5	1.9	J	5
2-Hexanone	591-78-6		U	5		U	5
4-Methyl-2-pentanone	108-10-1		U	5		U	5
Acetone	67-64-1	5	J	5	10		5
Benzene	71-43-2		U	1		U	1
Bromoform	75-25-2		U	1		U	1
Carbon disulfide	75-15-0	0.53		1		U	1
Carbon tetrachloride	56-23-5		U	1		U	1
Chlorobenzene	108-90-7		U	1		U	1
Chloroethane	75-00-3		UJ	1		U	1
Chloroform	67-66-3		U	1		U	1
cis-1,3-Dichloropropene	10061-01-5		U	1		U	1
Ethylbenzene	100-41-4		U	1		U	1
Methylene chloride	75-09-2		U	1		U	1
Tetrachloroethene	127-18-4		U	1		U	1
Toluene	108-88-3	0.3		1		U	1
trans-1,2-Dichloroethene	156-60-5		U	1		U	1
trans-1,3-Dichloropropene	10061-02-6		U	1		U	1
Trichloroethene	79-01-6		U	1		U	1
Vinyl chloride	75-01-4		U	1		U	1
Xylenes (total)	1330-20-7		U	3		U	3
PAHs (ug/L)							
2-Methylnaphthalene	91-57-6		U	2.4		U	2.2
Acenaphthene	83-32-9		U	2.4		U	2.2
Acenaphthylene	208-96-8		U	2.4		U	2.2
Anthracene	120-12-7		U	2.4		U	2.2
Benzo(a)anthracene	56-55-3		U	2.4		U	2.2
Benzo(a)pyrene	50-32-8		U	2.4		U	2.2
Benzo(b)fluoranthene	205-99-2		U	2.4		U	2.2
Benzo(ghi)perylene	191-24-2		U	2.4		U	2.2
Benzo(k)fluoranthene	207-08-9		U	2.4		U	2.2
Chrysene	218-01-9		U	2.4		U	2.2
Dibenz(a,h)anthracene	53-70-3		U	2.4		U	2.2
Fluoranthene	206-44-0		U	2.4		U	2.2
Fluorene	86-73-7		U	2.4		U	2.2
Indeno(1,2,3-cd)pyrene	193-39-5		U	2.4		U	2.2
Naphthalene	91-20-3		U	2.4		U	2.2
Phenanthrene	85-01-8		U	2.4		U	2.2

Highlighted Values Indicate PAL Exceedances

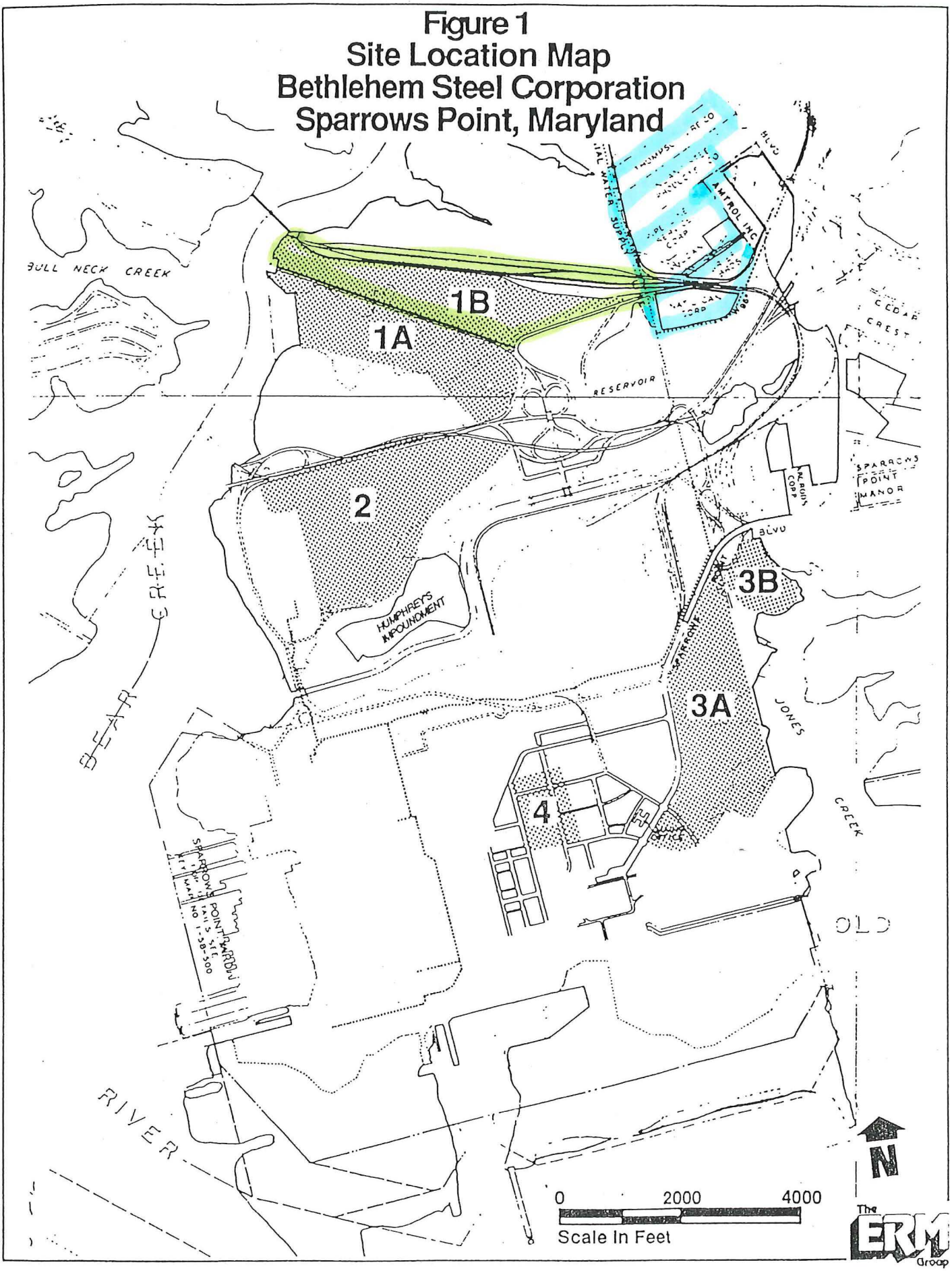
TABLE B-4
CL1B PARCEL SMALL POND SURFACE WATER DATA
RG STEEL SPARROWS POINT SITE
SPARROWS POINT, MARYLAND

Constituent	CAS #	CL-SW-02			CL-SP-SW-01		
		Result	Qual	RL	Result	Qual	RL
Pyrene	129-00-0		U	2.4		U	2.2
Other SVOCs (ug/kg)							
1,2,4-Trichlorobenzene	120-82-1		U	2.4		U	2.2
1,2-Dichlorobenzene	95-50-1		U	2.4		U	2.2
1,3-Dichlorobenzene	541-73-1		U	2.4		U	2.2
1,4-Dichlorobenzene	106-46-7		U	2.4		U	2.2
2,2'-oxybis(1-Chloropropane)	108-60-1		U	2.4		U	2.2
2,4,5-Trichlorophenol	95-95-4		U	12		U	11
2,4,6-Trichlorophenol	88-06-2		U	12		U	11
2,4-Dichlorophenol	120-83-2		U	2.4		U	2.2
2,4-Dimethylphenol	105-67-9		U	12		U	11
2,4-Dinitrophenol	51-28-5		UJ	60		U	56
2,4-Dinitrotoluene	121-14-2		U	12		U	11
2,6-Dinitrotoluene	606-20-2		U	12		U	11
2-Chloronaphthalene	91-58-7		U	2.4		U	2.2
2-Chlorophenol	95-57-8		U	12		U	11
2-Methylphenol	95-48-7		U	12		U	11
2-Nitrophenol	88-75-5		U	12		U	11
3,3'-Dichlorobenzidine	91-94-1		U	12		U	11
3,3'-Dimethylbenzidine	119-93-7		U	60		U	110
3-Methylphenol & 4-Methylphenol	MEPH1314		U	12		U	11
4,6-Dinitro-2-methylphenol	534-52-1		U	60		U	56
4-Bromophenyl phenyl ether	101-55-3		U	12		U	11
4-Chloro-3-methylphenol	59-50-7		U	12		U	11
4-Chlorophenyl phenyl ether	7005-72-3		U	12		U	11
4-Nitrophenol	100-02-7		U	60		U	56
bis(2-Chloroethoxy)methane	111-91-1		U	12		U	11
bis(2-Chloroethyl) ether	111-44-4		U	2.4		U	2.2
bis(2-Ethylhexyl) phthalate	117-81-7		U	12		U	11
Butyl benzyl phthalate	85-68-7		U	12		U	11
Dibenzofuran	132-64-9		U	12		U	11
Diethyl phthalate	84-66-2		U	12		U	11
Dimethyl phthalate	131-11-3		U	12		U	11
Di-n-butyl phthalate	84-74-2		U	12		U	11
Di-n-octyl phthalate	117-84-0		U	12		U	11
Hexachlorobenzene	118-74-1		U	2.4		U	2.2
Hexachlorobutadiene	87-68-3		U	2.4		U	2.2
Hexachlorocyclopentadiene	77-47-4		U	12		U	11
Hexachloroethane	67-72-1		U	12		U	11
Isophorone	78-59-1		U	12		U	11
Nitrobenzene	98-95-3		U	2.4		U	2.2
Pentachloroethane	76-01-7		U	60		U	22
Pentachlorophenol	87-86-5		U	12		U	11
Phenol	108-95-2		U	2.4		U	2.2
Pyridine	110-86-1		U	12		U	11
Other (mg/L)							
Hardness, as CaCO3	HARDNESS	1270		25	2000		50

Highlighted Values Indicate PAL Exceedances

APPENDIX B

Figure 1
Site Location Map
Bethlehem Steel Corporation
Sparrows Point, Maryland



43922

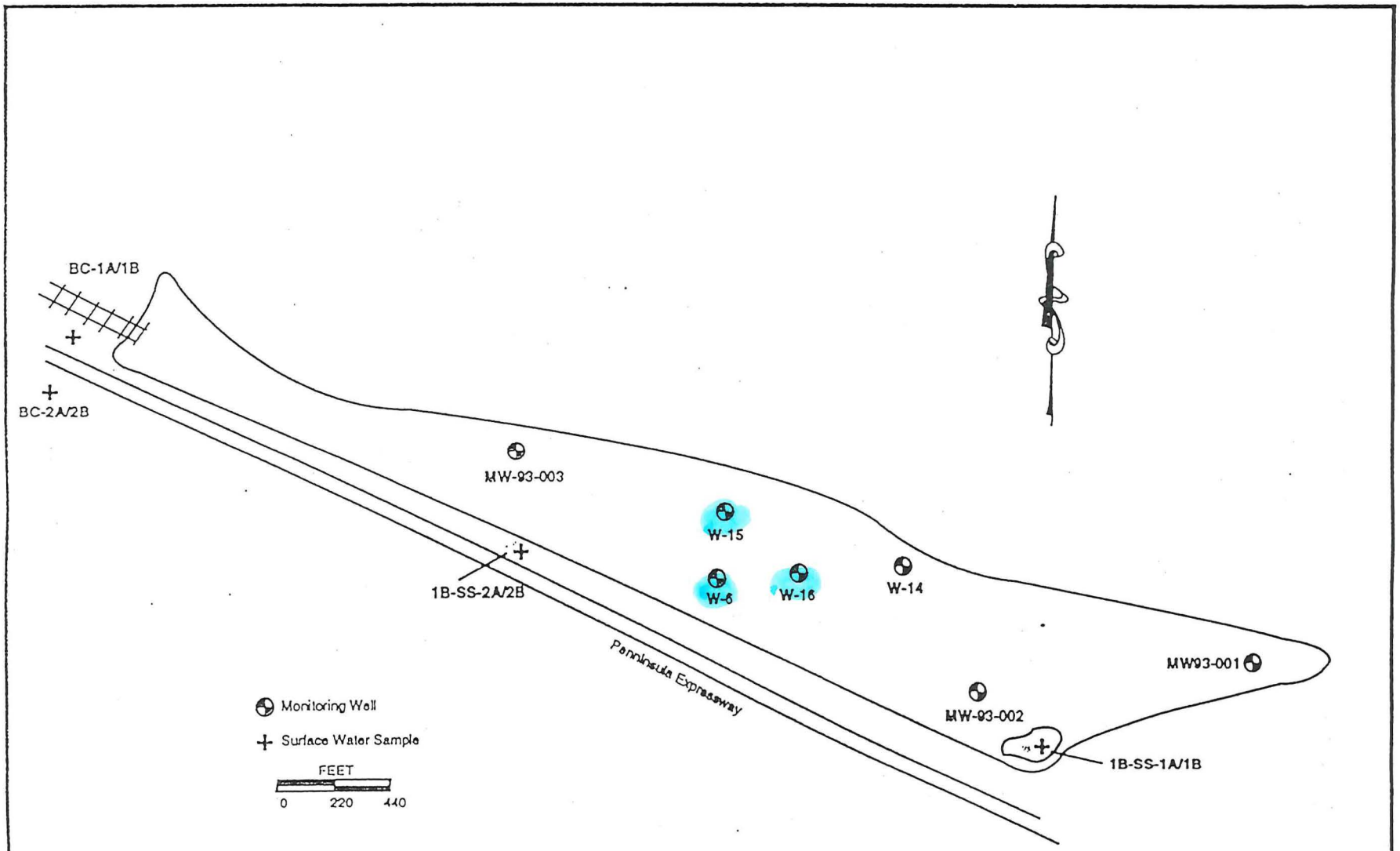
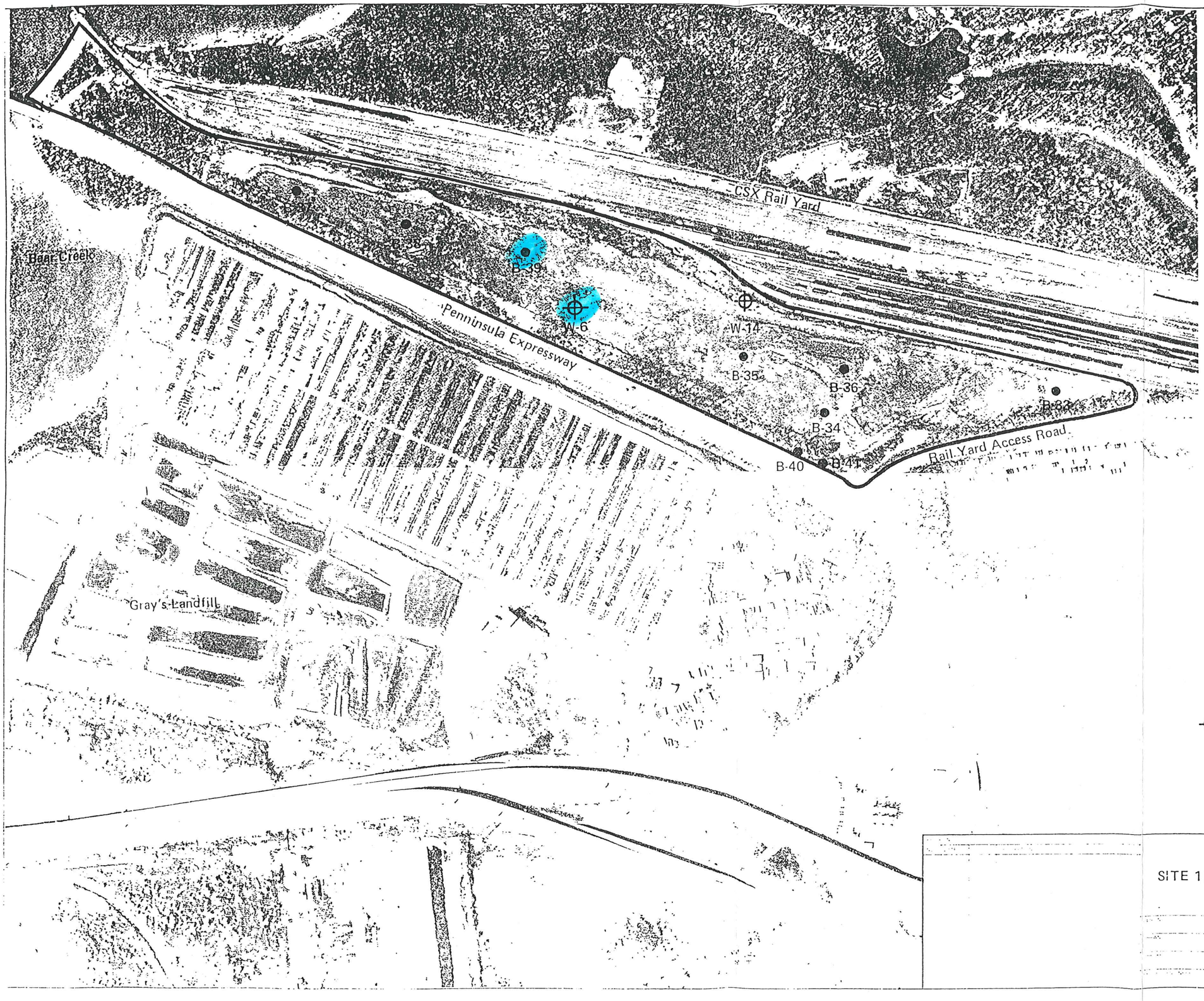


