RESPONSE AND DEVELOPMENT WORK PLAN

AREA B: PARCEL B15
TRADEPOINT ATLANTIC
SPARROWS POINT, MARYLAND

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1.0 INTRODUCTION

ARM Group Inc. (ARM), on behalf of EnviroAnalytics Group (EAG), has prepared this Response and Development Work Plan for a portion of the Tradepoint Atlantic property that has been designated as Area B: Parcel B15, (the Site). Tradepoint Atlantic submitted a letter (**Appendix A**) requesting an expedited remedial plan review to achieve construction deadlines for the proposed development on this Site. Parcel B15 is comprised of approximately 16.5 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

The conduct of any environmental assessment and cleanup activities on the Tradepoint Atlantic property, as well as any associated development, is subject to the requirements outlined in the following agreements:

- 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 B15 is part of the acreage that was removed (Carveout Area) from inclusion in the Multimedia Consent Decree between Bethlehem Steel Corporation, the United States Environmental Protection Agency (EPA), and the Maryland Department of the Environment (MDE) (effective October 8, 1997) as documented in correspondence received from EPA on September 12, 2014. Based on this agreement, EPA has determined that no further investigation or corrective measures will be required under the terms of the Consent Decree for the Carveout Area. However, the SA reflects that the property within the Carveout Area will remain subject to the EPA's RCRA Corrective Action authorities.

In consultation with the Department, Tradepoint Atlantic affirms that it desires to accelerate the assessment, remediation and redevelopment of certain parcels within the larger site due to current market conditions. To that end, the Department and Tradepoint Atlantic agree that the Controlled Hazardous Substance (CHS) Act (Section 7-222 of the Environment Article) and the CHS Response Plan (COMAR 26.14.02) shall serve as the governing statutory and regulatory authority for completing the development activities on Parcel B15 and complement the statutory requirements of the Voluntary Cleanup Program (Section 7-501 of the Environment Article). Upon submission of a Site Response and Development Work Plan and completion of the

remedial activities for the parcel, the Department shall issue a "No Further Action" letter upon a recordation of an environmental covenant describing any necessary land use controls for the specific parcel. At such time that all remedial activities have been completed, Tradepoint Atlantic shall submit to the Department a request for issuing a Certificate of Completion (COC) as well as all pertinent information concerning completion of remedial activities conducted on the parcel. Once the VCP has completed its review of the submitted information it shall issue a COC for the entire parcel described in Tradepoint Atlantic's VCP application.

Alternatively, Tradepoint Atlantic or other entity may elect to submit an application for a specific sub-parcel and submit it to the VCP for review and acceptance. If the application is received after the cleanup and redevelopment activities described in this Work Plan are implemented and a No Further Action letter is issued by the Department pursuant to the CHS Act, the VCP shall prepare a No Further Requirements Determination for the sub-parcel.

If Tradepoint Atlantic or other entity has not carried out cleanup and redevelopment activities described in the Work Plan, the cleanup and redevelopment activities may be conducted under the oversight authority of either the VCP or the CHS Act, so long as those activities comport with this Work Plan.

A proprietary site planning document which shows the proposed development for Parcel B15 has also been reviewed. The Development Area (Site) consists of 16.5 acres currently slated for development and use as a storage facility and laydown area. The parcel contains two existing Brick Sheds totaling approximately 4 acres which are proposed for reuse as storage buildings with a small office space. Development activities will include fine grading and asphalt paving, stormwater management and lighting and security improvements. The Development Area consists of the entirety of the parcel, and all of the area will be covered by asphalt paving or intact building slabs (**Figure 2**).

This Response and Development Work Plan provides a Site description and history, summary of environmental conditions identified by Phase I and Phase II Investigations including work associated with the Parcel B15 Phase II Investigation, Area B Groundwater Investigation, and Finishing Mills Groundwater Investigation, a human health Screening Level Risk Assessment (SLRA) conducted for the identified conditions, and engineering and institutional controls which have been designed to facilitate the planned parcel development and address the impacts and potential human health exposures. The engineering and institutional controls include work practices and applicable protocols that are submitted for approval to support the development and use of the Site. Engineering and institutional controls approved and installed as part of this Site Response and Development Work Plan shall be described in closure certification documentation submitted to the Department demonstrating that the exposure pathways on the parcel are addressed in a manner that protects public health and the environment.

2.0 SITE DESCRIPTION AND HISTORY

2.1. SITE DESCRIPTION

Parcel B15 includes an area of 16.5 acres and is shown in **Figure 1**. The Site is currently zoned Manufacturing Heavy-Industrial Major (MH-IM), and is not occupied.

A site visit was completed by ARM on June 15, 2016 to confirm that the Brick Sheds occupy the northern portion of Parcel B15 covering approximately 4 acres of the total area. The Brick Sheds remain standing on elevated floor slabs (trailer height) with open sides. There were stockpiles of various metals and materials being stored in the Brick Sheds at the time of the site visit. A follow-up site visit was performed on August 26, 2016 to observe an enclosed portion of the southern Brick Shed, which was vacant and being used for miscellaneous storage. The enclosed portion of the structure may be occupied in the future following Site development. The remaining portion of the parcel is either paved or covered with slag aggregate for laydown and does not contain significant vegetation.

Parcel B15 is at an elevation of approximately 12 feet above mean sea level (amsl). Elevations in the parcel are fairly uniform between 10 and 12 feet amsl over the majority of the parcel area. Several small mounds of stockpiled material are present in the southern and western portions of the Site with peak elevations as high as 18 feet amsl. Elevations across the Site appear to slope downward slightly to the north. Surface runoff generally flows from the south to the north based on the observed elevations, but may collect in low spots throughout the parcel.

There is no groundwater use on-site or within the surrounding Tradepoint Atlantic property.

2.2. SITE HISTORY

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.

There is limited information on specific historical processes that occurred within Parcel B15. A portion of the Parcel B15 Development Area was formerly occupied by two brick storage sheds which remain standing in the eastern half of the parcel. The development area also included an open laydown area and associated access railways in the western half of the parcel.

3.0 ENVIRONMENTAL SITE ASSESSMENT RESULTS

3.1. PHASE I ENVIRONMENTAL SITE ASSESSMENT RESULTS

A Phase I Environmental Site Assessment (ESA) was completed by Weaver Boos Consultants for the entire Sparrows Point property on 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. The Phase I ESA identified particular features across the Tradepoint Atlantic property which presented potential risks to the environment. These Recognized Environmental Conditions (RECs) included buildings and process areas where releases of hazardous substances and/or petroleum products potentially may have occurred. The Phase I ESA also relied upon findings identified during a previous visual site inspection (VSI) 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 Description of Current Conditions (DCC) report prepared by Rust Environmental and Infrastructure, dated January 1998 (included with 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. Weaver Boos made the determination to identify a feature as a REC based on historical information, observations during the site visit, and prior knowledge and experience with similar facilities. There were no RECs identified within the Parcel B15 development boundaries.

