Phase II Investigation
Work Plan

Area B: Parcel B22
Tradepoint Atlantic
Sparrows Point, Maryland

Prepared for:
EnviroAnalytics Group
1650 Des Peres Road, Suite 230
Saint Louis, Missouri 63131

Prepared by:
ARM Group Inc.
9175 Guilford Road
Suite 310
Columbia, MD 21046

Revision 1
June 2, 2016

ARM Project 150300M-20

Respectfully Submitted,

Eric S. Magdar
Senior Geologist

T. Neil Peters, P.E.
Vice President

TABLE OF CONTENTS

TABLE OF CONTENTS
(CONT.)

FIGURES

APPENDICES

1.0 INTRODUCTION

1.1. INTRODUCTION

ARM Group Inc. (ARM), on behalf of EnviroAnalytics Group (EAG), has prepared the following Work Plan to complete a Phase II site investigation on a portion of the Tradepoint Atlantic property that has been designated as Area B, Parcel B22 (the Site). Parcel B22 is comprised of approximately 130.8 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

Site characterization of Parcel B22 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 B22 (with the exception of 23 acres located furthest south) is also part of the acreage that remains subject to the requirements of the Multimedia Consent Decree between Bethlehem Steel Corporation, the United States Environmental Protection Agency (EPA), and the Maryland Department of the Environment (MDE) (effective October 8, 1997) as documented in correspondence received from EPA on September 12, 2014.

1.2. SITE BACKGROUND

1.2.1. Steel Manufacturing Operations

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 approximately 72% natural soils and 28% slag based on the approximate shoreline of the Sparrows Point Peninsula in 1916, as shown on **Figure 2** (Adapted from Figure 2-20 on the Description of Current Conditions Report (DCC) report prepared by Rust Environmental and Infrastructure, dated January 1998). Parcel B22 was formerly occupied by the following major facilities: the Continuous Cold Tin Mill, Hot Strip Mill Area, and the Finishing Mills Area, each containing numerous steel product manufacturing operations. The parcel also included processing and shipping buildings and Palm Oil Recovery, Inc. (PORI) facilities. All buildings, with the exception of a few small shops, have been recently demolished or are in the process of being demolished. Several pits and basements across the Site have been filled-in, with others remaining open. The concrete slabs remain on grade.

Several iron and steel work processes were completed within the boundary of Parcel B22. Descriptions of the facilities and processes are provided below:

Hot Strip Mill:
Slabs were transferred to the Hot Strip Mill, often following preparation steps which could include slitting (to alter the size) or scarfing (to remove surface defects). Prepared slabs were transported to reheat furnaces, where they were heated and soaked until achieving a rolling temperature of approximately 2,200 degrees F. Heated slabs left the furnace and were descaled with high pressure water to remove iron oxides, then rolled into hot bands of specific size and gauge. The bands were water cooled and coiled for sale or further processing. The furnaces used a combination of natural gas, No. 6 fuel oil, and/or on-specification used oil.

Tin Mill Facilities:
The No. 3 Pickler removed scale from steel bands received from the Hot Strip Mill by using both mechanical descaling and chemical descaling. Five pickling tanks were used to chemically descale the sheet with a sulfuric acid pickling solution. After picking, the strip was rinsed, dried, slit, oiled, and transferred to the 48” Tandem Mill for further processing. Acid emissions generated from the operation were vented through blowers located above tanks and sent to a scrubber.

The 48” Tandem Mill reduced the steel strip in thickness, produced a smooth/dense surface, and developed the required metallurgical properties. The Mill received product, uncoiled it, and processed it through roll stands. Coils were typically delivered to either the No. 6 Washer or the No. 5 Continuous Anneal operation, or shipped directly to customers. An oil/water emulsion was applied during rolling.

The No. 6 Washer was used to clean strips from the Tandem Mills with a caustic solution before annealing. The strip was first uncoiled and welded to the previous strip and fed into a caustic wash tank. After the caustic wash, the strip was fed into a scrubber tank equipped with brushes for cleaning. The strip was then rinsed, dried, and rewound into a coil for transport to the Box Anneal Furnaces. The fumes generated from the caustic wash tank and from the water rinse in the No. 6 Washer were directed to a scrubber system.

The Box Annealing facility annealed coils to varying degrees of hardness determined by the customer's end use. Coils were stacked on a pedestal and capped by an inner cover. The portable Box Annealing furnace was placed over the base, and natural gas flow was started and ignited. The operation produced gasses from residual oils on the surface of the coils which were consumed in the furnace. Each furnace vented inside the building.

Depending on the customer's requirements for hardness and plating, cold-reduced strip may have required annealing. The No. 5 Continuous Anneal combined the caustic cleaning process with continuous annealing. The strip was uncoiled, welded to the previous strip and fed into a caustic wash tank. After the caustic wash, the strip was fed into a tank equipped with brushes for cleaning. The strip was rinsed, dried, and fed to the annealing furnace. After annealing, the strip was cooled and rewound into a coil for further processing. The fumes generated in the caustic washer were controlled by a scrubber.

Product from the No. 5 Continuous Anneal and the batch Box Annealing operation was delivered to the No. 6 Skin Pass Mill. The No. 6 Skin Pass Mill reduced the gauge, tempered the steel, and prepared the surface of the strip for finishing. For protecting product quality, the particulate generated in the process could be directed to a dust-collection system. Fugitive VOC emissions were generated during material-handling operations.

The No. 3 Duo Mill was used to reduce the thickness of the annealed strip and temper the steel. Materials used in the process included rolling oil and a rust-inhibitor solution. The mill was equipped with a fume-exhaust system that led to a mist eliminator.

Three Coil Preparation Lines were used in the Tin Mill Department to prepare the final product for packaging and shipping. These lines received coils from the plating lines and trimmed the coils or removed defective sections. A percentage of No. 5 Coil Preparation Line product was oiled for protection of the steel during storage and shipment. All coil-preparation lines could occasionally rewind coils as necessary for the other Tin Mill Operating Units.

The No. 1 Tin Plate Line applied a tin coating to a prepared coil. The strip first entered an alkaline cleaning section, which consisted of a caustic bath followed by a water rinse. The strip then passed through a sulfuric acid pickling bath and a water rinse to prepare the surface for coating. The alkaline cleaning, pickling, plating and chemical treatment areas were served by individual scrubbers. The strip then entered an electroplating bath where the strip was plated with tin. The strip was hot-rinsed, quenched and conveyed to the chemical-treatment area, where the strip surface was passivated with dichromate solution. The strip was then cleaned and transported for shipment. The No. 2 Tin Plate Line also applied a tin coating to a prepared coil through a very similar process.

In the No. 8 Chrome Line, the strip was plated with chrome. The strip was first cleaned using caustic solution and then pickled using a sulfuric acid solution. Once the strip was rinsed, it was chrome plated. Inert anodes were used to plate chrome from chromic acid onto the strip. Chrome passivation was used as a second treatment stage. Emissions from the caustic bath, pickler, plating tanks, and chemical treatment tanks were directed to a scrubber.

Cold Sheet Mill Facilities:
Finished steel was produced in various portions of the Site at the Cold Sheet Mill. These mills generated various steel products, all to customer specifications, including cold-rolled sheets. Some of the products were galvanized, coated with corrosion-resistant alloys (i.e., galvalume or chrome), or tin- plated at the Coating Lines located in the Cold Sheet Mill and the Tin Mill.

The Pickling Line prepared hot bands from the Hot Strip Mill for further processing in the Tandem Mill. Steel was uncoiled, welded to the previous band and the scale broken before sending it through a continuous bath of sulfuric acid pickling solution. Acid flowed countercurrent with the strip and was removed at the entry end of the pickler. The strip was then rinsed and dried and may have been oiled and then re-coiled, or could be passed directly to the Tandem Mill.

The Tandem Mill reduced the thickness of the strip, produced a smooth, dense surface and developed the required metallurgical properties of the steel. It received strip directly from the pickling operation passing it through a five-stand continuous mill arrangement. After rolling, it was rewound into a coil for shipment to final customers, to the annealing operations, and/or coating operations.