Figure 2-1. Well location and surface water sampling locations Site 1B.



NOTE: Locations approximate for presentation purposes only. For boring and well coordinates see Appendix E.

SITE 1B Figure 4.3-1. Borings and Well Locations.

Parcel A7 Historical County Lands Investigation Data
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Sample ID	Chemical Analyte	Units	Result		Sample Date
Soil Data					
B-33	Naphthalene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	2-Methylnaphthalene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	Acenaphylene	µg/kg	**1,100**		5/20/1988-6/18/1988
B-33	Dibenzofuran	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	Anthracene	µg/kg	**1,500**		5/20/1988-6/18/1988
B-33	Benz[a]anthracene	µg/kg	**1,200**		5/20/1988-6/18/1988
B-33	Carbon disulfide	µg/kg	**2**		5/20/1988-6/18/1988
B-33	Chrysene	µg/kg	**1,300**		5/20/1988-6/18/1988
B-33	Fluoranthene	µg/kg	**4,200**		5/20/1988-6/18/1988
B-33	Fluorene	µg/kg	**1,200**		5/20/1988-6/18/1988
B-33	Phenanthrene	µg/kg	**5,100**		5/20/1988-6/18/1988
B-33	Benzo[b]fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	Benzo[k]fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	Benzo[a]pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	Indeno[1,2,3-cd]pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	Dibenzo[a,h]anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	Benzo[g,h,i]perylene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-33	Methylene Chloride	µg/kg	10	U	5/20/1988-6/18/1988
B-33	Acetone	µg/kg	40	U	5/20/1988-6/18/1988
B-33	Pyrene	µg/kg	**2,700**		5/20/1988-6/18/1988
B-33	Chloroform	µg/kg	2	U	5/20/1988-6/18/1988
B-33	2-Butanone	µg/kg	20	U	5/20/1988-6/18/1988
B-33	Benzene	µg/kg	2	U	5/20/1988-6/18/1988
B-33	Toluene	µg/kg	2	U	5/20/1988-6/18/1988
B-33	Ethylbenzene	µg/kg	2	U	5/20/1988-6/18/1988
B-33	Xylenes (total)	µg/kg	2	U	5/20/1988-6/18/1988
B-34	Naphthalene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	2-Methylnaphthalene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Acenaphylene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Dibenzofuran	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Fluorene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Phenanthrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Benz[a]anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Chrysene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Benzo[b]fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Benzo[k]fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Benzo[a]pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Indeno[1,2,3-cd]pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Dibenzo[a,h]anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Benzo[g,h,i]perylene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-34	Methylene Chloride	µg/kg	10	U	5/20/1988-6/18/1988

Parcel A7 Historical County Lands Investigation Data
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Sample ID	Chemical Analyte	Units	Result		Sample Date
B-34	Acetone	µg/kg	40	U	5/20/1988-6/18/1988
B-34	Carbon disulfide	µg/kg	2	U	5/20/1988-6/18/1988
B-34	Chloroform	µg/kg	2	U	5/20/1988-6/18/1988
B-34	2-Butanone	µg/kg	20	U	5/20/1988-6/18/1988
B-34	Benzene	µg/kg	2	U	5/20/1988-6/18/1988
B-34	Toluene	µg/kg	2	U	5/20/1988-6/18/1988
B-34	Ethylbenzene	µg/kg	2	U	5/20/1988-6/18/1988
B-34	Xylenes (total)	µg/kg	2	U	5/20/1988-6/18/1988
B-35	Naphthalene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	2-Methylnaphthalene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Acenaphylene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Dibenzofuran	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Fluorene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Phenanthrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Benz[a]anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Chrysene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Benzo[b]fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Benzo[k]fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Benzo[a]pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Indeno[1,2,3-cd]pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Dibenzo[a,h]anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Benzo[g,h,i]perylene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-35	Methylene Chloride	µg/kg	10	U	5/20/1988-6/18/1988
B-35	Acetone	µg/kg	40	U	5/20/1988-6/18/1988
B-35	Carbon disulfide	µg/kg	2	U	5/20/1988-6/18/1988
B-35	Chloroform	µg/kg	2	U	5/20/1988-6/18/1988
B-35	2-Butanone	µg/kg	20	U	5/20/1988-6/18/1988
B-35	Benzene	µg/kg	2	U	5/20/1988-6/18/1988
B-35	Toluene	µg/kg	2	U	5/20/1988-6/18/1988
B-35	Ethylbenzene	µg/kg	2	U	5/20/1988-6/18/1988
B-35	Xylenes (total)	µg/kg	2	U	5/20/1988-6/18/1988
B-36	Naphthalene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	2-Methylnaphthalene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Acenaphylene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Dibenzofuran	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Fluorene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Phenanthrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988

Sample ID	Chemical Analyte	Units	Result		Sample Date
B-36	Fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Benz[a]anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Chrysene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Benzo[b]fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Benzo[k]fluoranthene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Benzo[a]pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Indeno[1,2,3-cd]pyrene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Dibenzo[a,h]anthracene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Benzo[g,h,i]perylene	µg/kg	1,000	U	5/20/1988-6/18/1988
B-36	Methylene Chloride	µg/kg	10	U	5/20/1988-6/18/1988
B-36	Acetone	µg/kg	40	U	5/20/1988-6/18/1988
B-36	Carbon disulfide	µg/kg	2	U	5/20/1988-6/18/1988
B-36	Chloroform	µg/kg	2	U	5/20/1988-6/18/1988
B-36	2-Butanone	µg/kg	20	U	5/20/1988-6/18/1988
B-36	Benzene	µg/kg	2	U	5/20/1988-6/18/1988
B-36	Toluene	µg/kg	2	U	5/20/1988-6/18/1988
B-36	Ethylbenzene	µg/kg	2	U	5/20/1988-6/18/1988
B-36	Xylenes (total)	µg/kg	2	U	5/20/1988-6/18/1988
Aqueous Data					
1B-SS-1A	Acetone	µg/L	**9**	J	
1B-SS-1A	Xylenes (total)	µg/L	10	U	
1B-SS-1A	Benzene	µg/L	**4**	J	
1B-SS-1A	Toluene	µg/L	**2**	J	
1B-SS-1B (duplicate)	Acetone	µg/L	10	U	
1B-SS-1B (duplicate)	Benzene	µg/L	**4**	J	
1B-SS-1B (duplicate)	Toluene	µg/L	10	U	
1B-SS-1B (duplicate)	Xylenes (total)	µg/L	10	U	
MW 93-001	Vinyl Chloride	µg/L	10	U	6/1/1993
MW 93-001	Acetone	µg/L	10	U	6/1/1993
MW 93-001	Carbon disulfide	µg/L	10	U	6/1/1993
MW 93-001	1,1-Dichloroethane	µg/L	10	U	6/1/1993
MW 93-001	1,2-Dichloroethene	µg/L	10	U	6/1/1993
MW 93-001	1,2-Dichloroethane	µg/L	10	U	6/1/1993
MW 93-001	1,1,1-Trichloroethane	µg/L	10	U	6/1/1993
MW 93-002	Acetone	µg/L	**31**		6/1/1993
MW 93-002	Vinyl Chloride	µg/L	10	U	6/1/1993
MW 93-002	Carbon disulfide	µg/L	10	U	6/1/1993
MW 93-002	1,1-Dichloroethane	µg/L	10	U	6/1/1993
MW 93-002	1,2-Dichloroethene	µg/L	10	U	6/1/1993
MW 93-002	1,2-Dichloroethane	µg/L	10	U	6/1/1993
MW 93-002	1,1,1-Trichloroethane	µg/L	10	U	6/1/1993

Detections are in bold

APPENDIX C

Parcel A7 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Table 1 - Soil/Sediment 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
Parcel A7 Site Coverage			Investigate potential impacts related to any historical activities which may have occurred on the site (potential leaks or releases).	9	A7-001; A7-002; A7-003; A7-005; A7-006; A7-010 through A7-013	*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, Oil & Grease, PCBs (0-1')
Parcel A7 Pits (Dec. 2015 Site Visit)		Topographic Lines	Investigate potential impacts related to any historical activities within pits observed during the December 2015 site walk (potential leaks or releases).	9	A7-004, A7-007, A7-008, A7-009, A7-014, A7-015, A7-020, A7-021, and A7-022	*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, Oil & Grease, PCBs (0-1')
Large Pond Sediment Samples			Investigate potential impacts related to the large pond (potential leaks or releases).	2	A7-016 and A7-017	Total depth of 12 inches	Top 12 inches of sediment at each location.	VOC, SVOC, Metals, DRO/GRO, Oil & Grease, PCBs
Small Pond Sediment Samples			Investigate potential impacts related to the small pond (potential leaks or releases).	2	A7-018 and A7-019	Total depth of 12 inches	Top 12 inches of sediment at each location.	VOC, SVOC, Metals, DRO/GRO, Oil & Grease, PCBs
Slag/Soil Berm Test Pits - Spoil Piles (if warranted)		Topographic Lines	MDE Request. Presence of slag/soil berms surround pits and larger topographic depressions. Investigate to determine whether the materials in the berms are indicative of potential contamination.	0-10	NA	Varies depending on orientation and size of berm. Determined by environmental professional providing oversight.	10-point composite sample from spoil piles (only sample if potential indications of contamination are observed).	VOC, SVOC, Metals, DRO/GRO, Oil & Grease, PCBs
			Total:	22				

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

Engineered Barrier (N/A): No Areas in Parcel A7

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

Engineered Barrier - Buildings/Paving (0 acres) = **N/A**

No Engineered Barrier (22.2 acres) = **15 Borings Required, 18 Proposed (+4 Sediment Samples)**

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

* If Geoprobe® access is restricited by site topography, borings will be completed using a hand auger to a total depth of 5' bgs (thus excluding the 9-10' bgs sample).

^VOCs are only collected if the PID reading exceeds 10 ppm

Parcel A7 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Table 2 - Aqueous Samples

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	Condition of Existing Well	Number of Locations	Sample Locations	Well Depth	Screen Interval	Analytical Parameters: Groundwater Samples†
Existing Well			Useable (see **Appendix D**)	1	MW93-001	16.70 feet from top of casing	Unknown	VOC, SVOC, Metals, Total Cyanide, DRO/GRO, Oil & Grease
Existing Well			Useable (see **Appendix D**)	1	MW93-002	20.05 feet from top of casing	Unknown	VOC, SVOC, Metals, Total Cyanide, DRO/GRO, Oil & Grease
Existing Well			Outer casing in good condition, though well cap could not be removed. An attempt will be made to remove cap and inspect interior of well.	1	W-14	Unknown	Unknown	VOC, SVOC, Metals, Total Cyanide, DRO/GRO, Oil & Grease
Large Pond (Surface Water)			*N/A*	2	A7-016 and A7-017	*N/A*	*N/A*	VOC, SVOC, Metals, Total Cyanide, DRO/GRO, Oil & Grease
Small Pond (Surface Water)			*N/A*	2	A7-018 and A7-019	*N/A*	*N/A*	VOC, SVOC, Metals, Total Cyanide, DRO/GRO, Oil & Grease
			Total:	7				

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

Metals = dissolved and/or total metals as specified in the Work Plan text.

APPENDIX D

WELL INSPECTION FORM

Site: Sparrows Point Area A Location of Well: Parcel A7

ARM Representative: LMG Date: 1/7/2016 Project Number: 150298M

WELL INFORMATION

Well ID: MW-001 (MW93-001) Well Permit No.: _____

Coordinates:

Latitude/Northing 574715.04 Longitude/Easting 1461911.38

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

Well ID Marked? yes If yes, where? Top of PVC cap

Locking cap? no Lock? _____ Diameter of Well: 4”

Structural integrity of well: good

WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	4.84’ TOC/ 3.74’ BGS	
Depth to Bottom (feet BGS/TOC)	16.7’ TOC	

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

Additional Comments: Rubber cap on PVC. Sediment was attached on probe when it came up from bottom. Outer metal pad was locked; lock was cut.