Relevant SWMUs and AOCs were also identified as located in Figure 3-1 from the DCC Report. This figure generally shows the SWMUs, AOCs, and main facility areas within the property boundaries. There were no SWMUs or AOCs identified within the Parcel B15 boundaries.

3.2. PHASE II INVESTIGATION RESULTS – PARCEL B15

A Phase II Investigation for soil, groundwater, and sub-slab soil gas conditions was performed for the Site in accordance with the requirements outlined in the ACO as further described in the Phase II Investigation Work Plan – Area B: Parcel B15 (Revision 2) dated September 16, 2016. This work plan was submitted for approval by the agencies on September 29, 2016. Findings from the Phase II Investigation are summarized in this document.

The Phase II Investigation was developed to target the specific features which represented a potential release of hazardous substances and/or petroleum products to the environment. Although there were no RECs, SWMUs, or AOCs identified at the Site based on Weaver Boos' Phase I Investigation, other targets were identified from historical steel plant drawings that would have the potential for environmental contamination. Samples were also collected at site-wide locations to ensure full coverage of the parcel.

A total of 49 soil samples (from the 21 boring locations shown in **Figure 3**) were collected and analyzed to assess the presence or absence of contamination in Parcel B15. Soil samples were analyzed for the EPA Target Compound List (TCL) Semi-Volatile Organic Compounds (SVOCs), Total Petroleum Hydrocarbons (TPH) Diesel Range Organics (DRO) and Gasoline Range Organics (GRO), Oil & Grease, EPA Target Analyte List (TAL) Metals, hexavalent chromium, and cyanide. During field screening of the soil cores, any sample interval which exceeded a PID reading of 10 ppm was also analyzed for TCL Volatile Organic Compounds (VOCs). Shallow soil samples (0 to 1 foot bgs) were also analyzed for PCBs. The laboratory Certificates of Analysis (including Chains of Custody) are included as electronic attachments. The laboratory reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

Groundwater at the Site is being investigated in accordance with the Phase II Investigation Work Plan – Area B: Parcel B15 (Revision 2) dated September 16, 2016. The Work Plan included several existing shallow wells which were sampled for the separate Area B Groundwater Investigation (Work Plan dated October 6, 2015; Phase II Report dated September 30, 2016) and Finishing Mills Groundwater Investigation (Work Plan dated July 7, 2016). The sampling and analysis plans defined in these separate documents were designed to provide a focused investigation of groundwater in the steel making areas (Area B and the Finishing Mills, respectively). However, the location of five shallow wells within or adjacent to Parcel B15 allowed for further characterization of shallow groundwater in the vicinity of the proposed development. A total of eight shallow groundwater samples were collected from temporary groundwater sample collection points (piezometers) and permanent monitoring wells within and surrounding Parcel B15. The piezometers included in the Parcel B15 Phase II Investigation were specifically requested by the agencies in the vicinity of the Brick Sheds to determine whether the existing buildings or associated storage may be a significant source of releases to the groundwater. The locations of the shallow groundwater sample points are shown on **Figure 4**. These eight groundwater samples were analyzed for TCL-VOCs, TCL-SVOCs, TAL-Dissolved Metals, TPH-DRO, TPH-GRO, hexavalent chromium, and cyanide. The permanent groundwater wells were additionally analyzed for TAL-Metals (total). The temporary piezometers were analyzed for dissolved hexavalent chromium in lieu of total hexavalent chromium. The laboratory Certificates of Analysis (including Chains of Custody) are included as electronic attachments. The laboratory reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

A Building Occupancy Assessment (BOA) specific to sub-slab soil gas conditions was performed for the enclosed portion of the southern Brick Shed in accordance with the requirements outlined in the Phase II Investigation Work Plan for Parcel B15. A total of three temporary monitoring probes were installed at the locations provided on **Figure 5** to collect sub-slab soil gas samples. Sub-slab soil gas samples were submitted to PACE, and analyzed for VOCs via USEPA Method TO-15. The laboratory Certificates of Analysis (including Chains of

Custody) are included as electronic attachments. The laboratory reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

3.2.1. Summary of Soil Sample Results

Soil sample results for the Parcel B15 Development Area were screened against Project Action Limits (PALs) established in the site-wide Quality Assurance Project Plan (QAPP) dated April 5, 2016 to identify any Contaminants of Potential Concern (COPCs) based on EPA's Regional Screening Levels (RSLs) for the composite worker exposure to soil. **Table 1** and **Table 2** provide a summary of the detected organic compounds and inorganics in the soil samples submitted for laboratory analysis, and **Figures S-1** through **S-4** present a summary of the soil sample results that exceeded the PALs. The tables and figures include all analytical data within the proposed development area. Any compound for which any result exceeded the PAL was identified as a COPC. COPCs in soil within the proposed Development Area of Parcel B15 consisted of five inorganics (arsenic, manganese, lead, thallium, and vanadium), seven SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-c,d]pyrene, and naphthalene), total PCBs, and TPH-DRO.

3.2.2. Summary of Groundwater Results

Data from the Area B Groundwater Investigation, Finishing Mills Groundwater Investigation, and Parcel B15 Phase II Investigation pertinent to the proposed development plan has been evaluated with respect to potential concerns associated with construction activities or the proposed Site use. The Finishing Mills Groundwater Investigation Work Plan (Revision 1) dated July 7, 2016 and Area B Groundwater Investigation Work Plan (Revision 3) dated October 6, 2016 were intended to provide a focused investigation of groundwater in the primary steel making areas, with collection points distributed regularly throughout and along the perimeter of these respective areas. Wells proximal to Parcel B15 were included in the Phase II evaluation of the parcel (as specified in the Phase II Investigation Work Plan dated September 16, 2016). The overall Finishing Mills and Area B groundwater investigations have been completed and all analytical data within and in the vicinity of the proposed Development Area has been received. The Area B Groundwater Phase II Investigation Report (dated September 10, 2016) was delivered to the agencies for review on October 3, 2016. A total of eight groundwater samples were collected from shallow temporary groundwater sample collection points (three) and permanent monitoring wells (five) relevant to the proposed development. The three piezometers were specifically requested by the agencies for investigation of the Brick Sheds (and associated storage areas) to determine whether the existing buildings may be a significant source of releases to the groundwater. **Table 3** and **Table 4** present a summary of the organic compounds and inorganics detected in the groundwater samples, and **Figures GW-1** through **GW-4** present all shallow groundwater sample results that exceeded the PALs. If both total and dissolved

concentrations exceeded the criteria for a specific metal, the value for total metals is displayed on the figure for each sample.