Coating Lines:
No. 1 Galvanize Line process involved heat treating, chemical treatment, and coating with a molten zinc. Prepared coils were delivered to the coating lines in coil form. The sheet was uncoiled before entering the direct-fired natural-gas furnace for annealing. Residual oil and fines on the surface of the sheet steel were burned in the process. After the strip was annealed, it passed through an electrically heated holding furnace, which served as a soaking operation. The sheet then passed through a molten-metal coating bath. The coated strip passed through a wiper to control coating thickness before cooling. Depending on the end use of the strip, a chrome oxide layer may have been applied in a chrome passivation process to prevent oxidation. The strip was dried, and, depending on end use, could be oiled for downstream processing and prevention of oxidation. After chemical treatment, the strips were either shipped off the site or further processed.

The No. 2 Galvanize Line applied a zinc coating to a heat-treated and prepared coil from the Cold Sheet Mill. The strip was uncoiled and prepared by annealing and heat soaking prior to coating with molten zinc. From the coating bath, the coated strip passed through a wiper to control coating thickness before cooling. The strip was then passed through another annealing furnace before being cooled, leveled and conveyed to a chemical-treatment area where the strip could be passivated with dichromate solution. The strip was dried and oiled, then coiled and packaged for shipment.

The No. 3 Galvalume Line applied a zinc/aluminum coating to a heat-treated and prepared coil. Preparation may have consisted of strip caustic cleaning, preheating and annealing, then heat soaking prior to coating with molten zinc/aluminum. From the coating bath, the coated strip passed through a wiper to control coating thickness before cooling. The strip was leveled and conveyed to a chemical-treatment area where it could be coated with acrylic or passivated with dichromate solution. The strip was then dried and could be oiled or coiled before shipment.

The No. 4 Hot Dip Coating Line could make either galvanized and Galvalume product. Coils from the Tandem Mill were transferred to the No. 4 Hot Dip Coating Line where they were uncoiled. They may have been caustically cleaned to remove fines and oils, and were annealed in a furnace. The sheet was then coated with a mixture of liquid aluminum/zinc alloy or liquid zinc. Air knives controlled coating thickness by removing excess from the strip. The coated strip was then cooled and quenched. The strip could be chemically treated with dichromate solution or acrylic polymer. An electrically heated hot-air drier was used immediately after passivation. The strip was then oiled and/or recoiled prior to shipment off the site.

1.2.2. Background Environmental Data

The separate Finishing Mills Groundwater Investigation Work Plan includes historical groundwater data from past monitoring wells installed within and surrounding the Finishing Mills area (inclusive of Parcel B22). In addition, recent groundwater data was obtained from several monitoring wells within and surrounding the Finishing Mills area during the completion of the Area B Groundwater Investigation. The results from the recent groundwater sampling events (December 2015 through March 2016), and a summary of any Project Action Limit (PAL) exceedances in the groundwater, are also provided in the Finishing Mills Groundwater Investigation Work Plan. There are no historical soil or soil gas sampling datasets available from this parcel.

1.3. SAMPLING DESIGN AND RATIONALE

Across the whole Tradepoint Atlantic property, several buildings and facilities may have been historical sources of environmental contamination. These areas were identified as targets for sampling through a careful review of historical documents. When a sampling target was identified, at least two (2) borings were placed at or around its location using GIS software (ArcMap Version 10.3.1). The first sampling targets to be identified were Recognized Environmental Conditions (RECs) located within the Site boundaries, as shown on the REC Location Map provided in the Phase I Environmental Site Assessment (ESA) prepared by Weaver Boos Consultants dated May 19, 2014. Weaver Boos completed site visits of Sparrows Point from February 19 through 21, 2014, for the purpose of characterizing current conditions at the former steel plant. A previous visual site inspection (VSI) was conducted as part of the RCRA Facility Assessment (RFA) prepared by A.T. Kearney, Inc. dated August 1993, for the purpose of identifying Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) on the property. This 1991 VSI is regularly cited in the DCC Report and Weaver Boos' Phase I ESA. Weaver Boos' distinction of a REC or Non-REC was based upon the findings of the DCC Report (which was prepared when the features remained on-site in 1998) or on observations of the general area during their site visit. All RECs were targeted with at least three (3) borings. Based on the review of historical documents and aerial images, REC boundaries are adjusted, as appropriate, from the original positions shown on the REC Location Map. The following RECs were identified at the Site from information presented in the DCC Report and Phase I ESA:

Coating Lines Blind Sumps (REC 1I, Finding 19, also listed as SWMU 54):
The coating lines blind sumps were located in the Coating Lines Area of the Cold Sheet Mill. The Cold Sheet Mill was located in the central portion of the Finishing Mills Area. This unit managed wastewaters within the Coating Lines Area, and included a concrete-lined pit in the basement floor for the containment of spills or leaks from the process area located above.

Cold Sheet Mill Piping (REC 1J, Finding 23, also listed as SWMU 58):
The piping within the Cold Sheet Mill transported process wastewater to the Tin Mill Canal discharge piping. Wastewater was transferred to the PORI Area (SWMUs 71 to 73). The system consisted primarily of concrete trenches with some brick sewers, and some open/box trenches. As the piping system was present throughout the process building, target borings were proposed along the main sewer lines (and connections between lines) leading from the Cold Sheet Mill area. These sewer lines were visible on the 5500 set of historical steel plant drawings (discussed below). The selected sewer lines clearly tie into the PORI facilities, and any wastewater passing from the process areas would be transported through the selected piping network.

Tandem Mill Trench System (REC 1K, Finding 24, also listed as SWMU 59):
The trench system within the Tandem Mill transported oily process wastewater to the Tin Mill Canal discharge piping. Wastewater was transferred to the PORI Area (SWMUs 71 to 73). The system consisted primarily of concrete trenches with some brick sewers. As the piping system was present throughout the process building, target borings were proposed along the main sewer lines (and connections between lines) leading from the Tandem Mill area. These sewer lines were visible on the 5500 set of historical steel plant drawings (discussed below). The selected

sewer lines clearly tie into the PORI facilities, and any wastewater passing from the process areas would be transported through the selected piping network.

PORI Oil/Water Separator (REC 1O, Finding 36, also listed as SWMU 71):
The PORI Area was located in the northern section of the Finishing Mills Area. The oil/water separator received waste oil and water from the cold rolling operations across the facility. Including external sources, the unit received and processed nearly 1 million gallons of waste oil per month. The PORI operations adhered to strict requirements for inflow oil, because the operation needed to meet National Pollutant Discharge Elimination System (NPDES) discharge criteria and the processed waste oil needed to meet specifications for resale. There were no known or reported releases from the oil/water separator.

PORI Holding Tank (REC 1P, Finding 37, also listed as SWMU 72):
After passing through the oil/water separator, the recovered oil was transferred to the PORI holding tanks for storage. There were no known or reported releases from the holding tanks.

PORI Lagoon (REC 1Q, Finding 38, also listed as SWMU 73):
After passing through the oil/water separator, the wastewater was then piped to the lagoon. Within this feature, additional waste oil was skimmed and transferred back to the oil/water separator. Water from the lagoon was discharged to the Tin Mill Canal through a permitted outfall. During the 1991 VSI, the lagoon was observed to have oil-stained sides indicating the historical presence of oil and potential releases.

Acid Tanks (REC 1V, Finding 53, also listed as AOC J):
Six sulfuric acid tanks were located outside of the Tin Mill. The RFA report indicated that the acid tanks were approximately 30 years old and in poor condition, and two tanks were decommissioned due to leaks in 1990. The sump and gravel below the tanks had undefined staining during the 1991 VSI.

Tin Mill Sump (Acid Monitoring Area) (REC 1S, Finding 41, also listed as SWMU 86):
The sump in the acid monitoring area handled pickling wastewater. It was located beneath the acid tanks associated with AOC J, and discharged to the Tin Mill Canal. The sump was observed to have undefined staining during the 1991 VSI.

Spent Pickle Liquor Tanks (REC 1W, Finding 58, also listed as AOC W):
Two spent pickle liquor tanks (60,000 gallon rubber-lined steel tanks) were located outside of the Cold Sheet Mill Building at the north end. During the 1991 VSI, the gravel/soil below the tanks was observed to have heavy (undefined) staining. The gravel underneath the tanks was made from limestone to help neutralize the pickle liquor should a leak occur. The tanks were initially

observed to be bulging, buckling, and rusty during the VSI. Examination by Bethlehem Steel showed that the damage was only in the tank insulation, and the tanks were in good condition.