PICTURE OF WELL DURING INSPECTION

WELL INSPECTION FORM

Site: Sparrows Point Area A Location of Well: Parcel A7

ARM Representative: TRS Date: 1/5/16 Project Number: 150298M

WELL INFORMATION

Well ID: MW93-002 Well Permit No.: _____

Coordinates:

Latitude/Northing 574579 Longitude/Easting 1460855

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

Well ID Marked? no If yes, where? _____

Locking cap? yes Lock? no Diameter of Well: 4”

Structural integrity of well: good

WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	12.32’ TOC/ 10.14’ BGS	
Depth to Bottom (feet BGS/TOC)	20.05 TOC	

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

Additional Comments: Probe came up from bottom measurement with a large amount of sediment attached

PICTURE OF WELL DURING INSPECTION

WELL INSPECTION FORM

Site: Sparrows Point Area A Location of Well: Parcel A5

ARM Representative: LMG Date: 1/7/16 Project Number: 150298M

WELL INFORMATION

Well ID: W-14 Well Permit No.: BA-81-0320

Coordinates:

Latitude/Northing 575141.43 Longitude/Easting 1460398.31

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

Well ID Marked? N/D If yes, where? _____

Locking cap? N/D Lock? _____ Diameter of Well: N/D

Structural integrity of well: good

WELL MEASUREMENTS

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

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

Additional Comments: Outer metal case was rusted and screwed on. Could not remove or access the well.

PICTURE OF WELL DURING INSPECTION

ARM Group Inc.

APPENDIX E

HEALTH AND **SAFETY PLAN**

SPARROWS POINT TERMINAL
SPARROWS POINT, MARYLAND

Prepared by:

January 2015

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

1.1 Background

The Sparrows Point Terminal site has historically been a steel making facility. It is located in Baltimore County, Maryland in the southeast corner of the Baltimore metropolitan area (approximately 9 miles from the downtown area), on the Sparrows Point Peninsula in the Chesapeake Bay watershed. The facility occupies the entire peninsula and is bounded to the west by Bear Creek; to the south by Patapsco River; and to the east by Jones Creek, Old Road Bay and residential areas of the City of Edgemere. The facility is bounded to the north by the Sparrows Point Country Club. The site is approximately 3,100 acres in size.

Pennsylvania Steel built the furnace at Sparrows Point in 1887 and the first iron was cast in 1889. Bethlehem Steel Corporation (BSC) purchased the facility in 1916 and enlarged it by building additional and plating facilities. BSC filed for bankruptcy in 2001. A series of entities has owned the site between then and now: the International Steel Group (ISG), Mittal Steel, ISG Sparrows Point, LLC, Severstal Sparrows Holding LLC, which was renamed to Severstal Sparrows Point, LLC, RG Steel Sparrows Point, LLC, and then a joint venture to Sparrows Point LLC (SP) and HRE Sparrows Point LLC. Most recently, in 2014, the property and assets were sold to Sparrows Point Terminal LLC (SPT). Environmental liability was retained by SP and work is currently being conducted by EnviroAnalytics Group, LLC (EAG) on behalf of SP.

- In addition to the current environmental investigation and remediation being conducted onsite by EAG and their consultants, there are other entities conducting work on the facility. Demolition of the remaining structures is currently ongoing at the site, and those contractors are being managed by SPT.
- The purpose of this document is to provide an overall health and safety plan (HASP) for EAG personnel and EAG directed contractors who are engaging in environmental investigation and remediation activities onsite. EAG directed contractors will also be expected to have their own Health and Safety Program, and they may opt to draft their own site specific HASP, provided it meets the requirements in this HASP.

1.2 Historic Operations

Steel manufacturing involves handling vast amounts of raw material including coke, iron ore, limestone and scrap steel, as well as recovering byproducts and managing waste materials. The operations listed below either were or are currently performed at the Sparrows Point Facility.

- Iron and steel production
- Coal chemical recovery system
- Other byproducts recovery systems
- Wastewater treatment systems
- Solid waste management
- Air pollution control

A number of site-specific environmental and hydrogeologic investigations have been prepared for the Sparrows Point facility. For the purposes of this HASP, information was obtained from the "Special Study Area Release Site Characterization" completed in 2001 by CH2MHill, as well as additional documents submitted since that time. There are five separate Special Study Areas as put forth in the Consent Decree:

- Humphrey Impoundment,
- Tin Mill Canal/Finishing Mills Areas,
- Coke Oven Area,
- Coke Point Landfill, and
- Greys Landfill.

Contaminated soils and groundwater may be present at the site. This plan was prepared based on an assessment of hazards expected to be present and a review of data from the previous site investigations and groundwater sampling events.

During the current investigations and remedial efforts, all related work will be performed in accordance with the requirements of this HASP and Occupational Safety and Health Administration (OSHA) regulations as defined in 29 Code of Federal Regulations (CFR) 1910.120 and 1926.65.

2.0 PURPOSE, SCOPE AND ORGANIZATION

This section describes the purpose, scope and organization of this HASP and the health and safety responsibilities of EAG, their employees, and their subcontractors involved in the field investigation and remediation activities at the Sparrows Point facility.

2.1 Scope

Field investigation and remediation activities for this project may include, but are not limited to:

- Groundwater sampling and monitoring,
- Groundwater and remediation well installation,
- Groundwater and remediation well repairs,
- Groundwater and remediation well closure and abandonment,
- Surface water sampling,
- Sediment sampling,
- Soil boring and subsurface soil sampling,
- Soil excavations for remedial purposes,
- Installation and operation of remediation systems for soil, soil vapor, and groundwater,
- Decommissioning and closure of remediation systems,
- Soil excavations for remedial purposes,
- Insitu soil mixing/soil stabilization,
- Exsitu soil mixing/soil stabilization,
- Dredging operations along Tin Mill Canal,
- Insitu chemical and/or biological injections, and
- Recovery of non-aqueous phase liquids (NAPL)

When EAG personnel are providing oversight of subcontractors, they will attend the safety and health briefings held by the contractor. EAG personnel will follow the requirements of this HASP, as well as any potentially more stringent requirements of the contractor's health and safety plan.

When EAG personnel are conducting tasks on their own, with or without subcontractors, they will follow the requirements of this HASP. EAG contractors, such as drillers, will also be required to follow the requirements of this HASP, as well as any more stringent requirements of the contractor's health and safety plan.

All EAG field personnel, including subcontractors to EAG, will be required to read and understand this HASP and agree to implement its provisions. All site personnel will sign the Acknowledgement Form included in **Attachment A** stating that they have read, understood, and agree to abide by the guidelines and requirements set forth in this plan.

2.2 Organization of Document

This HASP includes health and safety procedures for all generally anticipated project field activities. This plan also meets the OSHA requirements contained in the CFR, specifically 29 CFR 1910.120 and 29 CFR 1926, by including the following items:

- A description of staff organization, qualifications and responsibilities (Section 2.3),
- Hazard analysis (Section 3.0),
- Health hazard information (Section 4.0),
- Personal protective equipment (PPE), including available first aid, emergency, and safety equipment (Section 5.0),
- Employee and subcontractor training and standard safety procedures (section 6.0),
- Exposure monitoring plan (Section 7.0),
- Medical surveillance (Section 8.0),
- Site control measures and decontamination procedures for personnel and equipment (Section 9.0),
- Emergency response and contingency procedures (section 10.0), and
- Material Safety Data Sheets (MSDSs) for chemicals used on-site (**Attachment B**).

2.3 EAG Health and Safety Personnel

Personnel responsible for implementing this HASP include:

EAG Contacts for Sparrows Point Project Work	
VP Remediation, Russ Becker	(314) 686-5611
Senior Project Manager, James Calenda	(314) 620-3056
Senior Project Engineer, Elizabeth Schlaeger	(314) 307-1732
Josh Burke – Field Operations Manager	(314) 686-5623
Project Field Team Members, Jeff Wilson and Bill Trentzsch	(314) 620-3135, (314) 686-5598

3.0 HAZARD ANALYSIS

This section outlines the potential hazards related to the field activities listed in Section 2.1.

3.1 Hazard Analysis

The field activities planned for this project pose potential health and safety hazards for field team members. This section describes the hazards associated with the above-listed field activities. Detailed chemical, physical, and biological hazards information is provided in Section 4.0 (Health Hazard Information).

Hazards to which employees and subcontractors may be exposed to as a result of the above-listed activities include potential chemical exposures, lacerations, excessive noise, thermal stress, lifting of excessive weight or bulk, hand tools and heavy equipment, drilling and slips, trips and falls.

3.1.1 Chemical Hazards

Potential exposures to chemicals in the soil or groundwater include the possibility of dermal exposure (contact and/or absorption), inhalation of chemical contamination that may be encountered during sampling or during equipment decontamination activities, or ingestion of contaminants if good personal hygiene practices are not followed.

Benzene, naphthalene, and various metals are the major contaminants that have been identified in groundwater during previous investigations at the site In addition, light NAPL (LNAPL – benzene, in particular) and dense NAPL (DNAPL – naphthalene, in particular) have also been identified or are heavily suspected in various locations in the Coke Oven Area. Dissolved metals the chemicals of concern primarily located in the area of Tin Mill Canal and the Rod and Wire Mill Area. Treatment chemicals, such as sulfuric acid, are currently being used in remediation systems. All appropriate MSDS sheets will be reviewed that apply to the investigation or remedial tasks being conducted. MSDS sheets are located in **Attachment B**. It should be noted that this is a dynamic document: should any additional chemicals be introduced or discovered, the MSDS sheets will be added to **Attachment B**, as necessary.

3.1.2 Physical Hazards

The potential physical hazards associated with field activities include:

- Excessive lifting
- Slips, trips, and falls
- Working at heights
- Exposure to extreme outside temperatures and weather
- Equipment hazards
- Drilling Hazards
- Noise
- Dust and fumes
- Injury from tools, equipment, rotating parts
- Electrical hazards
- Buried and overhead hazards
- Work over water
- Driving to, from, and around the site (including working in trafficked areas)

Additional hazards may be encountered based on the various task at hand. It will be the responsibility of the site manager, with the help of field staff, to identify and address any additional hazards on a "per task or job" basis. A Job Safety Analyses (JSA) may need to be conducted prior to the start of various tasks. Safety meetings will be conducted with all staff in attendance, before the start of any new task or when any significant personnel or other changes (such as a swift change in weather, for example) occur. Updated information relating to physical hazards will be presented during these meetings in an effort to familiarize the crew with potential hazards, discuss new situations, and determine how the associated risks can be reduced. Further, good housekeeping practices will be enforced to preclude other risks resulting from clutter and inattention to detail. In addition, internal field audits will be randomly conducted to ensure adherence to all procedures are being followed.

3.1.3 Biological Hazards

Biological hazards that may be encountered when conducting field activities include the following:

- Poisonous snakes and spiders
- Ticks and tick-borne diseases
- Stinging insects such as chiggers, bees, wasps, etc.
- Various viruses and diseases spread via animal to human contact such as West Nile virus or rabies
- Various viruses and diseases spread via human to human contact such as colds or the flu
- Dermal contact with poison ivy, oak, and/or sumac
- Bloodborne pathogens when administering first aid

First aid kits will be available on-site. It is crucial to note that any site personnel who has significant allergies should communicate that information to the field team they are working with, along with the location of their auto-injector pen (such as an Epi-Pen) for use in case of going into anaphylactic shock from something that would cause such a reaction (like a bee sting, for example). Personnel who suffer from such allergies are responsible for providing their own auto-injector devices as those are typically prescription based as well as specific to their particular allergy.

4.0 HEALTH HAZARD INFORMATION

This section provides chemical hazard information for those potentially hazardous materials expected to be present at the facility. Potential physical and biological hazards are also discussed in this section.

4.1 Chemical Hazards

Exposure to chemicals through inhalation, ingestion, or skin contact may result in health hazards to field workers. Hazards associated with exposure will be evaluated using OSHA Permissible Exposure Limits (PELs) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs). Each of these values are 8-hour, time-weighted averaged (TWAs) above which an employee cannot be exposed. EAG may also use the National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs) where applicable. Although the OSHA PELs are the only exposure limits enforceable by law, the most stringent of exposure limits will be used as the EAG-enforced exposure criteria during field activities.

The following is a summary of the potential hazards created by the compounds that may be encountered during field activities. Data from sampling of groundwater wells was reviewed to identify potential contaminants at the site. Contaminants of concern may include benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), phenols, metals and water treatment chemicals. Table 4-1 contains chemical information and exposure limits for various chemicals that may be expected to be present in the investigation and remediation efforts. During the recovery of NAPL, the major contaminants of concern are benzene and naphthalene. It is possible that carbon monoxide may also be encountered from the use of various internal combustion engines (vehicular or otherwise); however, it is anticipated that since any such engine will be used outdoors, it is not expected that concentrations of concern will accumulate. With the use of any such engine, the engine should be positioned such that site personnel are upwind of the engine exhaust.

If any chemicals are brought on-site, MSDS must be made available and added to **Attachment B**. Personnel must be trained in the hazards and use of chemicals.