Any compound for which any result exceeded the PAL specified in the QAPP was identified as a COPC in groundwater. COPCs in shallow groundwater in the vicinity of Parcel B15 consisted of three inorganic compounds (dissolved hexavalent chromium, dissolved/total thallium, and dissolved/total vanadium), two VOCs (tetrachloroethene and chloroform), five SVOCs (1,1-biphenyl, benzo[a]anthracene, benzo[b]fluoranthene, indeno[1,2,3-c,d]pyrene, and naphthalene), and TPH-DRO. While the concentrations of these COPCs on-site do not present a human health hazard since there is no groundwater use, proper water management is required to prevent unacceptable discharges or risks to on-site workers.

Hexavalent chromium (B15-012-PZ, B15-014-PZ, and B15-018-PZ) and naphthalene (B15-014-PZ and TM03-PZM004) were reported at elevated levels in several groundwater samples. The hexavalent chromium results are suspect because the dissolved chromium results in the same piezometer samples were significantly lower than the hexavalent chromium values, and results for this compound have commonly been impacted by sample color (matrix interferences). In the case of the maximum detection for hexavalent chromium (80 ug/L in B15-012-PZ), dissolved chromium was below the reporting limit of 5 µg/L. Based on the relatively low magnitude of the naphthalene detections within the parcel boundary, a significant source of naphthalene is not suspected in the Development Area.

The presence and absence of groundwater impacts within the proposed development area have been adequately described. Several locations were observed to be impacted by elevated levels of VOCs, SVOCs, TPH, and/or inorganics above the PALs; however, the detected levels of compounds did not suggest that sources of continuing releases of contaminant mass to the groundwater are present. The three piezometers installed to investigate possible sources related to the Brick Sheds did not appear to be more heavily impacted than the permanent monitoring wells in the vicinity of the Site, indicating that the existing buildings are not significant sources. General groundwater conditions (not parcel specific) covered by the Area B Groundwater Investigation and Finishing Mills Groundwater Investigation will be discussed further in the associated Phase II reports, but no further analysis or remedial action is recommended with regard to the potential for groundwater impacts within the Parcel B15 Development Area.

3.2.3. **Sub-Slab Soil Gas Investigation**

The purpose of the investigation was to verify that conditions within, below, and around the building do not pose a potentially unacceptable risk to future commercial workers occupying the enclosed space of the southern Brick Shed. While there were a few VOCs detected in the sub-slab samples, none of the detections exceeded the specified PAL for any compound in the soil gas samples submitted for analysis. **Table 5** presents a summary of the VOCs detected in the sub-slab soil gas samples collected from below the Brick Sheds.

3.2.4. NAPL Investigation

Each groundwater collection point was inspected for evidence of non-aqueous phase liquid (NAPL) using an oil-water interface probe prior to sampling. None of the temporary groundwater sample collection points or permanent wells showed evidence of NAPL during these checks.

One additional temporary piezometer was installed at soil boring B15-003-SB based on the potential presence of NAPL identified in this soil core during the field investigation. At this location, a piezometer was installed and immediately checked for the presence of NAPL using an oil-water interface probe. NAPL was not detected at this location during the initial check, and the piezometer was allowed to equilibrate for at least 48 hours prior to a second measurement. No measureable NAPL was detected in the piezometer during the second gauging. A 30-day gauging event was performed on September 29, 2016, and no measureable NAPL was detected. Based on these observations, it was determined that NAPL is not present at the piezometer locations and additional delineation or action is not required in accordance with the Parcel B15 Phase II Investigation Work Plan.

3.3. HUMAN HEALTH SCREENING LEVEL RISK ANALYSIS (SLRA)

3.3.1. Analysis Process

A human health Screening Level Risk Analysis (SLRA) has been conducted for soils to further evaluate the Site conditions in support of the design of necessary response measures. The SLRA included the following evaluation process:

Identification of Constituents of Potential Concern (COPCs): Analytical results for the parcel soils were compared to the Project Action Limits (PALs), which are the USEPA Industrial Soil Regional Screening Levels (RSLs). Compounds that are present at concentrations at or above the PAL were identified as COPCs to be included in the SLRA.

Identification of Exposure Units (EUs): Parcel B15 (16.5 ac) consisted of one single exposure unit including the entire area to be developed.

Exposure Point Concentrations (EPCs): The COPC soil data for the exposure unit was divided into surface (0-1 ft) and subsurface (>1 ft) depths for estimation of potential exposure point concentrations. Thus, for the Development Area of Parcel B15 there are two soil data sets. A statistical analysis was performed for each COPC data set, using the ProUCL software (version 5.0) developed by the USEPA to determine representative reasonable maximum exposure (RME) values for the EPC for each constituent. The RME value is typically the 95% Upper Confidence Limit (UCL) of the mean. For lead,

the arithmetic mean for each depth was calculated for comparison to the Adult Lead Model-based values. For PCBs, all results equaling or exceeding 50 mg/kg would be delineated for excavation and removal (if applicable). All PCB results less than 50 mg/kg are included in the EPCs and risk ratio calculations.

Risk Ratios: The surface soil EPCs were compared to the USEPA RSLs for the Composite Industrial Worker, and the subsurface soil EPCs were compared to the Calculator-based RSLs for Construction Worker, Soil – Other Construction Activities to develop risk ratios for each COPC. The risk ratios were calculated with a cancer risk of 1E-6 and a non-cancer Hazard Quotient (HQ) of 1. The risk ratios for the carcinogens were summed to develop a screening level estimate of the baseline cumulative cancer risk. The risk ratios for the non-carcinogens were segregated and summed by target organ to develop a screening level estimate of the baseline cumulative non-cancer risk.

Assessment of Lead: For lead, the arithmetic mean concentrations for surface soil and subsurface soils for the site-wide EU were compared to the applicable RSL (800 mg/kg) as an initial screening. If the mean concentrations for the EU were below the applicable RSL, the EU was identified as requiring no further action for lead. If a mean concentration exceeded the RSL, the mean values were compared to a soil lead concentration of 1,235 mg/kg, which is the most conservative (i.e., lowest) concentration calculated by the Adult Lead Model (ALM Version date 6/21/2009) that would yield a probability of 5% of a blood lead concentration of 10 ug/dL. If the arithmetic mean concentrations for the EU were below 1,235 mg/kg, the EU was identified as requiring no further action for lead. The lead averages are presented for surface and subsurface soils in **Table 6**.

Assessment of TPH-DRO: EPCs were not calculated for TPH-DRO. Instead, the individual results were compared to the PAL set to a HQ of 1 (6,200 mg/kg). One subsurface sample exceeded the specified limit (B15-008-SB-9 at 13,500 mg/kg) and will be evaluated for the possible presence of free petroleum product. If NAPL is determined to be present at this location, it will be delineated and evaluated for further action.