Spent Pickle Liquor Sump/Trench System (REC 1U, Finding 48, also listed as SWMU 198):
The sump and trench system associated with the liquor tanks is located in the north-central part of the Finishing Mills Area. The unit was associated with piping designed to transport spent pickle solution from the Cold Sheet and Tin Mills to the pickle liquor ASTs (AOC W). Spent pickle liquor from the tanks was transported to the Tin Mill discharge location by additional piping.

Hot Strip Mill Drum Handling Area (REC 1Y, Finding 60):
The Drum Handling Area is located outside of the Hot Strip Mill in from of the pump house at Truck Dock 5. As many as 150 drums of solvents, pit/sump materials, waste oils, and floor sweepings were stored in the area. It is unknown if any releases occurred as a result of the drum storage and handling.

In addition to the listed RECs, the Hot Strip Mill was generally observed by Weaver Boos to be heavily stained with petroleum products, with varying ground surface conditions. This entire facility area was classified as a REC. Following the identification and evaluation of all RECs at the Site, SWMUs and 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 parcel boundaries. All of the SWMUs within the Parcel B22 boundary are cross-listed as RECs, and have been previously discussed. Additional AOCs were present within the parcel boundary, and were included as sampling targets. The position of the AOCs may have been adjusted from Figure 3-1 based on a review of historical documents and aerial images, as appropriate. The following AOCs were identified within the parcel:

Former 1991 PCB Spill Area (AOC A):
On March 21, 1991, a 55 gallon drum of PCB oil was ruptured against a transformer enclosure when a hoist lost power while transporting the drum. The spill occurred inside a motor room of the hot strip mill building, and the area was reportedly isolated, cleaned, and sampled. Wipe samples of the area were collected in July 1992, and indicated that concentrations were below the applicable cleanup standards. The area was sealed with epoxy paint.

Former PCB Spill Area (Sheet Mill) (AOC D):
On January 28, 1986, an oil-bearing transformer leak was detected near the #1 and #2 Galvanizers inside the Cold Sheet Mill Building. The concrete floor was scrubbed with kerosene and soap and water during a three month period. Despite the cleanup, contamination persisted in the concrete to a depth of 4 inches. No further remediation activity was reported, but the area was sealed with epoxy paint. The #1 and #2 Galvanizers are visible on several sets of historical

plant drawings (discussed below). Although available information does not identify a specific spill location, borings targeting AOC D were located at the northern end of the galvanizing lines. Borings targeting other features provide adequate coverage in the southern and middle sections.

Truck Dock #9 Former Diesel Spill and Diesel Fuel UST Area (AOC K):
A spill of unknown quantity occurred at the #9 Truck Dock when a fuel line or valve broke during a transfer between a truck and the tank at the dock. Records indicate that either a 10,000 gallon diesel UST or 8,000 gallon fuel oil UST was removed between 1989 and 1990. Although corrosion pitting was observed on the exterior during removal, no apparent integrity problems were noted. Water and soil samples showed no detectable concentrations of BTEX.

Former Chromic Acid Spill Area (AOC S):
In September 1990, between 26,000 and 27,000 gallons of chromic acid overflowed from a process tank in the Coating Lines Section of the Cold Sheet Mill Building and discharged to a sump. The acid overflowed the sump and formed a thin stream which flowed beneath the #4 Coating Line into a basement. The sump and basement were pumped out and cleaned during remediation activities.

Former Diesel Fuel UST (Cold Sheet Mill) (AOC T):
The former diesel UST was located outside of the southwest corner of the Cold Sheet Mill Building, near Truck Dock 51A. The 10,000 gallon steel tank was removed on November 27, 1989. During removal, the tank exterior and end seams showed corrosion pitting, but no apparent integrity problems were noted. Some soil samples contained low detectable levels of BTEX constituents, but BTEX concentrations in groundwater were below detectable levels.

Former Spent Pickle Liquor Tanks (AOC V):
Two spent pickle liquor tanks were located outside of the north end of the Hot Strip Mill. The ASTs were removed around 1986, and gravel around the former tanks was observed to have undefined staining during the 1991 VSI. The tanks were designated as non-releasing units.

Additional Findings (Non-RECs) from the Phase I ESA which were identified as Potential Environmental Concerns were also reviewed and targeted as applicable. Following the identification of all RECs, SWMUs, and AOCs, four (4) sets of historical site drawings were reviewed to identify additional sampling targets. These site drawings included the 5000 Set (Plant Arrangement), the 5100 Set (Plant Index), the 5500 Set (Plant Sewer Lines), and a set of drawings indicating coke oven gas distribution drip leg locations. (Drip legs are points throughout the distribution system where coke oven gas condensate was removed from the gas pipelines. The condensate from the drip legs was typically discharged to drums, although it is possible some spilled out of the drums and on to the ground. Only drip legs which were located greater than 100 feet from the nearest boring were included as sampling targets.) **Figures 4 through 7** show the proposed borings and the parcel boundary overlain on the 5000 Set, 5100

Set, 5500 Set, and drip leg drawings, respectively. Careful review of these geospatially referenced figures and review of other historical documents (previously discussed) yielded the proposed boring locations. A summary of the specific drawings covering the Site is presented below:

Parcel B22 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.)	5034	6/23/1958	3/19/1982
		5035	9/1/1958	3/19/1982
		5040	6/15/1958	3/19/1982
		5041	6/15/1958	3/19/1982
		5045	9/21/1959	3/19/1982
		5046	9/21/1959	3/19/1982
		5050	*Unknown*	3/18/1982
		5051	6/1/1960	3/19/1982
Plant Index	Roads, water bodies, demolished buildings/structures, electric lines, above-ground pipelines	5134	*Unknown*	1/8/2008
		5135	*Unknown*	7/11/2008
		5140	*Unknown*	8/15/2008
		5141	*Unknown*	9/27/2010
		5145	*Unknown*	8/18/2008
		5146	*Unknown*	8/18/2008
		5150	*Unknown*	8/18/2008
		5151	*Unknown*	2/21/2008
Plant Sewer Lines	Same as above plus trenches, sumps, underground piping (includes pipe materials)	5534	8/28/1959	3/19/1976
		5535	*Unknown*	5/28/1976
		5540	6/15/1958	7/14/1991
		5541	9/6/1959	10/6/1993
		5545	9/21/1959	6/6/1985
		5546	10/15/1959	6/9/1993
		5550	9/16/1959	3/5/1976
		5551	9/16/1959	3/5/1976
Drip Legs	Coke Oven Gas Drip Legs Locations	5885B	*Unknown*	Sept. 1988
		5886B	*Unknown*	Sept. 1988

Sampling target locations were identified if the historical site drawings depicted industrial activities or a specific feature at a location that may have been a source of environmental contamination that impacted the Site. Based on this criterion, the following sampling targets were identified at the Site: Electric Sub-Stations, Electric Transformer, Fuel Department, Fuel

Station (Tractor), Grease Trap, Lube Oil Rooms/Shops, Oil Houses, Mech. Maintenance Shop, Fuel/Gas Pump Houses, SAH Sewer Pump Station, Scale Pits, Slab Storage Area, Acid Tanks, Caustic Tanks, Fuel/Oil Tanks, Palm Oil Tanks, and Unknown Contents Tanks. ARM received a list of former PCB-containing transformer equipment from Tradepoint Atlantic personnel, for inclusion as additional targets. The possible PCB-contaminated areas are indicated on the provided figures. The full list of sampling targets, along with the specific rationale for sampling each, is provided as **Appendix A.**

Additional sample locations were added to fill in areas with insufficient coverage (large spatial gaps between borings) within the Site and to meet the sample density requirements set forth in the Quality Assurance Project Plan (QAPP) Worksheet 17 – Sampling Design and Rationale. Parcel B22 contains a total of approximately 130.8 acres: 26.6 acres without engineered barriers and 104.2 acres with engineered barriers (roads, parking, and building slabs). In accordance with the relevant sampling density requirements, a minimum of 18 soil boring locations are required in the area without engineered barriers, and a minimum of 20 soil boring locations are required in the area with engineered barriers. A total of 59 borings have been proposed in areas without engineered barriers and a total of 120 borings have been proposed in areas with these barriers. **Figures 8a and 8b** shows the proposed borings on an aerial image to indicate locations of borings with regard to engineered barriers (roads, parking, and building slabs) and other landmarks.