Table 4-1
Chemical Contaminants of Potential Concern

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Benzene	PEL: 1PPM REL: 0.1 CA TLV: 0.5PPM STEL: 1PPM (NIOSH) Skin: YES	Colorless to light-yellow liquid with aromatic odor. LEL: 1.2% UEL: 7.8% VP: 75mm FI.P: 12°F	INH ABS ING CON	Irritation of eyes, skin, nose, respiratory system, giddiness, headache, nausea, fatigue, anorexia, dermatitis, bone marrow depression
Ethylbenzene	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: 125PPM IDLH: 800PPM Skin: NO	Colorless liquid with an aromatic odor. LEL: 0.85 UEL: 6.7% IP: 8.76EV VP: 7mm FI.P: 55°F	INH ING CON	Irritation of eyes, skin, mucous membranes; headache; dermatitis
1,1 dichloroethane	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: NA IDLH: 3000PPM Skin: NO	Colorless, oily liquid with a chloroform-like odor. LEL: 6.2% UEL: 16% IP: 11.05EV Vp: 64mm FI.P: 56°F	INH ING CON	Irritation of eyes, CNS depression, liver, kidney, lung damage
Phenol	PEL: 5PPM REL: 5PPM, 15.6PPM (C) TLV: 5PPM STEL: NA IDLH 250PPM Skin: YES	Colorless to light pink crystalline solid with a sweet, acrid odor. LEL: 1.8% UEL: 5.9% IP: 8.12EV Vp: 0.08mm FI.P: 175°F	INH ING CON ABS	Irritated eyes, nose, throat, anorexia, weakness, muscular ache, pain, dark urine, cyanosis, liver, kidney damage, skin burns, dermatitis, tremor, convulsions, twitch
Naphthalene	PEL: 10PPM REL: 10PPM TLV: 10PPM STEL: 15PPM IDLH: 250PPM Skin: YES	Colorless to brown solid with an odor of mothballs LEL: 0.9% UEL: 5.9% IP: 8.12EV Vp: 0.08mm FI.P: 174°F	INH ABS ING CON	Irritation of eyes, headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritated bladder, profuse sweating, jaundice, hematuria, renal shutdown, dermatitis, optical neuritis, corneal damage
Toluene	PEL: 200PPM, 300PPM (C) REL: 100PPM TLV: 20PPM STEL: 150PPM IDLH: 500PPM Skin: YES	Colorless liquid with a sweet, pungent benzene-like odor. LEL: 1.1% UEL: 7.1% IP: 8.82EV VP: 21MM FI.P: 40°F	INH ABS ING CON	Irritation of eyes, nose, fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, nervousness, muscle fatigue, insomnia, dermatitis, liver, kidney damage
Xylenes	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: 150PPM IDLH: 900PPM Skin: NO	Colorless liquid with an aromatic odor. LEL: 0.9% UEL: 6.7% IP: 8.40EV VP: 5MM FI.P: 88°F	INH ABS ING CON	Irritated eyes, nose, respiratory system, headache, fatigue, dizziness, confusion, malaise, drowsiness, incoherence, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Styrene	PEL: 100PPM, 200PPM (C) REL: 50PPM TLV: 20PPM STEL: 40PPM IDLH: 700PPM Skin: NO	Colorless to yellow, oily liquid with a sweet, floral odor. LEL: 0.9% UEL: 6.8% IP: 8.40eV VP: 5MM FI.P: 88°F	INH ABS ING CON	Irritated eyes, nose, respiratory system, headache, fatigue, dizziness, confusion, malaise, drowsiness, weakness, narcosis, dermatitis
Chlorodiphenyl (54% chlorine) (11097-69-1)	PEL: 0.5mg/m³ REL: 0.001mg/m³ TLV: 0.5mg/m³ STEL: N/A IDLH: 5mg/m³(CA) Skin: YES	Colorless to pale yellow viscous liquid with a mild hydrocarbon odor. LEL: NA UEL: NA IP: UNKNOWN VP: 0.00006MM FI.P: NA	INH ABS ING CON	Irritated eyes, chloracne, liver damage, reproductive effects (carcinogen)
Polynuclear aromatic hydrocarbons (PAHs) (coal tar pitch volatiles) (65996-93-2)	PEL: 0.2mg/m³ REL: 0.1mg/m³ TLV: 0.2 mg/m³ STEL: N/A IDLH: 80mg/m³(CA) Skin: NO	The pitch of coal tar is black or dark brown amorphous residue that remains after the redistillation process. LEL: N/A UEL: N/A IP: VARIES VP: VARIES FI.P: VARIES	INH CON	Direct contact or exposure to vapors may be irritating to the eyes. Direct contact can be highly irritating to the skin and produce dermatitis. Exposure to vapors may cause nausea and vomiting. A potential human carcinogen.
Arsenic (inorganic)	PEL: 0.01mg/m³ REL: NONE TLV: 0.5 mg/m³ STEL: N/A IDLH: 5mg/m³ (CA) Skin: NO	Silver-gray or tin-white brittle odorless solid. Air odor threshold: N/D.	INH ABS CON ING	Symptoms include ulceration of nasal septum, gastrointestinal disturbances, respiratory irritation and peripheral neuropathy. Potential occupational carcinogen.
Barium	PEL: 0.5mg/m³ REL: 0.5mg/m³ TLV: 0.5mg/m³ STEL: N/A IDLH: 50mg/m³ Skin: NO	White, odorless solid. Air odor threshold: N/D.	INH ING CON	Irritated eyes, skin, upper respiratory system, skin burns, gastroenteritis, muscle spasm, slow pulse, cardiac arrhythmia
Cadmium (elemental)	PEL: 0.005mg/m³ REL: CA TLV: 0.01mg/m³ STEL: N/A IDLH: 9mg/m³ (CA) Skin: NO	Silver-white, blue-tinged lustrous, odorless solid. Air odor threshold: N/D.	INH ING	Symptoms include pulmonary edema, cough, tight chest, head pain, chills, muscle aches, vomiting and diarrhea. Potential occupational carcinogen.
Chromium (Metal)	PEL: 1.0mg/m³ REL: 0.5mg/m³ TLV: 0.5mg/m³ STEL: N/A IDLH: 250mg/m³ Skin: NO	Blue-white to steel-gray lustrous, brittle, hard odorless solid. Air odor threshold: N/D.	INH ING CON	Symptoms may include irritated eyes and skin, lung fibrosis.
Chromium (Chromium III inorganic compounds)	PEL: 0.5mg/m³ REL: 0.5mg/m³ TLV: 0.5mg/m³ STEL: N/A IDLH: 25mg/m³ Skin: NO	Varies depending on specific compound.	INH ING CON	Irritation of eyes, sensitivity dermatitis

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Copper	PEL: 1mg/m³ REL: 1mg/m³ TLV: 1mg/m³ STEL: N/A IDLH: 100mg/m³ Skin: NO	Reddish, lustrous, malleable, odorless solid	INH ING CON	Irritation of eyes, nose, pharynx, nasal septum perforations, metallic taste, dermatitis
Lead (Elemental & Inorganic as Pb)	PEL: 0.05mg/m³ REL0.1mg/m³ TLV: 0.05mg/m³ STEL: N/A IDLH: 100mg/m³ Skin: NO	A heavy, ductile soft gray solid. Air odor threshold: N/D.	INH ING CON	Accumulative poison may cause weakness, insomnia, facial pallor, anorexia, malnutrition, constipation, abdominal pain, anemia, gingival lead line, paralysis of wrists and ankles, hypertension and kidney disease.
Nickel	PEL: 1mg/m³ REL: 0.015mg/m³ (Ca) TLV: 0.1mg/m³ STEL: N/A IDLH: 10mg/m³ Skin: NO	Lustrous, silvery, odorless solid. Air odor threshold: N/A VP: 0mm	INH CON ING	Sensitivity dermatitis, allergic asthma, pneumonitis
Vanadium pentoxide dust	PEL: 0.5mg/m³ (C) REL: 0.05mg/m³ (C) TLV: 0.05mg/m³ STEL: N/A IDLH: 35mg/m³ Skin: NO	Yellow-orange powder or dark gray, odorless flakes dispersed in air. VP: 0mm	INH ING CON	Irritated eyes, skin, throat, green tongue, metallic taste, eczema, cough, fine rales, wheezing, bronchitis
Zinc oxide	PEL: 5mg/m³ REL: 5mg/m³ TLV: 2mg/m³ STEL: 10mg/m³ IDLH: 500mg/m³ Skin: NO	White, lustrous solid	INH	Metal fume fever, chills, muscular ache, nausea, fever, dry throat, cough, weakness, metallic taste, headache, blurred vision, low back pain, vomiting, fatigue, malaise
Sulfuric Acid (water treatment chemical)	PEL: 1mg/m³ TLV: 0.2mg/m³ Skin: YES	Oily, colorless to slightly yellow, clear to turbid liquid	IHN ABS ING CON	Can cause irritation or corrosive burns to the upper respiratory system, lung irritation, pulmonary edema, burns to mouth throat and stomach, erode teeth, skin lesions
Antiscale (water treatment chemical)	PEL: 1mg/m³ TLV: 0.2mg/m³ Skin: YES	Liquid, colorless, clear	IHN ABS ING CON	May cause severe skin burns and eye damage, can cause cancer, fatal if inhaled, may damage organs through prolonged exposure
Antifoam (water treatment chemical)	N/E	Liquid emulsion, white, opaque	IHN ABS ING CON	May be harmful to skin, if inhaled and if swallowed
Gases				
Carbon Monoxide	PEL: 50PPM REL: 35PPM TLV: 25PPM STEL: 200PPM (C) IDLH: 1200PPM Skin: NO	Colorless, odorless gas LEL: 12.5% UEL: 74% IP: 14.01eV VP: >35atm FI.P: N/A	INH	Headache, rapid breathing, nausea, tiredness, dizziness, confusion

NOTES:

OSHA PEL	Occupational Safety and Health administration Final Rule Limits, Permissible Exposure Limit for an eight=hour, time-weighted average
ACGIH TLV	American Conference of Governmental Industrial Hygienists, Threshold Limit Value for eight-hour, time-weighted average
STEL	Short-term Exposure Limit for a 15-minute, time-weighted average
NIOSH IDLH	National Institute for Occupational Safety and Health, Immediately Dangerous to Life or Health concentration
PPM	Part of vapor or gas per millions parts of air by volume at 25°Celsius and 760mm Hg mg/m³ (milligram of substance per cubic meter of air)
CA	NIOSH has identified numerous chemicals that it recommends to be treated as potential or confirmed human carcinogens.
(C)	The (ceiling) concentration that should not be exceed during any part of the working exposure.
Skin	Refers to the potential contribution to the overall exposure by the cutaneous (absorption) route, including mucous membranes and eye, either by airborne or more particularly by direct contact with the substance.
UEL	Upper Explosive Limit – the highest concentration of a material in air that produces an explosion in fire or ignites when it contacts an ignition source.
LEL	Lower Explosive Limit – the lowest concentration of the material in air that can be detonated by spark, shock, fire, etc.
INH	Inhalation
ABS	Skin absorption
ING	Ingestion
CON	Skin and/or eye contact

4.2 Physical Hazards

Field employees and subcontractors may be exposed to a number of physical hazards during this project. Physical hazards that may be encountered include the following:

- Heat and cold stress
- Lifting hazards
- Slips, trips and falls
- Working around heavy equipment
- Drilling hazards
- Noise
- Use of hand and power tools
- Buried hazards
- Electrical hazards
- Underground and overhead utilities
- Working over water
- Travel to and from site

4.2.1 Heat Stress

Local weather conditions may produce an environment that will require restricted work schedules in order to protect employees from heat stress. The Project Manager or the Field Lead Team Member will observe workers for any potential symptoms of heat stress. Adaptation of work schedules and training on recognition of heat stress conditions should help prevent heat-related illnesses from occurring. Heat stress controls will be stated at 70°F for personnel in protective clothing and at 90°F for personnel in regular work clothing. Heat stress prevention controls include:

- Allow workers to become acclimatized to heat (three to six days)
- Provide rest breaks in a shaded or air-conditioned break area
- Provide sun screen to prevent sun burn
- Provide drinking water and electrolyte-replenishing fluids
- Keep ice readily available to rapidly cool field team members

The following Heat Stress Index should be used as a guide to evaluate heat stress situations. If the Heat Stress exceeds 105 degrees Fahrenheit, contact the project manager prior to conducting work for detailed guidance.

Heat Stress Index

Temp. °F	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
105	98	104	110	120	132				
102	97	101	108	117	125				
100	95	99	105	110	120	132			
98	93	97	101	106	110	125			
96	91	95	98	104	108	120	128		
94	89	93	95	100	105	111	122		
92	87	90	92	96	100	106	114	122	
90	85	88	90	92	96	100	106	114	122
88	82	86	87	89	93	95	100	106	115
86	80	84	85	87	90	92	96	100	109
84	78	81	83	85	86	89	91	95	99
82	77	79	80	81	84	86	89	91	95
80	75	77	78	79	81	83	85	86	89
78	72	75	77	78	79	80	81	83	85
76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77

NOTES: Add 10° F when protective clothing is being used; Add 10° F when in direct sunlight

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HSI Temp	Category	Injury Threat
Above 130° F	Extreme Danger	No work unless emergency exists. Contact Cardno ATC RSC and Corporate Risk Management Department prior to proceeding. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
105° to 130° F	Danger	Contact RSC prior to proceeding. Requires strict adherence to ACGIH Heat Stress Guidelines, including use of on-site WBGT equipment. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
90° to 105° F	Extreme Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
80° to 90° F	Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
Below 80° F	Normal Range	Typical conditions for time of year. Little or no danger under normal circumstances. As always, anticipate problems and work safely.

4.2.2 Cold Stress

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. The objective is to prevent the deep body temperature from falling below 96.8° F and to prevent cold injury to body extremities. Two factors influence the development of a cold injury the ambient temperature, and wind velocity. Reduced body temperature will very likely result in reduced mental alertness, reduction in rational decision making, and/or loss of consciousness with the threat of death.

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Use appropriate cold weather clothing when temperatures are at or below 40° F as exposed skin surfaces must be protected. These protective items can include facemask, hand wear, and foot wear. Workers handling evaporative solvents during cold stress conditions will take special precautions to avoid soaking gloves and clothing because of the added danger of prolonged skin contact and evaporative cooling. Personnel will wear protective clothing appropriate for the level of cold and planned physical activity. The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against glare and ultraviolet light should be worn in snowy and icy conditions.

The work rate should not be so great as to cause heavy sweating that could result in wet clothing. If heavy work must be done, opportunities for rest breaks will be provided where workers have the opportunity to change into dry clothing. Conversely, plan work activities to minimize time spent sitting or standing still. Rest breaks should be taken in a warm, dry area. Windbreaks can also be used to shield the work area from the cooling effects of wind.

If extreme cold-related weather conditions occur, EAG field personnel and subcontractors will take the following precautions:

- Wear adequate insulated clothing when the air temperature drops below 40°F
- Reduce work periods in extreme conditions to allow adequate rest periods in a warm area
- Change clothes when work clothes become wet
- Avoid caffeine (which has diuretic and circulatory effects)

4.2.3 Lifting Hazards

Field personnel may be exposed to injury caused by lifting heavy objects and various pieces large or unwieldy pieces of equipment. All field team members will be trained in the proper methods for lifting heavy and/or large equipment and are cautioned against lifting objects that are too heavy or too big for one person. Proper lifting techniques include the following:

- Keep feet approximately shoulder width apart
- Bend at the knees
- Tighten abdominal muscles
- Lift with the legs
- Keep the load close to the body
- Keep the back upright
- Use the buddy system for larger or heavy pieces of equipment

All drums will be staged using an approved drum dolly or other appropriate equipment. Proper care will be taken in the use of this equipment. Healthy employees with no medical restrictions may lift and carry a maximum of 50 pounds using proper lifting and carrying techniques. This recommended weight limit may be reduced depending on physical and workplace factors.