Risk Characterization Approach: For the site-wide EU, if the baseline risk ratio for each non-carcinogenic COPC does not exceed 1 (with the exception of lead), and the sum of the risk ratios for the carcinogenic COPCs does not exceed a cumulative cancer risk of less than 1E-5, then a no further action determination will be recommended.

If the baseline estimate of cumulative cancer risk exceeds 1E-5, but is less than 1E-4, then capping of the EU will be considered to be an acceptable presumptive remedy. The efficacy of capping for elevated non-cancer hazard will be evaluated in terms of the magnitude of exceedance and other factors such as bioavailability of the COPC.

Similarly, for lead, if the results of the ALM indicate that the mean concentrations would present a 5% to 10% probability of a blood concentration of 10 ug/dL for the EU, then capping of the EU would be an acceptable presumptive remedy. The mean soil lead concentrations corresponding to ALM probabilities of 5% and 10% are 1,235 mg/kg, and 2,000 mg/kg, respectively. If capping of the identified area is not proposed, additional more detailed quantitative evaluation of risk will be required for the EU.

If the sum of the risk ratios for carcinogens exceeds a cumulative cancer risk of 1E-4, further analysis of site conditions will be required including the consideration of toxicity reduction in any proposal for a remedy. The magnitude of non-carcinogen hazard exceedances and bioavailability of the COPC will also dictate further analysis of site conditions including consideration of toxicity reduction in any proposal for a remedy. In addition, if the ALM indicates that the mean concentrations would present a >10% probability of a blood concentration of 10 ug/dL for the EU, further analysis of site conditions including toxicity reduction will be completed such that the probability would be reduced to less than 10% after toxicity reduction, but before capping.

3.3.2. **Parcel B15 Development Area SLRA Results**

ProUCL output tables (with computed UCLs and average lead values) derived from the data for each COPC in soils are provided as electronic attachments, with computations presented and EPCs calculated for COPCs within each of the two data sets (surface and subsurface) for the exposure unit. The ProUCL input tables are also included as electronic attachments. The results were evaluated to identify any samples that may require additional assessment or special management based on the risk characterization approach. The calculated EPCs are shown in **Table 7** (surface soils) and **Table 8** (subsurface soils). The average lead concentrations are presented for each depth in **Table 6**.

Risk ratios for the estimates of potential EPCs for surface and subsurface soils are shown in **Table 9** and **Table 10**, respectively. For the Construction Worker scenario, the parameters selected for each activity (excavating, dozing, grading, etc.) as input into the RSL Calculator are indicated on **Table 10**. The risk ratios indicate that the cumulative cancer risks are less than 1E-4 for both the Composite Worker scenario (surface soils) and the Construction Worker Scenario (subsurface soils) in the parcel-wide exposure unit. Manganese, thallium, and vanadium were the only compounds that contributed significantly to non-cancer hazard for the Composite Worker scenario. The highest individual non-cancer HQ for the Composite Worker scenario was 4 for thallium, and when the non-cancer risks were segregated and summed by target organ for cumulative Hazard Index (HI), thallium (no target organ specified) was responsible for the highest value (4). For Construction Worker exposure to subsurface soils in the parcel, the highest HQ was 3 for manganese, which contributed to a cumulative HI of 3 for the nervous system. As with surface soils, thallium and vanadium were the other main contributors to non-

cancer hazard. The presence of elevated metals will be addressed within contractor-specific health and safety plans developed to support construction activities at the Site. As indicated on **Table 6**, neither surface nor subsurface soils exceeded an average lead value of 800 mg/kg. The screening criterion for lead was set at an exposure unit arithmetic mean of 800 mg/kg based on the RSL, with a secondary limit of 1,235 mg/kg based on the Adult Lead Model (ALM) developed by the USEPA (corresponding to a 5% probability of a blood lead level of 10 ug/dL).

Based on an analysis of the TPH analytical results, one location warranted further evaluation. The subsurface location B15-008-SB-9 targeted an open storage area and former scrap yard. This sample exceeded the acceptable DRO level for no further action (6,200 mg/kg). The elevated detection (13,500 mg/kg) was present in the subsurface soil, which would typically warrant evaluation of utility corridors to determine whether excavation and removal may be appropriate. However, since no utility installations are planned in Parcel B15, there are no conflicts with potential utility corridors. The elevated DRO detection at B15-008-SB will be investigated via the installation of a temporary screening piezometer. Since the shallow soil sample at the same boring location was not impacted by elevated DRO (86.5 mg/kg at B15-008-SB-1), the soil impacts detected at 9 feet bgs may be related to migration in groundwater at the top of the water table. If it is determined that free petroleum product (NAPL) is present, the extent of the product will be delineated and evaluated further.

Results from the SLRA in conjunction with the risk characterization approach indicate that a remedy of capping in the proposed areas will be acceptable to mitigate worker risk. There is no need for further analysis or remedial action to reduce toxicity for mitigation of human health exposures for the Parcel B15 Development Area.

3.4. MANAGEMENT OF PCB-CONTAMINATED MEDIA

Soils or contaminated media within the Development Area containing total PCB concentrations less than 50 mg/kg may be left in place if paved or otherwise capped. The Toxic Substances Control Act (TSCA) low and high occupancy standards will not apply to structures serving as engineered barriers. All soil exceeding 50 mg/kg of total PCBs would be excavated and transported to a permitted off-site commercial landfill approved to accept TSCA-regulated remediation waste. There were no PCB concentrations identified in Parcel B15 above 50 mg/kg.

3.5. BRICK SHEDS BUILDING OCCUPANCY ASSESSMENT (BOA)

A sub-slab soil gas survey of the enclosed portion of the southern Brick Shed was completed to verify that conditions within, below, and around the building would not pose a potentially unacceptable risk to current and future commercial workers occupying the buildings.

There is no groundwater use on-site. Therefore, exposure to groundwater is not a potential concern. The exterior of the building would be entirely paved and used for vehicle traffic,

thereby eliminating the risk for exposure to soils. The lease would include a restriction to prevent the tenant from disturbing any pavement or doing any excavation on the property without measures protective of workers' health and approved protocols. Therefore direct contact with the soil outside of the building, and potential exposure by dermal contact or incidental ingestion or by inhalation of vapors in an excavation, are not pathways of concern.

Based on the potential exposures described above, an evaluation of the potential for impacts to indoor air is sufficient to assess the risk to a commercial worker presented by the proposed use of the enclosed portion of the existing southern Brick Shed. The three sub-slab samples collected during the Phase II Investigation of the existing enclosed space did not contain any VOC compounds that exceeded their specified PALs based on the Maryland sub-slab soil gas screening values for non-residential properties. **Table 5** presents a summary of the VOCs detected in the sub-slab soil gas samples. Further investigation is not recommended based on the documentation of minimal impacts below the building slab, and the apparent insignificant risk for vapor intrusion.