Tradepoint Atlantic has developed an initial master plan for the entire site that shows potential future development areas across the entire Tradepoint Atlantic property. This master plan is a working document and it is expected to undergo subsequent revisions in the future. In its current iteration, the plan indicates that 95% of the total area within Parcel B22 is proposed for paving. **Figures 9a and 9b** shows the current and future (proposed) engineered barriers within Parcel B22, respectively.

No borings are proposed within the suspected boundaries of existing subgrade structures (pits). Information regarding subgrade structure outlines in Parcel B22 was received from MCM for features in the Hot Strip Mill area. Subgrade structures include pits, basements, underground vaults, and other underground rooms or storage areas. Outlines of subgrade structures as shown on the figures were based on historical drawings and may be approximate. The pit locations are highlighted on all relevant figures. MCM is presently compiling additional information (IDs, functions, dimensions) on subgrade structures within the Site. Further discussion of these structures will be provided to the MDE once ARM has received the remaining pertinent information.

Groundwater at the Site will be investigated as described in the separate Finishing Mills Groundwater Investigation Work Plan.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1. PROJECT PERSONNEL

The site characterization of Area B Parcel B22 will be conducted by ARM under a contract with EAG. ARM will provide project planning, field sampling and reporting support. The required drilling, Geoprobe® and laboratory services will be contracted directly by EAG. The management, field, and laboratory responsibilities of key project personnel are defined in this section.

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

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

The lead ARM 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 and groundwater at the Site, the investigation will be conducted under a site-specific Health and Safety Plan to protect investigation workers from possible exposure to contaminated soil and groundwater. The site-specific HASP for Parcel B22 is provided as **Appendix B**.

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

3.0 FIELD ACTIVITIES AND PROCEDURES

3.1. UTILITY CLEARANCE

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

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

3.2. SAMPLING PLAN

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

This Work Plan presents the methods and protocols to be used to complete the site characterization. These methods and procedures follow the MDE-VCP and EPA guidelines. Information regarding the project organization, field activities and sampling methods, sampling equipment, sample handling and management procedures, the laboratory analytical methods and selected laboratory, quality control and quality assurance procedures, investigation-derived waste (IDW) management methods, reporting requirements are described in detail in the QAPP that has been developed to support the investigation and remediation of the Tradepoint Atlantic Site (Quality Assurance Project Plan, ARM Group Inc., October 2, 2015). The proposed schedule of this investigation is contained in this work plan (Section 8.0). All site characterization activities will be conducted under the site-specific HASP (**Appendix B**).

3.3. SOIL INVESTIGATION

Soil samples will be collected from the locations identified on **Figures 3 through 9**, and in accordance with procedures referenced in the QAPP Worksheet 21 – Field SOPs (Standard Operating Procedures), SOP No. 009 – Sub-Surface Soil Sampling.

Regarding soil sampling depth, a shallow sample will be collected from the 0 to 1 foot depth interval, and a deeper sample will be collected from the 4 to 5 foot depth interval. One additional set of samples will also be collected from the 9 to 10 foot depth interval if groundwater has not been encountered; however, these samples will be held by the laboratory pending the analysis of the 0 to 1 and 4 to 5 foot depth interval samples. If the PID or other field observations indicate contamination to exist at a depth greater than 3 feet bgs but less than 9 feet bgs, and is above the water table, the sample from the deeper 4-5 foot interval may be shifted to the depth interval indicated by the PID response. It should be noted that no soil samples will be collected from a depth that is below the water table.

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

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

3.4. NAPL DELINEATION

In the event that NAPL bearing soils are identified in a soil boring, a temporary piezometer will be installed according to the specifications identified in SOP No. 28 – Direct Push Installation and Construction of Temporary Groundwater Sample Collection Points. ARM will immediately check the piezometer for the presence of NAPL using an oil-water interface probe in accordance with methods referenced in the SOP No. 19 – Depth to Groundwater and NAPL Measurements. If NAPL is not detected, the piezometer will be allowed to equilibrate for at least 48 hours prior to a second measurement. If no measureable product is detected after 48 hours, the piezometer will be emptied, removed and discarded, and the borehole will be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36. If measureable NAPL is detected during either check, another measurement will be made after a 30 day (minimum) equilibration period to determine NAPL thickness.

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

Each additional piezometer installed to delineate the NAPL will be checked for the presence of product with an oil-water interface probe immediately after installation, 48 hours after installation, and again after a 30 day equilibration period. If measureable NAPL is present within any of the piezometers, additional borings/piezometers will be added as necessary to complete the delineation. The MDE will be notified within 48 hours if NAPL is detected within the temporary piezometers (thus requiring 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 within 30 days of completing the field activities.

3.5. SAMPLE DOCUMENTATION

3.5.1. Sample Numbering

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

3.5.2. 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.

3.6. LABORATORY ANALYSIS

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

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

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

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

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

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

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

5.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

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

6.0 DATA VALIDATION

For this Parcel B22 Phase II Investigation, a representative 75% of the complete soil sample analytical dataset will undergo data validation.

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

7.0 REPORTING

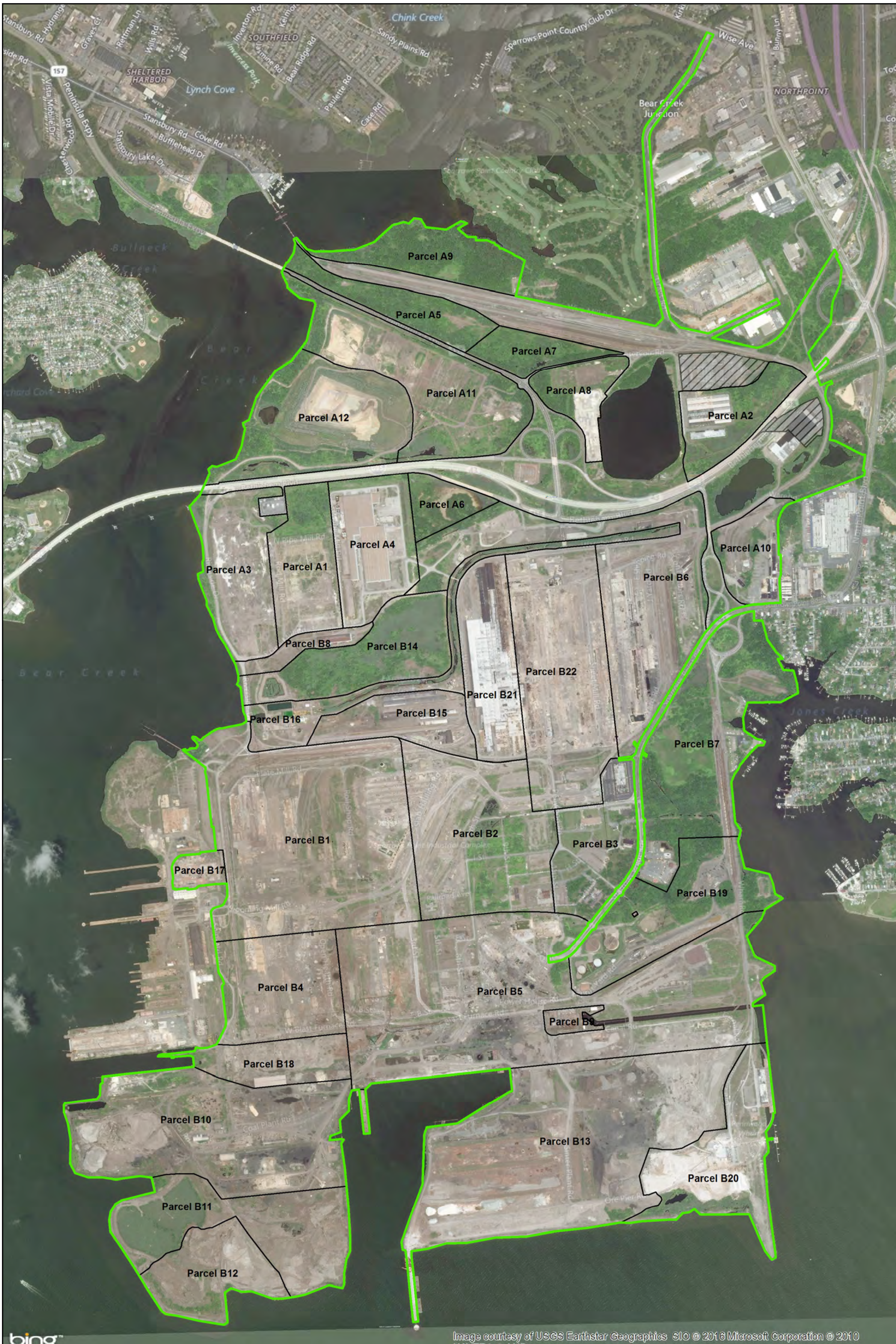
Following the receipt of all sampling results from "Area B Parcel B22", ARM will prepare a Phase II Site Investigation Report that will document the sample collection procedures and supporting rationale, and present and interpret the analytical results. All results will be presented in tabular and graphical formats as appropriate to best summarize the data for future use. The sample results will be compared against relevant criteria such as the MDE Generic Numeric Cleanup Standards and the EPA Regional Screening Levels, considering appropriate land use factors and institutional controls, to identify contaminants and exposure pathways of potential concern. ARM will also present recommendations for any additional site investigation activities if warranted.