4.2.4 Slips, Trips and Falls

The most common hazards that will be encountered during field activities will be slips, trips and falls. Field team members are trained to use common sense to avoid these hazards such as using work boots/safety shoes with nonskid soles. When working on slippery surfaces, tasks will be planned to decrease the risk of slipping via avoiding the slippery areas, if possible, or utilizing engineering controls. Engineering controls may involve the placement of supplemental material such as boards, gravel, or ice melt should be utilized to mitigate slippery conditions. Other engineering controls may involve the use of footgear traction control devices. Employees and subcontractors will avoid slippery surfaces, use engineering controls as appropriate, not hurry, and maintain good housekeeping.

4.2.5 Buried Hazards

Whenever the ground is penetrated, the potential for contacting buried hazards exists. During the planning/mobilization phase, prior to drilling or other excavation activities, EAG personnel and/or their contractors will establish the location of underground utility lines (gas, electrical, telephone, fiber optic cable, etc.) and/or substructures or other potential buried hazardous items. This may be conducted by review of historic utility and substructure maps, private utility locates, ground penetrating radar, or other technologies. If there is any evidence of utilities or subsurface objects/structures, drilling or excavation activities may be offset. If activities cannot be offset, measures will be taken to remove, disconnect, and/or protect the utilities and/or subsurface structures and/or objects. Every reasonable effort will be made to clear the area of intrusive work prior to fieldwork being started.

4.2.6 Electrical Hazards

It may be possible that overhead power lines will be in proximate locations during drilling or excavation activities. At least a 20 foot clearance must be maintained from overhead power lines. No equipment such as drill rigs or dump trucks can be moved while masts or buckets are in the upright position. Field personnel and subcontractors performing electrical work are required to be appropriately trained to work on the electrical systems in question prior to start of work. Authorization from project management personnel is required prior to any electrical work or work near overhead power lines. . When using extension cords, all field workers will ensure that they are in good working condition, are correctly rated for use, and do not contain abrasions such that bare wires could be exposed to the environment. Extension cords will not be used in wet areas without plugging the extension cord into a ground fault circuit interrupter (GFCI). GFCIs will detect a short circuit and cut power.

4.2.7 Heavy Equipment Operations

Heavy equipment must be operated in a safe manner and be properly maintained such that operators and ground personnel are protected.

Requirements for Operators

- Only qualified, trained, and authorized operators are allowed to operate equipment
- Seat belts will be used at all times in all equipment and trucks
- Operators will stop work whenever ground personnel or other equipment enter their work area; work will resume only when the area has been cleared
- No personnel may ride on equipment other than the Authorized Operator
- No personnel may be carried or lifted in the buckets or working "arms" of the equipment
- Spotters will be used when ground personnel are in the vicinity of heavy equipment work areas and/or when an operator is backing equipment near other structures or congested area

Requirements for Ground Personnel

- All ground personnel must wear orange protective vests in work areas with any operating heavy equipment
- Ground personnel will stay outside of the swing zone or work area of any operating equipment
- Ground personnel may only enter the swing or work area of any operating equipment when:
  -They have attracted the operators attention and made eye contact
  -The operator has idled the equipment down and grounded all extensions
  -The operator gives the ground personnel permission to approach
- Ground personnel shall never walk or position themselves between any fixed object and running equipment or between two running pieces of equipment

Equipment

- Maintain operations manuals at the site for each piece of equipment that is present and in use
- Ensure operators are familiar with the manual for the equipment and operate the equipment within the parameters of the manual
- Ensure all equipment is provided with roll-over protection systems
- Verify that seatbelts are present and functional in all equipment
- Prohibit the use of equipment that has cab glass which is broken or missing
- Ensure that backup alarms are functional on all trucks and equipment
- Require all extensions such as buckets, blades, forks, etc. to be grounded when not in use
- Require brakes to be set and wheels chocked (when applicable) when not in use

Daily inspections of equipment are required using a Daily Heavy Equipment Safety Checklist. Equipment deemed to be unsafe as a result of daily inspection will not be used until required repairs or maintenance occurs. During maintenance/repair, ensure that motors are turned off, all extensions are grounded or securely blocked, controls are in a neutral position, and the brakes are set.

4.2.8 Drilling and Excavation Safety

Prior to any intrusive work, as previously mentioned, the location of underground utilities, such as sewer, telephone, gas, water and electric lines must be determined and plainly staked. Necessary arrangements must be made with the utility company or owner for the protection, removal or relocation of the underground utilities. In such circumstances, excavation will be done in a manner that

does not endanger the field personnel engaged in the work or the underground utility. Utilities left in place will be protected by barricading, shoring, suspension or other measures, as necessary.

The use of unsafe or defective equipment is not permitted. Equipment must be inspected regularly. If found to be defective, equipment must be immediately removed from use and either repaired or replaced prior to resuming work with that equipment. Field personnel will be familiar with the location of first-aid kits and fire extinguishers. Telephone numbers for emergency assistance must be prominently posted and kept current.

Good housekeeping conditions will be observed in and around the work areas. Suitable storage places will be provided for all materials and supplies. Pipe, drill rods, etc. must be securely stacked on solid, level sills. Work surfaces, platforms, stairways, walkways, scaffolding, and access ways will be kept free of obstructions. All debris will be collected and stored in piles or containers for removal and disposal.

The area of the site to undergo intrusive activity must be walked over with the drillers and/or heavy equipment operators to identify all work locations, as well as making sure all marked utilities are seen by those doing the intrusive work.

Drilling Specific Concerns:

In areas where utilities have been identified or may be suspected, pre-drilling clearance such hand-augering, hand excavation (with shovels or post-hole diggers), or air-knifing to a depth of at least 5' below ground surface (BGS) may be required. The Project Manager will provide guidance in those instances on what has been determined as an acceptable means of clearing drilling locations. It should be noted that if the soil lithology changes to gravel within those 5 feet, that may be an indication of a utility trench and extreme caution should be taken OR the drilling location should be offset 5 horizontal feet from the original location. Should 3 consecutive attempts be made without success to offset a particular drilling location, the field personnel should stop and contact the Project Manager for further instruction.

Special precaution must be taken when using a drill rig on a site within the vicinity of electrical power lines and other overhead utilities. Electricity can shock, burn and cause death. When overhead electrical power lines exist at or near a drilling site, all wires will be considered dangerous.

A check will be made for sagging power lines before a site is entered. Power lines will not be lifted to gain entrance. The appropriate utility company will be contacted and a request will be made that it lift or raise cut off power to the lines.

The area around the drill rig will be inspected before the drill rig mast (derrick) is raised at a site in the vicinity of power lines. The minimum distance from any point on the drill rig to the nearest power line will be determined when the mast is raised or is being raised. The mast will not be raised and the drill rig will not be operated if this distance is less than 20 feet, because hoist lines and overhead power lines can be moved toward each other by the wind.

Before the mast is raised, personnel will be cleared from the immediate area, with the exception of the operator and a helper, when necessary. A check will be made to ensure safe clearance from energized power lines or equipment (minimum 20-foot clearance). Unsecured equipment must be removed from the mast and cables, mud lines and catline ropes must be adequately secured to the mast before raising. After it is raised, the mast must be secured to the rig in an upright position with steel pins.

Excavation Specific Concerns:

For excavation work, entry into an excavated area or trench will only be allowed when:

- Shoring, sloping, and spoil pile placement is in conformance with 29 CFR 1926 Subpart P, and
- Personal protection and monitoring, as detailed in this HASP, has been implemented.

All excavation contractors are required to provide an OSHA trained and certified Competent Person. Daily inspections of excavations, the adjacent areas, and protective systems shall be made by the Competent Person for evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the Competent Person prior to the start of work and as needed throughout each shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. All inspections made by the Competent Person should be recorded in the field log book. No personnel shall perform work in a trench or excavation that contains accumulated water (any accumulated water will need to be either pumped out until the trench/excavation is dry, or the accumulated water is allowed to disperse naturally). Each employee in an excavation shall be protected from cave-ins by an adequate protective system except when excavations are made entirely in stable rock or the excavation is less than 5 feet in depth and examination by the Competent Person provides no indication of a potential cave-in. Protective systems consist of sloping or benching, use of trench boxes or other shielding mechanisms, or the use of a shoring system in accordance with the regulations.

When mobile equipment is operated adjacent to an excavation and the operators/drivers do not have a clear and direct view of the edge of the excavation, a warning system such as barricades, hand or mechanical signals, or spotters are required.

Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard to personnel in the excavation. All temporary spoil piles shall be kept at least 2 feet away from the edge of the excavation. Spoil piles should be placed to channel rainwater or other run-off water away from the excavation.

All excavations deeper than 4 feet deep and which have the potential to have a hazardous atmosphere or oxygen deficient atmospheres (less than 19.5% oxygen) must be tested to ensure safe working conditions, prior to entry.

4.2.9 Use of Hand Tools and Portable Power Tools

Hand tools will be kept in good repair and used only for their designed purposes. Proper protective eyewear will be worn when using hand tools and portable power tools. Unguarded sharp-edged or

pointed tools will not be carried in field personnel's pockets. The use of tools with mushroomed heads, split or defective handles, worn parts, or other defects will not be permitted. Inspect all tools prior to start-up or use to identify any defects. Tools that have become unsafe will be reconditioned before reissue or they will be discarded and replaced. Throwing or dropping of tools from one level to another will not be permitted; rather, containers and hand lines will be used for transporting tools from one level to another if working at heights.

Non-sparking tools will be used in atmospheres where sources of ignition may cause fire or explosion. Electric-powered shop and hand tools will be of the double-insulated, shockproof type, or they will be effectively grounded. Power tools will be operated only by designated personnel who are familiar and trained with their use. When not in use, tools will not be left on scaffolds, ladders or overhead working surfaces.

4.2.10 Noise

Exposure to high levels of noise may occur when working near drill rigs or other heavy equipment. Also, depending upon where the work is being performed, local equipment (e.g., airports, factory machines, etc.) may produce high levels of noise. A good indication of the need for hearing protection is when verbal communication is difficult at a distance of 2-3 feet. Personnel will be provided with ear plugs and/or earmuffs when exposed to noise levels in excess of the 8-hour Permissible Exposure Limit (PEL) of 90 decibels.

4.2.11 Work Zone Traffic Control

Personnel will exercise caution when working near areas of vehicular traffic. Work zones will be identified by the use of delineators (traffic cones, flags, vehicles, DOT approved devices, temporary or permanent fencing, and/or safety barrier tape). Personnel will wear reflective vests when working in these areas. Depending on frequency, proximity, and nature of traffic, a flag person may also be utilized.

4.2.12 Work Over Water

If personnel will be working near, above or immediately adjacent to or within 6 feet of water that is 3 feet or more deep or where water presents a drowning hazard (e.g., fast-moving stream, water body with a soft bottom), employees are required to a U.S. Coast Guard (USCG) approved personal flotation device (PFD). All PFDs must have reflective tape on them to facilitate visibility. Employees must inspect PFDs daily before use for defects. Do no use defective PFDs.

4.2.13 Vehicle Use

Personnel must use caution when driving to, from, and across the site, paying special attention to other site traffic, as well as weather and road conditions. Heavy equipment should be transported during non-rush hour traffic.

4.3 Biological Hazards

Site activities on this Site may expose workers to other hazards such as poisonous plants, insects, animals, and indigenous pathogens. Protective clothing and respiratory protection equipment, and being capable of identifying poisonous plants, animals, and insects, can greatly reduce the chances of exposure. Thoroughly washing any exposed body parts, clothing, and equipment will also protect against infections. Avoiding contact with biological hazards is the best way to prevent potential adverse health effects. Recognition of potential hazards is essential. When avoidance is impractical or impossible, PPE, personal hygiene, good general health and awareness must be used to prevent adverse effects. If working in wooded/grassy areas, use appropriate insect repellants (containing DEET and/or Permethrin) and apply them per the manufacturers' directions. The following is a list of biological hazards that may be encountered while performing field activities at the project site and surrounding areas:

BIOLOGICAL HAZARD and LOCATION	CONTROL MEASURES
Snakes typically are found in underbrush and tall grassy areas.	If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound or apply a tourniquet. Carry the victim or have him/her walk slowly if the victim must be moved. Try to identify the snake: note color, size, patterns and markings.
Poison ivy, poison oak and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas.	Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.
Exposure to **bloodborne pathogens** may occur when rendering first aid or CPR, or when coming into contact with medical or other potentially infectious material or when coming into contact with landfill waste or waste streams containing such infectious material.	Training is required before a task involving potential exposure is performed. Exposure controls and personal protective equipment (PPE) area required. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.
Bees, spiders and other stinging insects may be encountered almost anywhere and may present a serious hazard particularly to people who are allergic.	Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past and inform the Project Manager and/or the buddy. If a stinger is present, remove it carefully with tweezers. Watch for allergic reaction; seek medical attention if a reaction develops.
Ticks typically are in wooded areas, bushes, tall grass and brush. Ticks are black, black and red or brown and can be up to one-quarter inch in size.	Avoid tick areas. Wear tightly woven, light-colored clothing with pants tucked into boots or socks. Spray outside of clothing with insect repellent containing permethrin. Check yourself for ticks often. If bitten, carefully remove tick with tweezers. Report the bit to the Project Manager. Look for symptoms of Lyme

	disease that include a rash that looks like a bulls eye and chills, fever, headache, fatigue, stiff neck or bone pain. If symptoms appear, seek medical attention.

5.0 PERSONAL PROTECTIVE EQUIPMENT

PPE ensembles are used to protect employees and subcontractors from potential contamination hazards while conducting project field activities. Level D is expected to be used for most activities at the site. The following subsections describe the PPE requirements for the field activities.