4.0 PROPOSED SITE DEVELOPMENT PLAN

Tradepoint Atlantic is proposing to construct a storage facility and laydown area on Parcel B15 of the Tradepoint Atlantic property. Improvements will be constructed on approximately 16.5 acres of land (the Development Area). The proposed future use is Tier 3B – Restricted Industrial.

Certain compounds (organics and inorganics) are present in the soils located near the surface at concentrations in excess of the PALs. Therefore, soil is considered a potential media of concern. Future adult workers and visitors could potentially contact surface soil. Future construction workers may contact impacted surface and subsurface soil during earth movement activities associated with future construction activities. Potential risks to future adult workers and visitors associated with impacts to soil and groundwater exceeding the PALs will be addressed through a remedy consisting of engineering controls (capping) and institutional controls (deed restrictions). The proposed site development plan provides for a containment remedy and institutional controls that will mitigate future adult workers and visitors from contacting impacted soil at the Site.

No significant groundwater impacts were identified in the Development Area. While the concentrations of COPCs in groundwater on site are not deemed to be a human health hazard since there is no groundwater use, proper water management is required to prevent unacceptable discharges or risks to construction workers. Work practices and health and safety plans will provide protection for construction workers associated with any future excavations at the Site. The proposed health and safety controls outlined in Section 5 and the site-specific Health and Safety Plan (HASP) will mitigate the potential risk to construction workers from contacting impacted groundwater at the Site. Additionally, a potable groundwater use restriction will be included as an institutional control in the No Further Action (NFA) Letter and Certificate of Completion (COC) issued by the MDE and a deed restriction prohibiting the potable use of groundwater will be filed.

The proposed health and safety controls outlined in Section 5 and the site-specific Health and Safety Plan (HASP) will mitigate the potential risk to construction workers from contacting impacted soil and groundwater at the Site.

The entirety of the proposed Development Area will be capped and covered by building footprints or paving. Landscaped capped areas are not currently proposed in any areas of the Site. The cover types are indicated in **Figure 6**. General sections showing required minimum thicknesses for the proposed paving cover are also provided on **Figure 6**.

Drawings for the proposed parcel development are provided in **Appendix B**. The existing Brick Sheds and associated loading docks will be retained and will cover 3.4 acres, or 20% of Parcel B15.

Asphalt paving (all types) will cover 13.1 acres, or 80% of the site. Paving sections that meet or exceed the minimum thicknesses specified in **Figure 6** will be used to cap the paved areas as shown in the proposed site development plans (**Appendix B**). The heavy duty paving section will consist of 7 inches of asphalt over a 3-inch aggregate base. The light duty paving section will consist of 4 inches of asphalt over a 6-inch aggregate base. The mill & overlay section will consist of 3 inches of asphalt over the underlying existing pavement (after removing 3 inches of existing material).

The process of constructing the proposed facility involves the tasks listed below. As-built and regulatory documentation for the outlined tasks and procedures will be provided in a Parcel B15 Response Action Completion Report (Completion Report):

- **Response Phase**

This work will be completed prior to the initiation of site development fine-grading activities.

1. Well abandonment

Wells and temporary groundwater sampling points installed for the Phase II investigation will be properly abandoned in accordance with Code of Maryland Regulations (COMAR) COMAR 26.04.04.34 through 36 prior to site work in this area. **Figure 7** shows the wells and temporary groundwater sampling points (piezometers) in all hydrogeologic zones on Parcel B15, indicating which are to be abandoned or retained.

2. Supplemental DRO delineation

The subsurface sample B15-008-SB-9 (targeting an open storage area and former laydown area) exceeded the acceptable DRO level for no further action (6,200 mg/kg). The elevated detection (13,500 mg/kg) appeared to be isolated to the subsurface soil, as the shallow sample at the same boring location did not have a significant DRO detection. The elevated DRO detection at 9 feet bgs may be the result of migration in groundwater at the top of the water table. There are no conflicts with potential utility corridors. The elevated DRO detection at B15-008-SB will be investigated via the installation of a temporary screening piezometer to determine if free petroleum product is present as a NAPL. The initial screening piezometer will be installed the week of October 10, 2016, prior to the start of paving activities at the Site.

The temporary screening piezometer will be immediately checked for the presence of NAPL using an oil-water interface probe in accordance with methods referenced in the QAPP SOP No. 019 – 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 checked again after 30 days. If measureable NAPL is detected during any check, the 30-day measurement will be required to determine NAPL thickness after equilibration. In the event that No NAPL

is detected in the screening piezometer, it 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 present in the screening piezometer, additional soil borings with shallow temporary piezometers will be installed to the north, south, east, and west of the detection point at distances of 25 feet. At each location, continuous core soil samples will be screened with a hand-held PID and inspected for evidence of NAPL.

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. If measureable NAPL is detected, it will be removed via surface techniques (bailing or similar), until product is no longer present beyond a surface sheen. 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. The results of the delineation, including NAPL thickness, will be presented in the Completion Report.

- **Development Phase**

1. Grading and site preparation

Site grading activities will be minimal, with no excavations initially planned. Development activities will be primarily limited to the placement of asphalt pavement and aggregate subbase where needed. Any material that is not suitable for compaction will be excavated and replaced with subbase material, although it is not anticipated that poor soils will be encountered. Borrow materials will be obtained from MDE-approved common borrow-site stockpiles or processed slag aggregate, if necessary, and shall be free of organic material, frozen material, or other deleterious material. In the case that there is excess material, the spoils will be stockpiled at a suitable location in accordance with the Materials Management Plan (MMP) for the Sparrows Point Facility (Papadopulos & Associates, et al., June 17, 2015). This work will be coordinated with MDE accordingly. No excess material will leave the 3,100 acre property without prior approval from MDE.

2. Placement of subbase

Following the completion of any preparatory work, the site will be fine-graded and placement of subbase will commence. The paved areas and access roads will receive a 3- to

6-inch thick layer of subbase material, which will consist of processed slag or a replacement aggregate material.

3. Floor slabs and paving

The Site will be covered with existing floor slabs or new asphalt paving as indicated in **Figure 6**. The full thickness of the pavement section (i.e., asphalt cap) to be placed over the existing soils will consist of 10 inches (3 inches of subbase and 7 inches of asphalt in the heavy duty areas and 6 inches of subbase and 4 inches of asphalt in the heavy duty areas). The thickness of asphalt in the mill & overlay areas will consist of 3 inches of asphalt over the existing pavement (after 3 inches of older material is removed).

4. Security

Following the completion of paving, the contractor will install site security fencing.

5. Stormwater management

No new stormwater facilities are proposed for construction at the Site, but stormwater will be managed in accordance with a master plan for the Tradepoint Atlantic property. Stormwater from Parcel B15 will be conveyed to a stormwater management facility on the property to be determined. Tradepoint Atlantic plans to submit a master stormwater management plan to Baltimore County that describes the new stormwater management facilities. The new stormwater management facilities will discharge to existing stormwater outfalls permitted under the current industrial stormwater NPDES permit.