8.0 SCHEDULE

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

- the sample collection activities will take approximately six (6) weeks to complete (including mobilization activities) once approval of the work plan is received;
- the sample analysis, data validation and review is expected to require an additional 10 weeks to complete; and
- the preparation of the investigation report, including an internal Quality Assurance Review cycle, will require another eight (8) 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
May 31, 2016

EnviroAnalytics Group	Tradepoint Atlantic	Figure
Area A: Project 150298M Area B: Project 150300M	Baltimore County, MD	1

ARM Group Inc.
Earth Resource Engineers and Consultants

0 375 750 1,500 Feet

Site Boundary
Area A Boundaries
Area B Boundaries
Land
Marsh
Water

Approximate Shoreline in 1916
May 31, 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

No Engineered Barrier:
20% of Parcel Coverage
1,158,696 square feet (26.6 acres)

Parking/Roads:
30% of Parcel Coverage
38% of Engineered Barriers
1,711,908 square feet (39.3 acres)

Building Slabs:
50% of Parcel Coverage
62% of Engineered Barriers
2,827,044 square feet (64.9 acres)

Parcel B22 Proposed Sample Locations
Locations of SWMUs, AOCs, and Facility Areas

June 2, 2016

Figure 3

EnviroAnalytics Group

ARM Project 150300M-20

Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 62.5 125 250 Feet

Soil Borings
Subgrade Structure
Former Building Slab
REC Area*
Parcel Boundary

Possible PCB-Containing Area
Over 50 ppm
Over 500 ppm

*Only REC areas with defined boundaries are included. Building-wide trenches and sewers are not shown.

No Engineered Barrier:
20% of Parcel Coverage
1,158,696 square feet (26.6 acres)

Parking/Roads:
30% of Parcel Coverage
38% of Engineered Barriers
1,711,908 square feet (39.3 acres)

Building Slabs:
50% of Parcel Coverage
62% of Engineered Barriers
2,827,044 square feet (64.9 acres)

Parcel B22 Proposed Sample Locations
Historical Site Drawings - 5000 Set

June 2, 2016

Figure 4

EnviroAnalytics Group

ARM Project 150300M-20

Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 62.5 125 250 Feet

- Soil Borings
- Parcel Boundary
- Subgrade Structure
- Former Building Slab
- REC Area*

Possible PCB-Containing Area
- Over 50 ppm
- Over 500 ppm

*Only REC areas with defined boundaries are included. Building-wide trenches and sewers are not shown.

Parcel B16
Tin Mill
Finishing Mills
Hot Strip Mill
Parcel B21
Parcel B22
Parcel B6
Parcel B2
Parcel B3
Parcel B7
REC 1P, Finding 37
REC 1Q, Finding 38
REC 1O, Finding 36
REC 1W/1U, Finding 58/48
REC 1V/1S, Finding 53/41
REC 1Y, Finding 60
No Engineered Barrier:
20% of Parcel Coverage
1,158,696 square feet (26.6 acres)
Parking/Roads:
30% of Parcel Coverage
38% of Engineered Barriers
1,711,908 square feet (39.3 acres)
Building Slabs:
50% of Parcel Coverage
62% of Engineered Barriers
2,827,044 square feet (64.9 acres)
Parcel B22 Proposed Sample Locations
Historical Site Drawings - 5100 Set
June 2, 2016
Figure
5
EnviroAnalytics Group
ARM Project 150300M-20
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
62.5
125
250
Feet
Soil Borings
Parcel Boundary
Subgrade Structure
Former Building Slab
REC Area*
Possible PCB-Containing Area
Over 50 ppm
Over 500 ppm
*Only REC areas with defined boundaries are included. Building-wide trenches and sewers are not shown.

Parcel B22 Proposed Sample Locations
Historical Site Drawings - 5500 Set

June 2, 2016

Figure 6

EnviroAnalytics Group

ARM Project 150300M-20

Tradepoint Atlantic

Baltimore County, MD

Parcel B22 Proposed Sample Locations
Locations of Drip Legs
June 2, 2016
Figure
7
EnviroAnalytics Group
ARM Project 150300M-20
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 62.5 125 250 Feet
Soil Borings
Subgrade Structure
Former Building Slab
REC Area*
Parcel Boundary
Possible PCB-Containing Area
Over 50 ppm
Over 500 ppm
Drip Leg Location
Drip Leg Number
*Only REC areas with defined boundaries are included. Building-wide trenches and sewers are not shown.
No Engineered Barrier:
20% of Parcel Coverage
1,158,696 square feet (26.6 acres)
Parking/Roads:
30% of Parcel Coverage
38% of Engineered Barriers
1,711,908 square feet (39.3 acres)
Building Slabs:
50% of Parcel Coverage
62% of Engineered Barriers
2,827,044 square feet (64.9 acres)
Parcel B16
Parcel B21
Parcel B22
Parcel B6
Parcel B7
Parcel B2
Parcel B3
Tin Mill
Finishing Mills
Hot Strip Mill
REC 1P, Finding 37
REC 1Q, Finding 38
REC 1O, Finding 36
REC 1W/1U, Finding 58/48
REC 1V/1S, Finding 53/41
REC 1Y, Finding 60
CANAL
TIN MILL DIVISON
68" HOT STRIP MILL
TIN MILL RD.
PENNWOOD RD
PARKING
ATHLETIC FIELD
SUB-STA.
N°4 CLKHSE
N°9 CLKHSE.
PALM OIL RECOVERY


Parcel B16
Tin Mill
Finishing Mills
Hot Strip Mill
Parcel B21
Parcel B22
Parcel B6
Parcel B7
Parcel B2
Parcel B3
No Engineered Barrier:
20% of Parcel Coverage
1,158,696 square feet (26.6 acres)
Parking/Roads:
30% of Parcel Coverage
38% of Engineered Barriers
1,711,908 square feet (39.3 acres)
Building Slabs:
50% of Parcel Coverage
62% of Engineered Barriers
2,827,044 square feet (64.9 acres)
Parcel B22 Proposed Sample Locations
Aerial View
June 2, 2016
Figure
8a
EnviroAnalytics Group
ARM Project 150300M-20
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
62.5
125
250
Feet
Soil Borings
Parcel Boundary
Subgrade Structure
Former Building Slab
REC Area*
Possible PCB-Containing Area
Over 50 ppm
Over 500 ppm
*Only REC areas with defined boundaries are included. Building-wide trenches and sewers are not shown.