5.1 Level D Protection

When the atmosphere contains no known hazards and work functions preclude splashes, immersions or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals, Level D protection may be used. Level D does not provide respiratory protection and only provides minimal dermal protection. The Level D ensemble consists of the following:

- Work clothes that may consist of a short or long-sleeved cotton shirt and cotton pants, cotton overalls, or disposal overalls such as Tyvek™
- Steel-toe/steel-shank work boots
- Safety glasses with side shields
- Hearing protection, as necessary
- Hand protection, as appropriate
- Hard hat when working around overhead equipment such as a drilling rig
- Reflective vests when working around heavy equipment or near roadways
- Body harness and life vests when working on or within 6 feet of bulkheads, at heights, or in 3 feet or more of standing water (such as in Tin Mill Canal)

5.2 Modified Level D Protection

This is the level of protection that may be needed for material handling, sampling operations, and operation of remediation equipment when splash hazards are present. Modified Level D protection consists of the following:

- Disposable overalls such as polyethylene-coated Tyvek™
- Latex, vinyl, or nitrite inner gloves when handling liquids/fluids
- Nitrile outer gloves (taped to outer suit)
- Chemical-protective over-boots (taped to outer suit)
- Steel-toe/steel-shank, high-ankle work boots
- Hard hat with face shield
- Safety glasses with side shields or goggles
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- Hearing protection, as necessary

5.3 Level C Protection

Level C protection will be used when site action levels are exceeded and respiratory protection is required. The Level C ensemble consists of Modified Level D with the following modifications:

- Half or full-face air-purifying respirator (APR) equipped with appropriate cartridges/filters
- Chemical resistant clothing such as poly-coated Tyvek™
- Inner and outer nitrile gloves
- Chemical-resistant safety boots or boot covers to go over safety boots

Upgrading or downgrading the level of protection used by EAG employees and subcontractors is a decision made by EAG based on the air monitoring protocols presented in Section 7.0 for respiratory protection, the potential for inhalation exposure to toxic chemicals, and the need for dermal protection during the activity.

5.4 First Aid, Emergency and Safety Equipment

The following first aid, emergency and safety equipment will be maintained onsite at the work area:

- A portable eye wash
- Appropriate ABC-type fire extinguishers (minimum of 10 pounds; remediation systems to house individual 20 pound extinguishers) carried in every vehicle used during field operations
- Industrial first-aid kit (one 16-unit that complies with American National Standards Institute (ANSI) Z308A for every 25 persons or less)
- Bloodborne pathogen precaution kit with CPR mouth shield
- Instant cold packs
- Soap or waterless hand cleaner and towels
- American Red Cross First Aid and CPR Instruction Manuals

6.0 PERSONNEL TRAINING AND STANDARD SAFETY PROCEDURES

Employees must have received, at the time of project assignment, a minimum of 40 hours of initial OSHA health and safety training for hazardous waste site operations. Personnel who have not met the requirements for the initial training will not be allowed in the Exclusion Zone (EZ) or Contamination Reduction Zone (CRZ) of any active work area. A copy of each subcontractor site worker's 40-hour training certificate must be sent to the Project Manager for review prior to the start of the site work.

The 8-hour refresher training course must be taken at a minimum of once per year. At the time of the job assignment, all site workers must have received 8 hours of refresher training within the past year. This course is required of all field personnel to maintain their qualifications for hazardous waste site work. A copy of each subcontractor site worker's most recent 8-hour refresher training certificate must be sent to the Project Manager for review prior to the start of the site work.

A site-specific safety orientation will be conducted by EAG for all EAG employees and subcontractors engaged in fieldwork.

6.1 Onsite Safety, Health and Emergency Response Training

The OSHA 1910.120 standard requires that site safety and health training be provided by a trained, experienced supervisor. "Trained" is defined to mean an individual that has satisfactorily completed the OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course and 8-hour site supervisor training. Training will be offered at the time of the initial task assignment and/or whenever new chemicals are introduced into the workplace. Training will include all applicable regulatory requirements, location of the program, inventory and MSDSs, chemicals used and their hazards (chemical, physical, and health), how to detect the presence or release of chemicals, safe work practices and methods employees can take to protect themselves from hazards, how to read MSDSs and site or project specific information on hazard warnings and labels in use at that location. All training will be documented and training certificates will be kept in the employee's permanent training file. All applicable training will also require annual refreshers.

EAG qualified personnel must also provide safety meetings.

6.2 Standard Safety Procedures

This section describes the standard safety procedures that EAG requires all onsite personnel to follow during site activities.

6.2.1 General Safety Work Practices

All onsite employees and subcontractors will observe the following general safety work practices:

- Health and safety tailgate briefings will occur to introduce new activities, any new safety issues, and emergency egress routes for work areas; any significant change (added personnel, change in scope, or change in field conditions) will trigger a second (or more) tailgate meeting to address whatever change occurred
- No food, drink, or tobacco products will be allowed in the Exclusion and Contamination Reduction Zones
- Loose clothing, hair, and/or jewelry will not be permitted around moving or rotating equipment
- The "buddy system" will be implemented as necessary whereby a pair of co-workers watches out for each other while in proximity of potential physical work hazards
- Good housekeeping of all work areas will be maintained on an ongoing basis

6.2.2 Hand Safety

This standard is intended to protect employees from activities that may expose them to injury. This standard provides information on recognizing those conditions that require personal protective equipment (PPE) or specific work practices to reduce the risk of hand injury.

Appropriate gloves must be worn when persons work with materials or equipment that presents the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc.

<u>Guidelines for Working With and Around Equipment (Hand Tools, Portable Powered Equipment)</u>:

- Employees should be trained in the use of all tools.
- Keep hand and power tools in good repair and use them only for the task for which they were designed.

- Inspect tools before use and remove damaged or defective tools from service.
- Operate tools in accordance with manufacturer's instructions.
- Do not remove or bypass a guarding device for any reason.
- Keep surfaces and handles clean and free of excess oil to prevent slipping.
- Wear proper PPE, including gloves, as necessary.
- Do not carry sharp tools in pockets.
- Clean tools and return to the toolbox or storage area upon completion of a job.
- Before applying pressure, ensure that wrenches have a good bite.
- Brace yourself by placing your body in the proper position so you will not fall if the tool slips.
- Make sure hands and fingers have sufficient clearance in the event the tool slips.
- Always pull on a wrench, never push.
- When working with tools overhead, place tools in a holding receptacle when not in use.
- Do not throw tools from place to place or from person to person, or drop tools from heights.
- Inspect all tools prior to start-up or use to identify any defects.
- Powered hand tools should not be capable of being locked in the ON position.
- Require that all power-fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.
- Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools.
- Do not use cheater pipes.
- Make provisions to prevent machines from restarting through proper lockout/tagout.

<u>Guidelines for using Cutting Tools:</u>

- Always use the specific tool for the task. Tubing cutters, snips, self- retracting knives, concealed blade cutters, and related tools are task specific and minimize the risk of hand injury. For more information about cutting tools, see Supplemental Information A.
- Fixed open-blade knives (FOBK) are prohibited from use. Examples of fixed open-blade knives include pocket knives, multitools, hunting knives, and standard utility knives.
- When utilizing cutting tools, personnel will observe the following precautions to the fullest extent possible:
- Use the correct tool and correct size tool for the job.
- Cut in a direction away from yourself and not toward other workers in the area.
- Maintain the noncutting hand and arm toward the body and out of the direction of the cutting tool if it were to slip out of the material being cut.
- Ensure that the tool is sharp and clean; dirty and dull tools typically cause poor cuts and more hazard than a sharp, clean cutting tool.
- Store these tools correctly with covers in place or blades retracted, as provided by the manufacturer.
- On tasks where cutting may be very frequent or last all day (e.g., liner samples), consider Kevlar® gloves in the PPE evaluation for the project.
- Do not remove guards on paper cutters.

6.2.3 Respiratory Protection

Based on air monitoring, an upgrade to Level C protection may be indicated. Half or full-face APRs will be utilized for protection against organic vapors and particulates. All employees required to wear respirators will be need to be medically cleared, in writing to do so by a qualified Occupational Physician.

All respirator users must be trained before they are assigned a respirator, annually thereafter, whenever a new hazard or job is introduces and whenever employees fail to demonstrate proper use or knowledge. Training will include, at a minimum:

- Why the respirator is necessary and what conditions can make the respirator ineffective.
- What limitation and capabilities of the respirators area.
- How to inspect, put on and remove and check the seals of the respirator.
- What respirator maintenance and storage procedures are.
- How to recognize medicals signs and symptoms that may limit or prevent effective use of the respirator.
- The engineering and administrative controls being used and the need for respirators.
- The hazards and consequences of improper respirator use.
- How to recognize and handle emergency situations.

Training will be documented and training certificated will be kept in the employee's permanent training file.

6.2.4 Personal Hygiene Practices

The field team must pay strict attention to sanitation and personal hygiene requirements to avoid personal contamination. The following instructions will be discussed and must be followed:

- During field activities, never put anything in the mouth, including fingers
- All employees must wash their hands, forearms, face, and neck before eating drinking, smoking or using the restroom
- Smoking is prohibited except in designated areas outside the work zone
- At the end of the day, all employees will shower upon returning home or to their hotel

6.2.5 Electrical Safety

All extension cords used onsite must be heavy-duty variety and must be properly grounded. All temporary circuitry must incorporate the use of GFCI devices. Refer to electrical safety in Section 4.2.6, Electrical Hazards.

6.2.6 Fire Safety

All flammable liquids will be used only for their intended purpose and stored and handled only in approved containers. Portable containers must be the approved red safety containers equipped with flame arresters and self-closing lids. All transfers of flammable liquids must be made with the containers grounded or bonded. Also, gasoline containers will be clearly labeled and storage areas (if

applicable) will be posted with "No Smoking" signs. Fire extinguishers will be stalled in all areas that contain flammable liquids.

6.2.7 Illumination

All work is planned for daylight hours. No special requirements are anticipated. However, should any work take place outdoors after daylight hours, suitable lighting will be required. In addition, suitable lighting is to be provided in each remediation system building or enclosure.

6.2.8 Sanitation

Potable water and toilet facilities will be provided in compliance with the OSHA 1926.51 standard. Any container used to distribute drinking water shall be clearly marked and not used for any other purpose. Single drinking cups will be supplied, both a sanitary container for the unused cups and a receptacle for disposed of the used cups will also be provided. Port-a-johns will be provided since there are no sanitary sewers on the job site.

7.0 EXPOSURE MONITORING PLAN

This section describes air and personnel monitoring protocols, sampling methods, and instrumentation to be used, as well as the methods and frequency of sampling instrument calibration and action levels for potential work site hazards. When engaged in air monitoring, EAG personnel and subcontractors must use the forms to record air monitoring data and air monitoring instrument calibration records. All monitoring records/forms are to be maintained in the project file by the EAG Project Manager.

7.1 Air Monitoring

The surveillance program is established to detect changes in the ambient air at the work site and to ensure the continuing safety of the work zones and adequacy of the level of worker protection. During field activities, the designated field team member will monitor the work site for combustible gas concentrations and organic vapors. Calibration of all monitoring equipment will be performed in accordance with the manufacturers' procedures by trained EAG employees and subcontractors. The Project Manager, Project Field Team Leader or representative will be notified immediately of any contaminant levels that could trigger an upgrade in PPE or cause a suspension of site activities.

- One or more of the following direct-reading instruments may be used to aid in this determination. Photoionization Detectors (PID) and Flame Ionization Detectors (FID) will measure non-specific organic gases and vapors. Combustible Gas Indicators (CGI) will detect explosive atmospheres. Oxygen (O2) meters will detect fluctuations in oxygen concentrations. These instruments should be calibrated or bump tested daily and whenever the readings may be erratic. All readings should be recorded in the field log books.

Air monitoring results obtained from the breathing zone during field activities will be recorded in field log books. All such records will also include the location, date/time, weather conditions, person monitored, background concentration, and identification of specific contaminant whenever possible. Air monitoring information will be utilized to evaluate personnel exposure and assess the appropriateness of PPE for Site conditions.

7.1.1 Combustible Gas and Oxygen Deficiency/Excess Monitoring

Explosive gas concentrations are not expected to exceed 10% of the lower explosive level (LEL). Should the need be indicated for monitoring, action guidance for the CGI/O2 meter responses is contained in **Table 7-1**.

Table 7-1

CGI/Oxygen Meter Action Levels	
Meter Response	**Action**
CGI response 0%-10% LEL	Continue normal operations
CGI initial response >10% and <20% LEL	Eliminate all sources of ignition from the work area; temporarily retreat from work area for 15-30 minutes and then monitor area again
CGI response after 15-30 minute retreat >10% and <20% LEL	Retreat from work area; notify Project Manager
CGI response >20%	Discontinue operations; retreat from work area
Oxygen level <19.5%	Retreat from work area; notify Project Manager
Oxygen level >23.5%	Retreat from work area; notify Project Manager

7.1.2 Organic Vapor Concentrations

Real-time monitoring for organic vapor concentrations in the breathing zone and down hole will be conducted during field operations (installation of groundwater monitoring and groundwater sampling by EAG and EAG subcontractor personnel) with a PID equipped with a 10.2- or 11.7-electron volt (eV) probe. The PID will be taken into the field and operated during site activities where contaminated soil and/or groundwater may be present. Air monitoring will be conducted during well installation and when a well is opened for groundwater measurements. Measurements will be made at the well head and personnel breathing zones where activities are being performed. The instrument will be calibrated using ultra-high purity air and isobutylene vapor of known concentration before and after use each day. Air calibration measurements will be documented in writing and kept in the project file. Action guidance for PID responses is contained in **Table 7-2**.

Table 7-2

Action Levels for General Site Work	
Meter Response in Breathing Zone (minimum of 3 minutes)	**Action Required**
<5ppm above background	Use Level D PPE
>5ppm above background	Level C PPE, including half or full-face APR with organic vapor cartridges/P100 filters
>50ppm above background	Stop work
Action Levels for Handling NAPL	
Meter Response in Breathing Zone (minimum of 3 minutes)	**Action Required**
<1ppm above background	Use Modified Level D PPE
>1ppm to <10ppm	Level C PPE, including half or full-face APR with organic vapor cartridges
>10ppm above background	Immediately withdraw; monitoring will continue until action levels will allow safe re-entry

If air concentrations of organic vapors are greater than 5 ppm above background in the breathing zone for a 3-minute period, personnel will stop work, retreat from site, and allow time (at least 15 minutes) for vapors to dissipate. If monitoring indicates that concentrations still exceed 5 ppm, workers will upgrade to Level C PPE. If monitoring indicates that concentrations exceed 50 ppm, work will be stopped until site conditions can be re-evaluated.

These action levels are based on the assumption that the major component of free product being recovered will be benzene or naphthalene.

Work involving NAPL recovery from monitoring wells will be conducted in Level C PPE. This level may be downgraded based on air monitoring data and actual field conditions. Downgrading of PPE must be approved by the PM and HSE staff. If ventilation is conducted, additional air monitoring will be performed to the resumption of work to determine the level of PPE required.