5.0 DEVELOPMENT IMPLEMENTATION PROTOCOLS

5.1. DEVELOPMENT PHASE

This plan presents protocols for the handling of soils and fill materials in association with construction of the storage facility and laydown area of Parcel B15. In particular, this plan highlights the minimum standards for construction practices and managing potentially contaminated materials to reduce potential risks to workers and the environment.

Several contaminants of potential concern (COPCs) were identified in soil samples across the site at concentrations that are above the Project Action Limits (PALs). The PALs are set based on EPA's Regional Screening Levels (RSLs) for industrial soils. COPCs in soil within the proposed development area consist of five inorganics (arsenic, manganese, lead, thallium, and vanadium), seven SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-c,d]pyrene, and naphthalene), total PCBs (there were no total PCBs in excess of 50 mg/kg), and TPH-DRO. Because these COPCs can present potential risks to human health and the environment at certain concentrations, this plan presents material management and other protocols to be followed during the work to adequately mitigate such potential risks for material remaining on-site during the development phase.

5.1.1. Pre-Construction Meeting

Prior to any earthwork being conducted on-site, a pre-construction meeting shall be held to address proper operating procedures for working on-site and handling potentially contaminated material. This meeting shall consist of the construction manager and any workers involved with earthwork. The site-specific Health and Safety Plan for the project shall be reviewed and discussed.

5.1.2. Fill

Processed slag aggregate from the Tradepoint property will be used as compacted sub-base for the paving for this project. Soil relocated during fine-grading activities at the Site has been deemed to be suitable for re-use as fill below the paved areas of the Site. As indicated in the SLRA for the Parcel B15 Development Area, the on-site soil contaminant concentrations do not exceed acceptable risk (cancer or non-cancer) for capped areas (100% of the Site). These materials are considered suitable for use as on-site fill below the proposed asphalt laydown area. Any clean fill material imported to the site will be screened according to MDE guidance for suitability.

5.1.3. **Dust Control**

General construction operations, including fine-grading and cap construction activities may be performed at the Site. These activities are anticipated to be performed in areas of soil impacted with COPCs. To limit worker exposure to contaminants borne on dust and windblown particulates, dust control measures will be implemented, if warranted when the above activities are performed in areas with impacted soil. The action level proposed for the purpose of determining the need for dust suppression techniques (e.g. watering and/or misting) and/or continuous monitoring during the response and development activities on Site will be 3.0 mg/m^3. The lowest of the site-specific dust action levels, OSHA PELs, and ACGIH TLV was selected as the proposed action level.

If visible dust is generated in the breathing zone, air monitoring will be implemented as follows:

- At the start of intrusive activities;
- Periodically during intrusive activities (15-minute intervals);
- When contaminants other than those previously identified are being handled;
- When a different type of operation is initiated or conditions change;
- If personnel are working in areas with obvious particulate contamination; and
- If a sufficient reasonable interval has passed so that exposures may have significantly changed.

Air monitoring will be performed using a ThermoElectron Corporation Personal Data RAM 1000AN dust monitor or equivalent real-time air monitoring device. If the action level (3.0 mg/m^3) is exceeded as a result of conditions occurring at the Site, operations will be stopped and dust suppression implemented. The background dust concentration will be utilized to evaluate whether Site activities are the source of the action level exceedance. Background concentrations will be based on measurements over a minimum of a one hour period at the upwind Site boundary. This upwind data will be used to calculate a time weighted average background dust concentration. The background dust concentration may need to be recalculated periodically during the work day, based on changed upwind conditions. Operations may be resumed once monitoring indicates that dust concentrations are below the action level.

As applicable, air monitoring will be conducted during response and development implementation activities in the immediate work zones and surrounding areas to assess levels of exposure to Site workers, establish that the work zone designations are valid, and verify that respiratory protection being worn by personnel, if needed, is adequate. Concurrent with the work zone air monitoring, perimeter air monitoring will also be performed to ensure contaminants are not migrating off-site. Perimeter monitoring will include monitoring along the perimeter of the Site, including both the downwind and upwind portions of the Site. The

concentration measured in the downwind portion of the Site shall not exceed the concentration in the upwind portion. If exceedances attributable to Site conditions are identified downwind for more than five minutes, dust control measures and additional monitoring will be implemented. The dust suppression measures may include wetting or misting through use of a hose connected to an available water supply or a water truck stationed on Site.

Dust control measures will be implemented as described above to address dust generated as a result of construction and response activities conducted on Site. However, based on the nature of the area and/or on-going activities surrounding the Site, it is possible that windblown particulates may come from surrounding areas. As discussed above, the dust concentration in the upwind portion of the Site will be considered when monitoring dust levels in the work zone. A pre-construction meeting will be held to discuss the potential of windblown particulates from other activities impacting the air monitoring required for this response plan. Site contact information will be provided to address the possibility of upwind dust impacts.

5.2. WATER MANAGEMENT

A total of eight shallow groundwater samples were collected from temporary groundwater sample collection points (piezometers) and permanent monitoring wells within and surrounding Parcel B15. None of the temporary groundwater sample collection points or permanent wells showed evidence of NAPL during mandatory checks.

COPCs in shallow groundwater in the vicinity of Parcel B15 consisted of three inorganic compounds (dissolved hexavalent chromium, dissolved/total thallium, and dissolved/total vanadium), two VOCs (tetrachloroethene and chloroform), five SVOCs (1,1-biphenyl, benzo[a]anthracene, benzo[b]fluoranthene, indeno[1,2,3-c,d]pyrene, and naphthalene), and TPH-DRO. While the concentrations of these COPCs are not deemed to be a human health hazard since there is no on-site groundwater use, proper water management is required to prevent unacceptable discharges or risks to on-site workers. It is not anticipated that any water management will be required during the development of Parcel B15, as no excavations are required to facilitate construction of the laydown area.

5.3. HEALTH AND SAFETY

A site-specific Health and Safety Plan (**Appendix C**) has been developed and is attached to this plan to present the minimum requirements for worker health and safety protection for the project. All contractors working on the site must prepare their own Health and Safety Plan that provides a level of protection at least as much as that provided by the attached Health and Safety Plan. Alternately, on-site contactors may elect to adopt the Health and Safety Plan provided.

Prior to commencing work, the contractor must conduct an on-site safety meeting for all personnel. All personnel must be made aware of the Health and Safety Plan. Detailed safety information shall be provided to personnel who may be exposed to contaminants of potential

concern. Workers will be responsible for following safety procedures to prevent contact with potentially contaminated soil or groundwater.

5.4. INSTITUTIONAL CONTROLS (FUTURE LAND USE CONTROLS)

Long-term conditions related to future use of the Site will be placed on the development and response plan approval, NFA Letter, and COC. These conditions are anticipated to include the following:

- A restriction prohibiting potable use of groundwater at the Site;
- Implementation of inspection procedures and maintenance of the containment remedies as outlined in Section 5.5 below.