Parcel B22 Proposed Sample Locations
Aerial View

June 2, 2016

Figure 8b

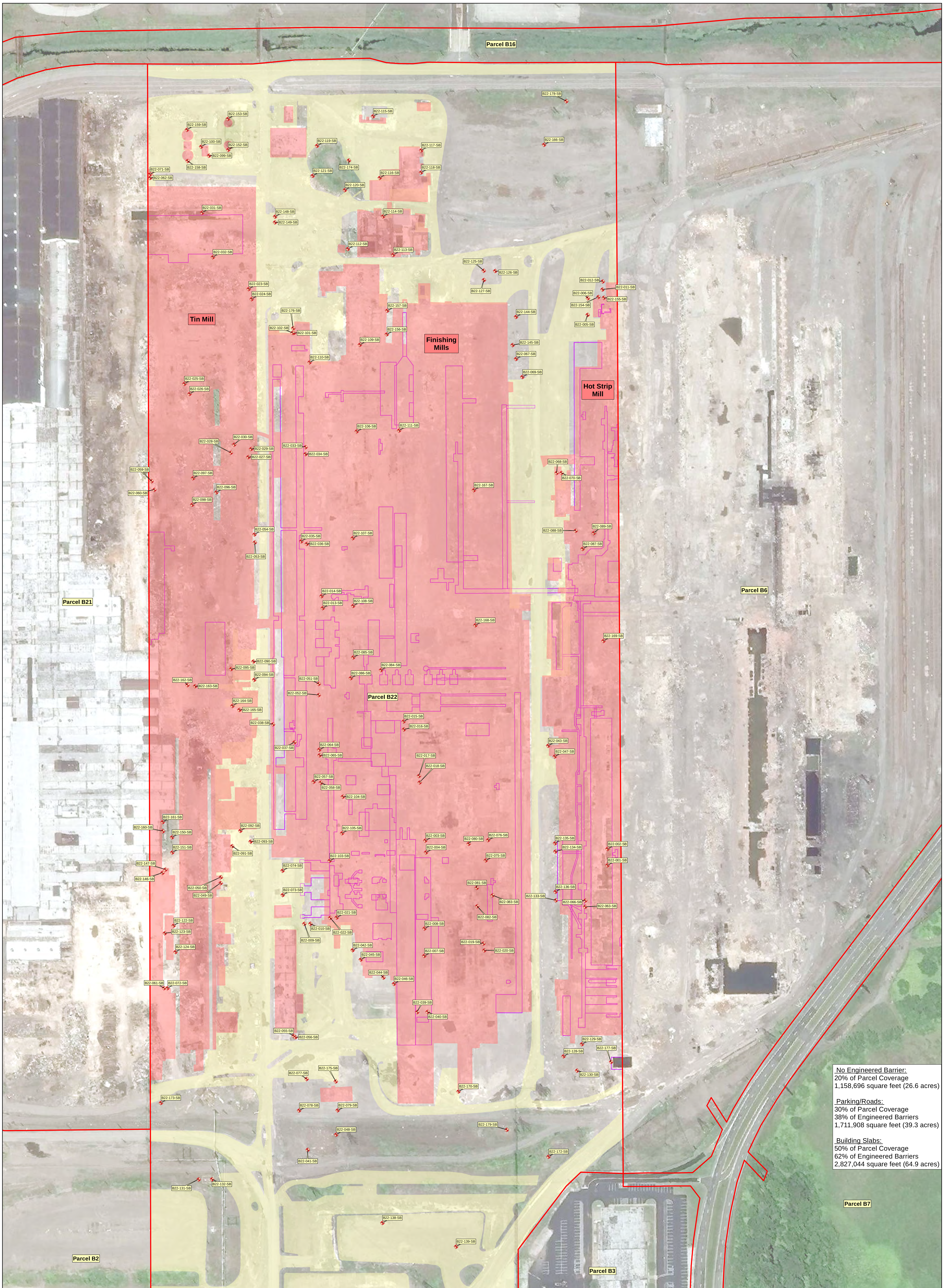
EnviroAnalytics Group

ARM Project 150300M-20

Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants



Parcel B22 Proposed Sample Locations
Current Engineered Barriers

June 2, 2016

Figure 9a

EnviroAnalytics Group

ARM Project 150300M-20

Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 62.5 125 250 Feet

- Soil Borings
- Subgrade Structure
- Former Building Slab
- Roads/Parking
- Parcel Boundary


Parcel B16
Parcel B21
Parcel B22
Parcel B6
Parcel B7
Parcel B2
Parcel B3
No Engineered Barrier:
20% of Parcel Coverage
1,158,696 square feet (26.6 acres)
Parking/Roads:
30% of Parcel Coverage
38% of Engineered Barriers
1,711,908 square feet (39.3 acres)
Building Slabs:
50% of Parcel Coverage
62% of Engineered Barriers
2,827,044 square feet (64.9 acres)
Parcel B22 Proposed Sample Locations
Future Engineered Barriers
June 2, 2016
Figure
9b
EnviroAnalytics Group
ARM Project 150300M-20
Tradepoint Atlantic
Baltimore County, MD
Soil Borings
Future Engineered Barriers
Parcel Boundary
ARM Group Inc.
Earth Resource Engineers and Consultants
0
62.5
125
250
Feet

APPENDIX A

Parcel B22 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Table 1 - Soil Sampling Summary

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
Former 1991 PCB Spill Area	AOC A	DCC Figure 3-1/ Drawing 5041	On March 21, 1991, a 55 gallon drum of PCB oil was ruptured against a transformer enclosure when a hoist lost power while transporting the drum. The spill occurred inside a motor room of the hot strip mill building, and the area was reportedly isolated, cleaned, and sampled. Wipe samples of the area were collected in July 1992, and indicated that concentrations were below the applicable cleanup standards. The area was sealed with epoxy paint, and no further action was proposed.	2	B22-001 and B22-002	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Former PCB Spill Area (Sheet Mill)	AOC D	DCC Figure 3-1/ Drawing 5041	On January 28, 1986, an oil-bearing transformer leak was detected near the #1 and #2 Galvanizers inside the Cold Sheet Mill Building. The concrete floor was scrubbed with kerosene and soap and water during a three month period. Despite the cleanup, contamination persisted in the concrete to a depth of 4 inches. No further remediation activity was reported, but the area was sealed with epoxy paint. Due to the low potential for an environmental release, no further action was proposed.	2	B22-003 and B22-004	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Truck Dock #9's Former Diesel Spill and Diesel Fuel UST Area	AOC K	DCC Figure 3-1	A spill of unknown quantity occurred at the #9 Truck Dock when a fuel line or valve broke during a transfer between a truck and the tank at the dock. Records indicate that either a 10,000 gallon diesel UST or 8,000 gallon fuel oil UST was removed between 1989 and 1990. Although corrosion pitting was observed on the exterior, no apparent integrity problems were noted. Water and soil samples showed no detectable concentrations of BTEX, and no further action was proposed.	2	B22-005 and B22-006	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Former Chromic Acid Spill Area	AOC S	DCC Figure 3-1	In September 1990, between 26,000 and 27,000 gallons of chromic acid overflowed from a process tank in the Coating Lines Section of the Cold Sheet Mill Building and discharged to a sump. The acid overflowed the sump and formed a thin stream which flowed beneath the #4 Coating Line into a basement. The sump and basement were pumped out and cleaned during remediation activities. Since the release was a one-time event which occurred indoors, no further action was proposed.	2	B22-007 and B22-008	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')

Parcel B22 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	RATIONALE	Number of Locations	Sample Locations	Boring Depth	Sample Depth	Analytical Parameters: Soil Samples
Former Diesel Fuel UST (Cold Sheet Mill)	AOC T	DCC Figure 3-1/ Drawing 5141	The former diesel UST was located outside of the southwest corner of the Cold Sheet Mill Building, near Truck Dock 51A. The 10,000 gallon steel tank was removed on November 27, 1989. The tank exterior and end seams showed corrosion pitting, but no apparent integrity problems were noted. Some soil samples contained low detectable levels of BTEX constituents, but BTEX concentrations in groundwater were below detectable levels. After the tank was removed, no further action was proposed for AOC T.	2	B22-009 and B22-010	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Former Spent Pickle Liquor Tanks	AOC V	DCC Figure 3-1/ Drawing 5046	Two spent pickle liquor tanks were located outside of the northern end of the Hot Strip Mill. The ASTs were removed around 1986, and gravel in the vicinity of the tanks was observed to have undefined staining during a 1991 VSI. The former tanks were designated as non-releasing units, and no further action was proposed.	2	B22-011 and B22-012	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Drip Legs		Drip Leg Drawings 5886B and 5888	Coke oven gas condensate was removed from the gas pipelines at drip legs located throughout the distribution system. The condensate was typically discharged to drums, although it is possible some spilled out of the drums and on to the ground.	28	B22-013 through B22-040	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Electric Sub-Stations		Drawings 5035, 5040, 5041, 5050, 5140, and 5141	Investigate potential impacts related to electric sub-stations (potential leaks or releases).	8	B22-041 through B22-048	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Electric Transformer		Drawings 5035, 5041, and 5141	Investigate potential impacts related to electric transformers (potential leaks or releases).	2	B22-049 through B22-050	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Fuel Department		Drawing 5041	Investigate potential impacts related to the Fuel Department (potential leaks or releases).	2	B22-051 and B22-052	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Fuel Station (Tractor)		Drawing 5045	Investigate potential impacts related to fuel stations (potential leaks for releases).	2	B22-053 and B22-054	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')