7.2 Physical Conditions Monitoring

Site workers will be monitored by the Project Manager for signs of weather-related symptoms from exposure to excessive heat or cold.

Whenever the air temperature exceeds 70°F for personnel wearing chemical protective clothing or 90°F for personnel wearing regular work clothes, the Project Manager will assess conditions that may cause heat stress in site workers.

8.0 MEDICAL SURVEILLANCE

This section discusses the medical surveillance program, how the results are reviewed by a physician and how participation is documented.

8.1 Medical Surveillance Program

All personnel who will be performing any task where potential exposure to hazardous material exists will undergo medical surveillance as outlined in OSHA 29 CFR 1910.120(f). All personnel performing tasks in the Exclusion Zone or Contamination Reduction Zone will be required to have passed the EAG medical surveillance examination (or equivalent), performed by a licensed Occupational Physician. The Project Manager will verify that all EAG and subcontractor personnel meet applicable OSHA medical surveillance requirements.

Applicable field employees will undergo an annual comprehensive medical examination, including a comprehensive health history, blood chemistry with complete blood count and differential, urinalysis, medical history, required chest x-rays, audiogram, pulmonary function testing, testing for heavy metals (as needed), and a physician's interpretation of each employee's medical surveillance examination, including the ability of the employee to wear a respirator. A comprehensive medical examination will be performed if an employee develops signs or symptoms indicating possible overexposure to hazardous substances and/or heat or cold stress.

8.2 Physician Review

All medical surveillance and examination results are reviewed by a licensed physician who is certified in Occupational Medicine by the American Board of Preventive Medicine. EAG employee participation in the medical surveillance program is a part of their permanent medical record maintained in the employee's home office. A copy of the current medical clearance signed by the occupational health physician for all EAG employees must be maintained at the home office.

9.0 SITE CONTROL MEASURES AND DECONTAMINATION

To provide for the protection of public health and safety and minimize the possibility of transferring hazardous substances from the site, contamination control procedures are required. These procedures consist of site control measures (which entail the delineation of work zones, communications, and site security) and decontamination procedures (which are necessary for both personnel and equipment). Contaminants that may be uncovered during sampling operations must not be transferred outside the work zone unless properly containerized, and must be removed from clothing, personnel, and equipment prior to relocation from that zone. This section discusses site control measures and decontamination procedures to be used during the collection of samples, the installation of soil borings and/or groundwater monitoring/remediation wells, excavations, and other intrusive work where contact with impacted soils and groundwater could occur by EAG and/or EAG subcontractor personnel.

9.1 Site Control Measures

Site control can be achieved by effectively delineating the work zone, providing appropriate communication, and establishing site security.

9.1.1 Work Zone Delineation

To minimize the transfer of hazardous substances from the site and to ensure proper protection of employees and subcontractors, work zones will be established by the Field Project Team Leader. Applicable site work and the associated requirement for work zones will be determined by the Project Manager. The work area will be divided into an Exclusion Zone (EZ), a Contamination Reduction Zone (CRZ), and a Support Zone (SZ). A typical work zone delineation setup is shown as **Figure 9-1**, below.

Exclusion Zone (EZ)

Contamination does or could exist in this zone. Only properly authorized and trained individuals (refer to Section 6.0) wearing appropriate PPE will be allowed to enter and work in this zone. All people entering the EZ must wear, at a minimum, Level D protection. An entry and exit point for personnel and equipment will be established at the periphery of the EZ (between the EZ and the CRZ) to regulate the flow of personnel and equipment.

Contamination Reduction Zone (CRZ)

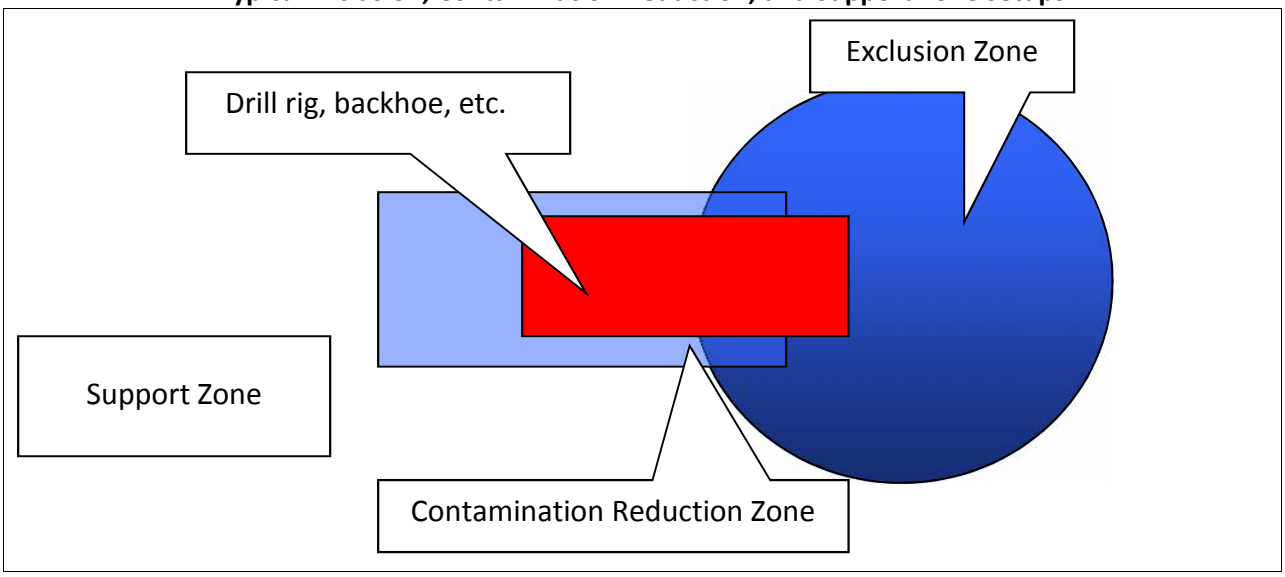
Between the EZ and the SZ will be the CRZ, which will provide a transition between the potentially contaminated EZ and the clean SZ. The CRZ (located upwind of the EZ, if possible) will be a corridor leading from the EZ and will serve as a buffer to further reduce the probability of the SZ becoming contaminated. Exit from the EZ will only be allowed through this CRZ. The CRZ will provide additional assurance that the physical transfer of contaminating substances on people, equipment, and/or in the air will be limited through a combination of decontamination and zone restrictions. Within this zone, employees and subcontractors may perform personal decontamination (e.g., face and hand washing), and certain PPE and small equipment decontamination. Buckets or wash basins for boot

washing and equipment decontamination will be stationed on a sheet of plastic (a minimum of 8 feet by 8 feet), the boundaries of which will constitute the CRZ.

Support Zone (SZ)

The Support Zone will be considered a non-contaminated area. The location of support facilities in the SZ will be upwind of the EZ (where possible) and readily accessible to the nearest road. The field office/support facilities, equipment vehicles, a first aid station and a visitors/personnel entry and exit log for the work site will be located in this zone. Potentially contaminated personal clothing, equipment and samples are not permitted in this zone unless properly containerized.

Figure 9-1
Typical Exclusion, Contamination Reduction, and Support Zone setups



9.1.2 Communications

A loud and clear form of communication should be made available for Site personnel entering the work zones. Site communication may be in the form of hand signals, voice, or other communication devices. All forms of communication should be understood by all workers on the Site prior to starting work. Offsite communications may be conducted with mobile phones or walkie-talkies only if the atmosphere has been deemed non-explosive, and the person using the mobile device is in the SZ while placing the call, or inside the cab of a stationary vehicle.

9.1.3 Site Security

The Sparrows Point facility is not open to the public, and there is a strictly monitored main entrance with a security guard on duty at all times who only allows authorized personnel onto the Site. This limited access to the facility should eliminate the need for many requirements for specific site security except those needed to maintain work zone integrity, such as visible barriers around open excavations or EZs and CRZs. No site visitors will be allowed to travel unescorted by EAG or subcontractor personnel around the facility.

Once site visitors arrive at their intended work zone, they must check in with the Field Team Lead. If visitors are authorized to enter the CRZ and/or the EZ, they must have completed OSHA 1910.120 medical surveillance and training requirements (refer to Section 8.0 and Section 6.0). Visitors must wear

appropriate PPE before they will be allowed to enter the CRZ and/or the EZ. They must also be taken through this HASP during a brief tail-gate meeting and sign the Acknowledgement page in the back prior to engaging in any activities inside the CRZ or the EZ. All site visitors must follow the same site control measures and decontamination procedures as EAG personnel and subcontractors. The Project Manager must also be informed of each visitor's name, purpose for their visit, time of entry (and exit), location of tasks they wish to perform, whether they completed their intended task(s), and any other relevant information pertaining to their visit.

9.2 Decontamination Procedures

Decontamination of employees, subcontractors, and equipment leaving the EZ will be performed to minimize human exposure to hazardous substances and to minimize the spread of contamination to surrounding areas. The purpose of the CRZ is to provide a location to perform limited personnel decontamination and certain PPE and small equipment decontamination.

9.2.1 Personnel Decontamination

Persons leaving the EZ must pass through the CRZ and follow decontamination procedures before entering the SZ. Hand tools and other sampling equipment used in the EZ and reusable PPE (boots, safety glasses, etc.) will be appropriately cleaned prior to removal from the site each day. The step-by-step sequence for personnel decontamination is as follows:

- Remove boot covers (if used) at the boot washing station and place them in the disposal container provided
- Wash outer gloves and chemical resistant boots (if used) at the boot washing station
- Remove wrist tape (if used) and outer gloves and place them in the disposal container provided
- Remove ankle tape (if used) and disposable coveralls (if used) and place them in the disposal container provided
- Remove respirators (if used) and place each in designated locations in the CRZ
- Remove inner gloves and discard in the disposal container provided
- Wash hands and face and proceed to the SZ

Respirators must be fully decontaminated after each use by the personnel who previously wore them. All project employees and subcontractors are required to take a thorough soap and water shower in their home or motel room at the end of each workday. If monitoring or a general exposure assessment indicates that an employee has become contaminated, the employee or subcontractor will notify the EAG Project Manager and the Field Team Lead as soon as the contaminated state has been discovered.

9.2.2 Equipment Decontamination

All equipment leaving the EZ must be decontaminated either within the CRZ or at the central decontamination area. Small equipment, such as hand tools, will be thoroughly decontaminated within the CRZ before being placed in the SZ. The field tools may be scrubbed visually clean using a detergent solution (Alconox/Liquinox) with water and a stiff, long-bristled scrub brush. Following the solution scrubbing, the tools may be rinsed with distilled water or isopropyl alcohol. Any vehicle working in an EZ will be decontaminated before leaving the site. The vehicle will be cleaned by sweeping excess soil and debris off the wheels. A high-pressure sprayer will then be used to wash the wheels, if necessary.

Each piece of equipment will be inspected after cleaning for any soil remaining on the tires or elsewhere. All vehicles will be cleaned to the satisfaction of the Field Team Lead or a designated assistant prior to entering the SZ or leaving the site. Employees or subcontractors performing decontamination shall wear the appropriate level of PPE (refer to Section 5.0).

9.2.3 Waste Management

The Project Manager and the Field Team Leads will be responsible for overseeing the containerization and disposal of any field derived wastes. Contaminated or suspected contaminated field derived wastes shall be disposed of in accordance with all local, state, and/or federal regulations. Field derived wastes include decontamination rinse waters and other related decontamination generated wastes.

Soils and groundwater expected to be encountered during any sampling or intrusive work not to be contaminated, based on existing data, may be discharged to the ground surface in the immediate vicinity of the monitoring well. However, any known or suspected to be contaminated soil (in small quantities) or groundwater will be containerized for future removal, likely in 55-gallon drums or other approved storage vessels. Depending on the suspected contaminants, the recovered groundwater may be sent through one of the onsite groundwater treatment units. However, the treatment unit must be designed to address the contaminants of concern in the groundwater being treated. Otherwise, the liquid must be staged onsite for eventual offsite disposal at an approved facility.

Impacted soil, if in drums, will be staged in an area designated by the Project Manager or Field Team Lead for eventual disposal. For large excavations, where excavated soil is stockpiled, it may be necessary to place soils on plastic and cover with plastic to prevent any potential leachable runoff. The Project Manager and/or Field Team Lead will provide the proper guidance necessary for handling bulk soil piles.

Any NAPL recovered via remediation systems or manual recovery efforts will be properly containerized and either disposed of offsite as a recyclable material, if possible, or as a hazardous waste. The receiving facility must be an approved facility.

10.0 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

The objective of emergency response and contingency procedures is to ensure that effective actions are implemented in a timely manner to minimize or control the effects of adverse events (e.g., potential chemical exposures, personal injuries, fires/explosions, and spills/releases). The following subsections describe the basic emergency responses required should an emergency take place during field investigation or remedial effort activities.

10.1 Emergency Phone Numbers

Emergency telephone numbers are listed in **Table 10-1**.

Table 10-1
Emergency Telephone Numbers and Agencies

Agency	Telephone Number
Security (Sparrows Point facility)	(410) 388-7761
Ambulance	911
Fire	911
Occupational Health Clinic	(410) 633-3600
Hospital	(410) 550-0100 (general) (410) 550-0350 (emergency)
National Response Center	(800) 424-8802
Poison Control Center - Maryland	(800) 222-1222
EAG Main Contact	
VP Remediation, Russ Becker	(314) 686-5611
Project Manager, James Calenda	(314) 620-3056

10.2 Injury/Illness Treatment

In the event of illness or injury, the following steps will be taken:

- Evaluate the extent of injuries or seriousness of illness.
- When employees require urgent medical attention, call for emergency assistance. First aid should be administered while awaiting an ambulance or paramedics. All emergency medical treatment, other than first aid, will be administered by the local paramedics. **Table 10-1** lists site emergency telephone numbers. In all cases, critical injuries must be immediately referred for professional medical attention.
- For a non-critical injury/illness, first aid will be administered by onsite personnel. Anyone sustaining a non-critical injury/illness who continues to work will be monitored by the Field Team Lead for any signs of worsening condition, if it is deemed that the person can return to work by the Team Lead and Project Manager. Injured personnel who later suffer any worsening change in status are to immediately notify the Team Lead or the Project Manager.