The responsible party will file the above deed restrictions as defined by the MDE VCP in the NFA Letter and COC. The proposed capped areas are subject to the proposed response action containment remedy and the maintenance requirement. The Site will be subject to the potable groundwater use restriction.

The Tenant will be required to sign onto the Environmental Covenant with restriction in the NFA. TPA will notify the Tenant of this requirement and will provide MDE with contact information for the Tenant prior to issuance of the NFA Letter.

5.5. POST REMEDIATION REQUIREMENTS

Post remediation requirements will include compliance with the conditions specified in the NFA Letter, COC, and the deed restrictions recorded for the Site. Deed restrictions will be recorded within 30 days after receipt of the final NFA Letter.

Maintenance requirements will include maintenance of the capped areas to minimize degradation of the cap and exposure to the underlying soil. An Operations and Maintenance Plan (O&M Plan) for the capped areas is included in **Appendix D**. The O&M Plan includes the inspection protocols and a maintenance schedule.

The responsible party will perform cap maintenance inspections, perform maintenance of the cap, and retain cap inspection records. Areas of the pavement cap that have degraded to a Pavement Condition Index (PCI) of 4.0 will be repaired within 30 days of discovery. MDE shall be notified within ten business days of any repairs that are the result of a PCI of 4.0 or greater or if damage to any landscaped capped area(s) exceeds one foot in diameter and/or two feet in depth. The notification will include documentation of the conditions being repaired and the location of the repair.

5.6. CONSTRUCTION OVERSIGHT

Key capping activities will be monitored through daily inspections by the environmental professional (EP).

Construction Oversight by an EP will ensure and document that the project is built as designed and appropriate environmental and safety protocols are followed.

Upon completion, the EP will certify that the project is constructed in accordance with this Development Plan. Records shall be provided to document:

- Daily Observations of Construction Activities during site grading
- Proper Cap Thickness and Construction

6.0 PERMITS, NOTIFICATIONS AND CONTINGENCIES

The participant and their contractors will comply with all local, state and federal laws and regulations by obtaining any necessary approvals and permits to conduct the activities contained herein.

There are no wetlands identified within the project area and no work will be performed beyond the shoreline so no permits are required from the MDE Water Resources Administration.

Contingency measures will include the following:

1. the MDE will be notified immediately of any previously undiscovered contamination, previously undiscovered storage tanks and other oil-related issues, and citations from regulatory entities related to health and safety practices; and

2. any significant change to the implementation schedule will be noted in the progress reports to MDE.

7.0 IMPLEMENTATION SCHEDULE

The proposed implementation schedule is shown below. Progress reports will be submitted to MDE upon completion of each milestone shown below.

Task	**Proposed Completion Date**
Anticipated Plan Approval	October 24, 2016
Remedial Phase	
Supplemental DRO Delineation (Starting)	October 14, 2016
Well Abandonment (excluding delineation)	October 28, 2016
Development Phase	
Completion of site preparation/grading	October 31, 2016
Installation of paving (Starting)	October 31, 2016
Submittal of Completion Report/Notice of Readiness for Use*	December 1, 2016
Request for a NFA from the MDE	December 30, 2017
Recordation of institutional controls in the land records office of Baltimore County	Within thirty days of receiving the approval of NFA from the MDE
Submit proof of recordation with Baltimore County	Upon receipt from Baltimore County

*Notice of Readiness for Use shall be prepared by Professional Engineer registered in Maryland and submitted with the Completion Report to certify that the work is consistent with the requirements of this Development Plan and the Site is suitable for occupancy and use.

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

P:\EnviroAnalytics Group\160443M EAG_TPA Redevelopment\Drwg\B15\Production\Figure 2 - Site Development Figure.dwg Plotted: October 7, 2016

Figure 2

drawing title
PARCEL B15 SITE DEVELOPMENT PLAN

project title
SPARROWS POINT AREA B
ENVIROANALYTICS GROUP

SPARROWS POINT
BALTIMORE COUNTY, MARYLAND

designed	JMA	scale	1" = 200'
checked	TNP	date	10/7/2016
drawn	JMA	project no.	160443M-4-1

0 200 400
SCALE IN FEET

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net


Parcel B14
Parcel B21
Parcel B16
B15-019-SB
B15-002-SB
B15-018-SB
B15-012-SB
B15-003-SB
Brick Sheds
B15-001-SB
B15-020-SB
B15-021-SB
B15-016-SB
B15-017-SB
Brick Sheds
B15-005-SB
B15-014-SB
B15-015-SB
B15-004-SB
B15-008-SB
B15-011-SB
B15-013-SB
B15-009-SB
Parcel B15
B15-006-SB
B15-007-SB
B15-010-SB
Limit of Disturbance
Parcel B23
Parcel B1
Parcel B2
Parcel B15 Soil Borings
Final Field Sample Locations
October 5, 2016
Figure
3
EnviroAnalytics Group
ARM Project 160443M-4
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 50 100 200
Feet
Phase II Soil Borings
Brick Sheds
Limit of Disturbance
Parcel Boundary