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
Grease Trap		Drawing 5541	Investigate potential impacts related to the grease trap (potential leaks or releases).	2	B22-055 and B22-056	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Lube Oil Rooms/Shops		Drawings 5041 and 5145	Investigate potential impacts related to lube oil rooms and shops (potential leaks or releases).	4	B22-057 through B22-060	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Oil Houses		Drawings 5040, 5041, 5046 and 5050	Investigate potential impacts related to oil houses (potential leaks or releases).	12	B22-061 through B22-072	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Mech. Maintenance Shop		Drawing 5041	Investigate potential impacts related to the mechanical maintenance shop (potential leaks or releases).	2	B22-073 and B22-074	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Possible PCB-Contaminated Areas		PCB Site Inventory Data/Map	Investigate potential impacts related to the storage and operation of PCB-containing equipment (potential leaks or releases).	25	B22-075 through B22-098; B22-175	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Fuel/Gas Pump Houses		Drawings 5046 and 5050	Investigate potential impacts related to pump houses used for fuel or gas (potential leaks or releases).	5	B22-099 through B22-102; B22-176	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Coating Lines Blind Sumps	REC 1I, Finding 19/ SWMU 54	DCC Figure 3-1	The coating lines blind sumps were located in the Coating Lines Area of the Cold Sheet Mill. The Cold Sheet Mill was located in the central portion of the Finishing Mills Area. This unit managed wastewaters within the Coating Lines Area, and included a concrete-lined pit in the basement floor for the containment of spills or leaks from the process area located on the floor above. Further evaluation was proposed regarding SWMU 54.	3	B22-103 through B22-105	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')

Parcel B22 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	RATIONALE	Number of Locations	Sample Locations	Boring Depth	Sample Depth	Analytical Parameters: Soil Samples
Cold Sheet Mill Piping	REC 1J, Finding 23/ SWMU 58	DCC Figure 3-1	The piping within the Cold Sheet Mill transported process wastewater to the Tin Mill Canal discharge piping. Wastewater was transferred to the PORI Area (SWMUs 71 to 73). The system consisted primarily of concrete trenches with some brick sewers, and some open/box trenches. Further evaluation was proposed regarding SWMU 58.	3	B22-106 through B22-108	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Tandem Mill Trench System	REC 1K, Finding 24/ SWMU 59	DCC Figure 3-1	The trench system within the Tandem Mill transported oily process wastewater to the Tin Mill Canal discharge piping. Wastewater was transferred to the PORI Area (SWMUs 71 to 73). The system consisted primarily of concrete trenches with some brick sewers. Further evaluation was proposed regarding SWMU 59.	3	B22-109 through B22-111	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
PORI Oil/Water Separator	REC 1O, Finding 36/ SWMU 71	DCC Figure 3-1/ Drawing 5051	The PORI Area was located in the northern section of the Finishing Mills Area. The oil/water separator received waste oil and water from the cold rolling operations across the facility. Including external sources, the unit received and processed nearly 1 million gallons of waste oil per month. There were no known or reported releases from the oil/water separator, but all of the PORI units were recommended for further evaluation.	3	B22-112 through B22-114	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
PORI Holding Tank	REC 1P, Finding 37/ SWMU 72	DCC Figure 3-1/ Drawing 5051	After passing through the oil/water separator, the recovered oil was transferred to the PORI holding tanks. There were no known or reported releases from the holding tanks, but all of the PORI units were recommended for further evaluation.	4	B22-115 through B22-118	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
PORI Lagoon	REC 1Q, Finding 38/ SWMU 73	DCC Figure 3-1/ Drawing 5051	After passing through the oil/water separator, the wastewater was then piped to the lagoon. Within this feature, additional waste oil was skimmed and transferred back to the oil/water separator. Water from the lagoon was discharged to the Tin Mill Canal through a permitted outfall. During the 1991 VSI, the lagoon was observed to have oil-stained sides indicating the presence of oil and possible releases. All of the PORI units were recommended for further evaluation.	4	B22-119 through B22-121; B22-174	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Acid Tanks	REC 1V, Finding 53/AOC J	DCC Figures 3-1/ Drawing 5040	Six sulfuric acid tanks were located outside of the Tin Mill. The tanks were noted to be approximately 30 years old and in poor condition, and two tanks were decommissioned due to leaks in 1990. The sump and gravel below the tanks had undefined staining. Further evaluation was proposed regarding AOC J.	3	B22-122 through B22-124	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')

Parcel B22 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	RATIONALE	Number of Locations	Sample Locations	Boring Depth	Sample Depth	Analytical Parameters: Soil Samples
Tin Mill Sump (Acid Area Monitoring)	REC 1S, Finding 41/ SWMU 86	DCC Figure 3-1/ Drawing 5040	The sump in the acid monitoring area handled pickling wastewater. It was located beneath the acid tanks associated with AOC J, and discharged to the Tin Mill Canal. The sump was observed to have undefined staining during the 1991 VSI, and further evaluation was proposed regarding SWMU 86.		*Same as previous*	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Spent Pickle Liquor Tanks	REC 1W, Finding 58/AOC W	DCC Figure 3-1	Two spent pickle liquor tanks (60,000 gallon rubber-lined steel tanks) were located outside of the Cold Sheet Mill Building at the north end. During the 1991 VSI, the gravel/soil below the tanks was observed to have heavy (undefined) staining. The gravel underneath the tanks was made from limestone to help neutralize the pickle liquor should a leak occur. The tanks were initially observed to be bulging, buckling, and rusty during the VSI.	3	B22-125 through B22-127	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Spent Pickle Liquor Sump/Trench System	REC 1U, Finding 48/SWMU 198	DCC Figure 3-1	The sump and trench system associated with the liquor tanks is located in the north-central part of the Finishing Mills Area. The unit was associated with piping designed to transport spent pickle solution from the Cold Sheet and Tin Mills to the pickle liquor ASTs (AOC W). Spent pickle liquor from the tanks is transported to the Tin Mill discharge location by additional piping.		*Same as previous*	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Hot Strip Mill Drum Handling Area	REC 1Y, Finding 60	DCC Figure 3-1	The Drum Handling Area is located outside of the Hot Strip Mill in from of the pump house at Truck Dock 5. As many as 150 drums of solvents, pit/sump materials, waste oils, and floor sweepings were stored in the area. Further evaluation was proposed, to determine if any releases occurred as a result of the drum storage and handling.	3	B22-128 through B22-130	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
SAH Sewer Pump Station		Drawing 5034	Investigate potential impacts related to the SAH Sewer Pump Station (potential leaks or releases).	2	B22-131 and B22-132	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Scale Pits		Drawings 5041 and 5141	Investigate potential impacts related to the scale pits (potential leaks or releases).	4	B22-133 through B22-136	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Slab Storage Area		Drawing 5135	Investigate potential impacts related to the slab storage area (potential leaks or releases).	7	B22-137 through B22-143	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')

Parcel B22 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	RATIONALE	Number of Locations	Sample Locations	Boring Depth	Sample Depth	Analytical Parameters: Soil Samples
Acid Tanks		Drawings 5040 and 5146	Investigate potential impacts related to acid tanks (potential leaks or releases).	4	B22-144 through B22-147	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Caustic Tanks		Drawings 5040 and 5051	Investigate potential impacts related to tanks holding caustic fluids (potential leaks or releases).	4	B22-148 through B22-151	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Fuel/Oil Tanks		Drawings 5050 and 5146	Investigate potential impacts related to fuel and oil tanks (potential leaks or releases).	4	B22-152 and B22-155	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Palm Oil Tanks		Drawings 5040, 5050, and 5146	Investigate potential impacts related to palm oil tanks (potential leaks or releases).	6	B22-156 through B22-161	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Tanks - Unknown Contents		Drawing 5040	Investigate potential impacts related to tanks containing unknown substances (potential leaks or releases).	4	B22-162 through B22-165	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Parcel B22 Coverage			Investigate potential impacts related to unknown historical activities, and characterize soil in areas not previously sampled.	8	B22-166 through B22-173	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
Pump Houses/Stations (MDE Request)		Drawings 5535, 5541, and 5551	MDE Requests. Investigate potential impacts related to pump houses and stations (potential leaks or releases).	3	B22-177 through B22-179	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, DRO/GRO, PCBs (0-1')
			Total:	179				