10.3 Occupational Health Clinic and Hospital Information

Occupational Health Clinic

The Concentra Medical Center, located at 1833 Portal Street, Baltimore, MD, is the closest occupational health clinic, just over 6 miles away. A map to the clinic in included as **Figure 10-1**. The clinic should be used for non-emergency injuries and illnesses.

Directions:
From Sparrow's Point Road, turn left onto Wharf Road;
Turn left onto MD-158 W/Bethlehem Blvd. (0.4 mile);
Turn right onto MD-157 N/Peninsula Expy. (2.7 miles);
Turn slight left onto Merritt Ave. (0.1 mile);
Merritt Ave. becomes Sollers Point Rd. (0.3 mile);
Turn left to stay on Sollers Point Rd (0.6 mile);
Turn left onto Williams Ave. (0.2 mile);
Turn right onto Dundalk Ave. (<0.1 miles);
Turn left onto Chandlery St. (0.1 mile);
Turn left onto Portal St.

Figure 10-1: Health Clinic (Non-Emergency) Map

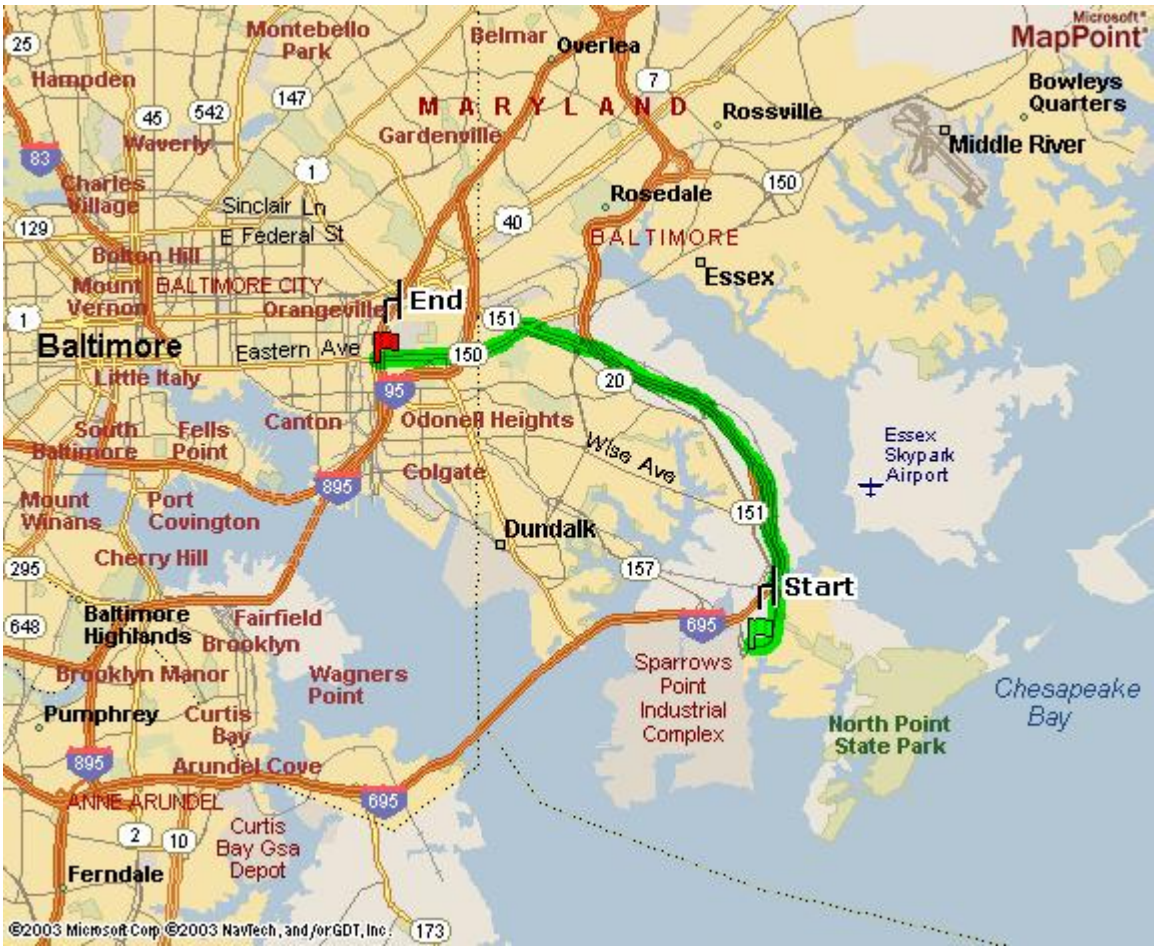
Hospital

The Johns Hopkins Bayview Hospital is the closest emergency facility, just over 9 miles away. The hospital is located at 4940 Eastern Avenue in Baltimore, MD. **Figure 10-2** is a map to this hospital. Maps are also included in **Attachment E**.

Directions:

From the Sparrows Point Industrial Complex, go north on Route 151 for approximately one mile.
Take ramp (right) onto I-695 towards I-695/Essex.
At exit 40, take ramp (right) onto Route 151/North Point Boulevard North/MD 150;
Take ramp (right) onto Route 150 (Eastern Avenue).
Continue on Eastern Avenue to hospital on right.

Figure 10-2: Hospital Map



Prior to the start of field activities, the Project Field Team Leader will call to verify the telephone numbers and directions for the clinic and hospital, and then distribute location maps and the emergency telephone list to workers and vehicles.

10.4 Accident and Emergency Medical Response

All field team members will be aware of the location of a first aid kit kept onsite. All vehicles used to transport injured persons to an offsite medical facility will be provided with directions and a map to the medical facility.

If treatment beyond first aid is required, emergency response personnel will be contacted for assistance and transport. Before beginning site activities, the Project Field Team Leader will ensure that each field team member knows where the nearest emergency medical facilities are and how to get there. The closest hospital will be used in cases of life-threatening emergencies at the direction of the Project Field Team Leader. The telephone numbers of the local emergency services will be available in the SZ, and the Project Field Team Leader will brief the field team on the procedures for calling for help in an emergency.

Site personnel will inform the Project Manager of any medications, allergies, or other medical information that may be applicable for their medical treatment. The Project Manager will supply this information to emergency response personnel, and will accompany the victim to the hospital, if possible.

10.4.1 Chemical Exposure

In case of accidental overexposure to a hazardous material (groundwater, soil, and/or off-gas materials), guidelines shown in **Table 10-2** will be used.

Table 10-2
Chemical Exposure Guidelines

Type of Overexposure	First Aid Guidelines
Skin Contact	Skin: Wash/rinse the affected area thoroughly with copious amounts of soap and water.
	Eyes: Eyes should be rinsed for at least 15 minutes following chemical contamination.
	Contact emergency response personnel if required, or transport victim to the hospital.
Inhalation	Move the victim to fresh air.
	Contact emergency response personnel if required, or transport victim to the hospital.
Ingestion	Contact Poison Control Center.
	Contact emergency response personnel, or transport victim to the hospital.

10.4.2 Decontamination During a Medical Emergency

For minor medical problems or injuries, regular decontamination procedures will be followed. If emergency, life-saving first aid and/or medical treatment are required, regular decontamination procedures may need to be abbreviated or omitted:

- Do not attempt to wash or rinse an unresponsive victim unless the victim has been contaminated with an extremely toxic or corrosive chemical that may cause injury or loss of life to emergency response personnel.
- Outer garments can be removed if it does not cause a delay, interfere with treatment, or aggravate the problem.

- PPE can be cut away and respiratory protective equipment must always be removed.
- If contaminated clothing cannot be safely removed, then the victim should be wrapped in a blanket or plastic sheeting to prevent contamination to the inside of the ambulance and/or emergency response personnel.

The Project Manager or Field Team Lead will advise the medical staff as to the type of contamination possibly involved.

10.4.3 Small or Incipient Fire

A small fire is defined as a fire that can be extinguished with an available 20 pound type ABC fire extinguisher. An incipient fire is a fire that is small because it has just started. In the event of a small or incipient fire, the following minimum actions will be taken:

- Evacuate nearby personnel from the area, if possible, to an upwind location or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible.
- Attempt to extinguish fire using portable fire extinguisher or by smothering.
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products, or if fire cannot be put out.
- After the fire has been extinguished, or emergency response personnel have been contacted, notify the following project personnel:
  The Project Manager

10.4.4 Large Fire or Explosion

An explosion, large fire or a small fire which cannot be extinguished is beyond the first line capabilities of EAG personnel. Professional emergency response personnel would be needed to provide emergency assistance for these types of incidents. In the event of a large fire, explosion or a small fire that cannot be extinguished, the following minimum actions will be taken:

- Evacuate all personnel from the site, if possible, to an upwind location, or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible
- Perform a quick role call to account for all site personnel
- Contact the fire department
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products
- After emergency response personnel have been contacted, notify the following project personnel:
  The Project Manager

10.4.5 Adverse Weather Conditions

In the event of adverse weather conditions, the Project Manager will determine if work can continue without sacrificing the health and safety of site personnel. Threatening weather conditions will be monitored by the Project Manager and possibly the Team Lead via radio, television, internet, and/ or calls to the National Weather Service. Some of the conditions to be considered include:

- Potential for heat or cold stress
- Limited visibility

- Electrical storms
- Treacherous weather-related working conditions (i.e., heavy rainfall, icy conditions causing slippery footing hazards, etc.).

10.4.6 First Aid for Heat Stress/Cold Stress

First aid treatment for **heat cramps** includes shade, rest and fluid replacement. If available, the individual should drink electrolyte replacement fluids (e.g., Gatorade, Squincher or 10-K). The individual should recover within half an hour.

First aid treatment for **heat exhaustion** includes cooling the victim, elevating the feet and fluid replacement. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Heat stroke is a medical emergency, requiring the immediate cooling of the victim and transport to the hospital for medical treatment immediately.

First aid treatment for **frost nip** and **frostbite** includes covering the affected area with warmth and retreating to a warm area. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Frozen tissue is a medical emergency and the victim must receive medical attention immediately. Contact emergency response personnel immediately or transport the victim to the hospital.

First aid treatment of **mild hypothermia** includes using heat to raise the individual's body temperature. Heat may be applied to the victim in the form of heat packs, hot water bottles and blankets. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Severe hypothermia is a medical emergency and the victim must be transported to the hospital immediately. First aid treatment for severe hypothermia includes handling the victim very gently; rough handling may set off of an irregular heartbeat. ***DO NOT*** attempt to re-warm the severely hypothermic victim; re-warming may cause the development of an irregular heartbeat.

10.4.7 Snake Bites

If bitten, lower the extremity below the heart to reduce the poison's dissemination through the body. Remain calm, try to keep the heart rate reduced and seek medical attention immediately. Do not cut the wound or attempt to suck out the venom. Note any physical features (e.g., shape of head and color or pattern on body) of the snake.

10.4.8 Animal Bites

All bites should be treated as contaminated soft tissue injuries. Bites should be washed immediately with large amounts of soap and water. If soap is not available, flush the wound with water. The severity and onset of any infection is dependent upon the number of organisms (viruses or bacteria) introduced into the wound. Washing saliva out of the wound immediately will reduce the number of bacteria or viruses that can enter the tissue. Medical attention must be sought if rabies is suspected or the individual has not had a recent tetanus booster.

10.4.9 Insect Bites and Stings

Emergency care for insect bites and stings depends on the individual's reaction. To treat a sting that results in a minor reaction, remove the stinger by gently scraping it off the skin. Do not try to grasp the sac or stinger, because this forces the remaining venom into the skin. Once the stinger has been removed, clean the wound and surrounding area. Apply cold packs to slow the absorption of the venom and reduce pain and swelling. The treatment for a severe reaction to insect stings includes the following:

- Confirm with the victim whether they are highly allergic to the insect that stung them
    - If victim has gone into anaphylactic shock, retrieve their epi pen or other auto-injector and administer per the directions as hastily as possible
- Assuming the victim remains conscious, ask them to refrain from moving around, and to lie down
- Immobilize the injured area immediately
- If an extremity is involved, remove any rings or watch
- Keep the affected part low, below the level of the heart
- Apply cold compresses to the affected area
- If possible, try to identify the type of insect that inflicted the sting
- Transport the victim to a medical facility immediately, continuing supportive measures en route.

All employees and subcontractors must report severe reactions to insect stings prior to the beginning of work to both the Project Manager and Field Team Lead.

10.4.10 Poisonous Plants

Decontamination: Wash the skin immediately after contact with the plant. Proper washing may not be practical in the middle of the woods, but a product such as Technu or a small wash-up kit with prepackaged, alcohol-based cleansing tissues can be effective. Employees and subcontractors should not forget to wash contaminated clothing and clean up contaminated equipment prior to re-use.

Treatment: Options are as follows:

- Home treatment: Calamine lotion and an oatmeal bath (one cup to a tub full of water) can help relieve itching. To prevent secondary skin infection, scratching is not helpful and the fingernails should be cut to avoid damage to the skin. Over-the-counter hydrocortisone cream can decrease inflammation and itching; however, the label should be read and the cream used according to directions.
- When to see the doctor: Severe cases may require further treatment. A physician should be seen if the rash appears infected, is on the face or other sensitive body areas, or is too extensive to be easily treated at home.

10.4.11 Ticks

To remove an attached tick:

- Use fine-tipped tweezers or a "tick tool" to grasp the tick at the surface of the skin
- If tweezers are not available, use a tissue to protect the fingers (exposure to the tick's body fluid may lead to transmission of disease)
- With a steady motion, pull the tick straight out

Disinfect the bite site and the tweezers. Wash your hands thoroughly with soap and water. Save the tick if you can by placing it in a Ziploc bag in the freezer; this may help with diagnosis in the future.

If flu-like symptoms such as fatigue, headache, neck-stiffness or jaw discomfort begin following a tick bite, seek medical attention.

APPENDICES

EnviroAnalytics Group

Environmental Engineers

ATTACHMENT A

COMPLIANCE AGREEMENT

EAG HEALTH AND SAFETY PLAN

ACKNOWLEDGEMENT FORM

I, _____, have read (or had read to me), EAG's health and safety plan.
(Print Name)

I understand my responsibilities as they are defined in this plan and will abide by these rules and procedures, as well as any regulations or otherwise governing safety. When in doubt concerning safe job performance, I will speak to my immediate supervisor and/or Project Manager.

I understand EAG reserves the right to change or amend the HASP at any time.

I understand any violation to the plan policies or procedures will be cause for disciplinary action up to and including termination.

_____ _____

Employee Signature Date

_____ _____

EAG Supervisor/Project Manager Signature Date

ATTACHMENT B

Material Safety Data Sheets (MSDSs)