Soil Borings Sampling Density Requirements (from Worksheet 17 - Sampling Design and Rationale)
No Engineered Barrier (16-40 acres): 1 boring per 1.5 acres with no less than 15.
Engineered Barrier (>100 acres): 1 boring per 6 acres with no less than 20.
No Engineered Barrier (26.6 acres) = **18 borings required, 59 proposed**
Engineered Barrier (104.2 acres) = **20 borings required, 120 proposed**
Parking/Roads (39.3 acres)
Buildings (64.9 acres)

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

APPENDIX B

Health and Safety Plan

Area B: Parcel B22
Tradepoint Atlantic
Sparrows Point, Maryland

Prepared for:

EnviroAnalytics Group
1650 Des Peres Road
Suite 230
Saint Louis, Missouri 63131

Prepared by:

ARM Group Inc.
9175 Guilford Road
Suite 310
Columbia, MD 21046

May 2016

ARM Project 150300M-20

Respectfully submitted,

Eric S. Magdar
Senior Geologist

T. Neil Peters
Vice President

TABLE OF CONTENTS

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared by ARM Group Inc. (ARM) to address personnel health and safety requirements for employees of ARM and its subcontractors to complete a Phase II investigation on a portion of the Tradepoint Atlantic property that has been designated as Parcel B22. The on-site activities shall include the following: installation of soil borings, collection of soil samples, and possible installation of temporary NAPL delineation piezometers. ARM will comply with industry-standard health and safety protocol and Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120 to prevent human exposure to volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), petroleum hydrocarbons, polychlorinated biphenyls (PCB) and metals that may be present in site soil and groundwater.

2.0 GENERAL INFORMATION

2.1 Site Description

Parcel B22, which is comprised of 130.8 acres of the approximately 3,100-acre former plant property, is located off of Sparrows Point Boulevard in Sparrows Point, Maryland. Parcel B22 is one of several parcels that make up a larger area, known as Area B, of the Tradepoint Atlantic facility. Area B and its parcels are shown on **Figure 1.**

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

2.2 Site Hazards

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

Chemical Hazards:

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

Explosive Hazards:

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

Physical Hazards:

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

Mechanical/Electrical Hazards:

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

2.3 Utilities

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

2.4 Waste Management

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

2.5 Site Controls and Security

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

3.0 OPERATING PROCEDURES

3.1 Air Monitoring

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

3.2 Personnel Protection

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

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

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

3.2.1 Determination of Level of Protection Requirements

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

Table 3-1

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

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

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

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

3.2.2 Dermal Protection

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

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

3.2.3 Eye Protection

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

3.3 Task-Related Personnel Protection

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

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

All personnel should wear the following:

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

3.4 Explosion Prevention

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

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

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

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

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

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

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

4.0 DECONTAMINATION PROCEDURES

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

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

a. Hand washing facilities

b. First-aid kit

c. Eye wash station

d. Fire extinguisher

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

4.1 Personnel Decontamination Procedures

Decontamination procedures should be as follows:

Level D decontamination will consist of:

1. Potable water wash and potable water rinse of boots and outer gloves (if worn).
2. Drum all visibly impacted disposable clothing.
3. Field wash of hands and face.

4.2 Equipment Decontamination

All equipment decontamination will be completed in accordance with the procedures referenced in Worksheet 21—Field SOPs, and Appendix A of the QAPP (SOP No. 016 Equipment Decontamination). The decontamination procedures that will be used during the course of this investigation include Decontamination Area (Section 3.1 of the SOP), Decontamination of Sampling Equipment (Section 3.5), Decontamination of Measurement Devices & Monitoring Equipment (Section 3.7), Decontamination of Subsurface Drilling Equipment (Section 3.8), and Document and Record Keeping (Section 5).

Level D personnel protection is required during equipment decontamination.

5.0 EMERGENCY CONTINGENCY INFORMATION

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

Table 5-1
Emergency Telephone Numbers

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

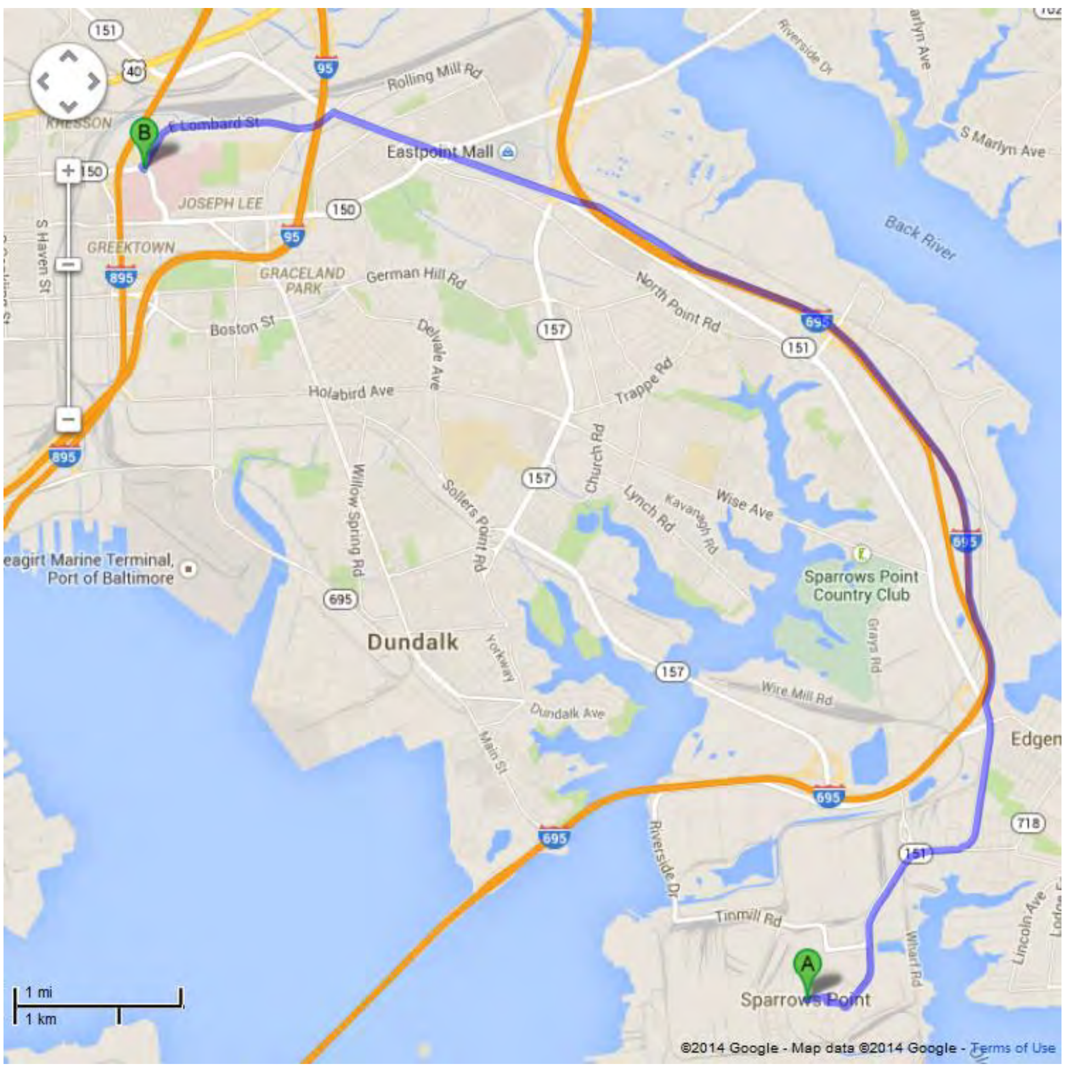
In the event of a fire or explosion, the site will be evacuated immediately and the appropriate emergency response groups notified. In the event of an environmental incident caused by spill or spread of contamination, personnel will attempt to contain the spread of contamination, if possible.

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

Hospital Route From Tradepoint Atlantic

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

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



6.0 ACKNOWLEDGEMENT OF PLAN

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

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

Title and Company	Name	Signature	Date