Parcel B15 Shallow Groundwater
Final Field Sample Locations

October 5, 2016

Figure 4

EnviroAnalytics Group

ARM Project 160443M-4

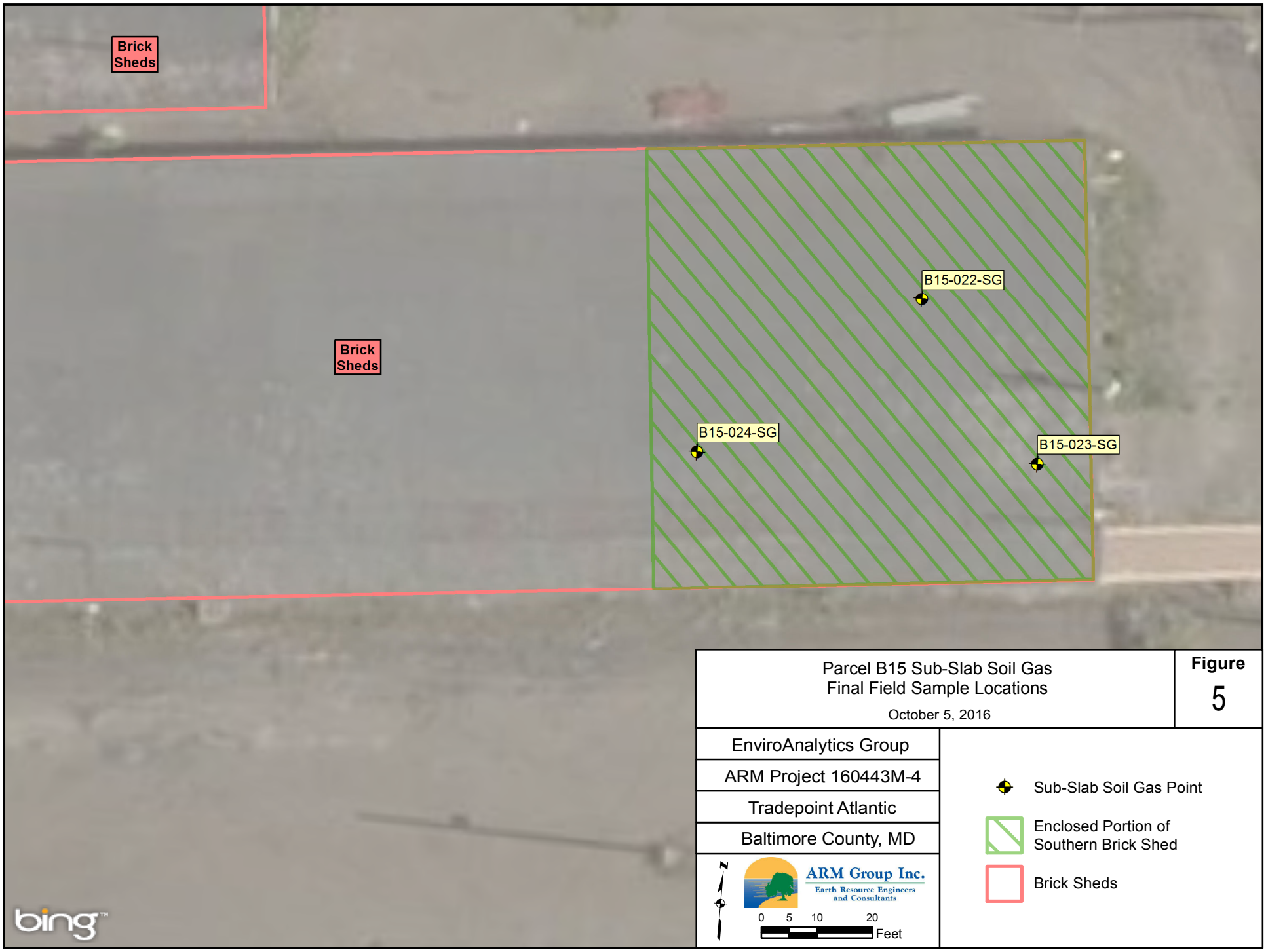
Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 50 100 200 Feet

- Shallow Piezometer
- Shallow Permanent Well
- Brick Sheds
- Limit of Disturbance
- Parcel Boundary



Parcel B15 Sub-Slab Soil Gas
Final Field Sample Locations

October 5, 2016

Figure
5

EnviroAnalytics Group

ARM Project 160443M-4

Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 5 10 20
Feet

Sub-Slab Soil Gas Point

Enclosed Portion of Southern Brick Shed

Brick Sheds

Parcel B14

Parcel B21

Parcel B16

Parcel B15

Parcel B23

Parcel B1

Parcel B2

Brick Sheds

Brick Sheds

Limit of Disturbance

B15-008-SB-1
Benzo[a]pyrene: 2.3
Benzo[b]fluoranthene: 3.4

B15-008-SB-9
Benzo[a]anthracene: 136
Benzo[a]pyrene: 102
Benzo[b]fluoranthene: 153
Benzo[k]fluoranthene: 73.9
Dibenz[a,h]anthracene: 27.8
Indeno[1,2,3-c,d]pyrene: 65.1
Naphthalene: 70.1

B15-012-SB-1

B15-012-SB-4

B15-019-SB-1

B15-020-SB-1

B15-020-SB-7
Benzo[a]anthracene: 3.1
Benzo[a]pyrene: 3.1
Benzo[b]fluoranthene: 6.9
Dibenz[a,h]anthracene: 0.43

B15-020-SB-10

B15-002-SB-1

B15-002-SB-8

B15-018-SB-1
Benzo[a]pyrene: 1.3
Benzo[b]fluoranthene: 3.3

B15-018-SB-6
Benzo[a]pyrene: 0.42

B15-003-SB-1

B15-003-SB-4
Benzo[a]anthracene: 3.9
Benzo[a]pyrene: 3.7
Benzo[b]fluoranthene: 5.1
Dibenz[a,h]anthracene: 0.61

B15-003-SB-10
Benzo[a]anthracene: 6.4
Benzo[a]pyrene: 5.2
Benzo[b]fluoranthene: 12.3
Dibenz[a,h]anthracene: 0.59

B15-016-SB-1
Benzo[a]anthracene: 3.1
Benzo[a]pyrene: 2.9
Benzo[b]fluoranthene: 5.2
Dibenz[a,h]anthracene: 0.94

B15-016-SB-5
Benzo[a]anthracene: 3.6
Benzo[a]pyrene: 3.4
Benzo[b]fluoranthene: 4.8
Dibenz[a,h]anthracene: 0.82

B15-016-SB-10
Benzo[a]pyrene: 1.4

B15-011-SB-1

B15-011-SB-4
Benzo[a]pyrene: 0.33

B15-001-SB-1

B15-001-SB-9
Benzo[a]anthracene: 3.8
Benzo[a]pyrene: 3.7
Benzo[b]fluoranthene: 5.0
Dibenz[a,h]anthracene: 0.53

B15-001-SB-10
Benzo[a]anthracene: 3.4
Benzo[a]pyrene: 3.0
Benzo[b]fluoranthene: 4.3
Dibenz[a,h]anthracene: 0.42

B15-005-SB-1

B15-005-SB-4

B15-014-SB-1
Benzo[a]pyrene: 0.37

B15-014-SB-8
Benzo[a]pyrene: 1.1

B15-014-SB-10
Benzo[a]pyrene: 1.3

B15-021-SB-1

B15-021-SB-4

B15-017-SB-1

B15-017-SB-8
Benzo[a]anthracene: 6.6
Benzo[a]pyrene: 5.9
Benzo[b]fluoranthene: 11.1
Dibenz[a,h]anthracene: 0.63

B15-009-SB-1
Benzo[a]pyrene: 0.92

B15-015-SB-1
Benzo[a]anthracene: 53.5
Benzo[a]pyrene: 26.9
Benzo[b]fluoranthene: 63.4
Benzo[k]fluoranthene: 56.0
Dibenz[a,h]anthracene: 6.8
Indeno[1,2,3-c,d]pyrene: 15.1
Naphthalene: 71.7

B15-015-SB-4
Benzo[a]pyrene: 1.3

B15-004-SB-1
Benzo[a]pyrene: 1.6
Benzo[b]fluoranthene: 3.3

B15-004-SB-5
Benzo[a]pyrene: 2.4
Benzo[b]fluoranthene: 6.1
Dibenz[a,h]anthracene: 0.33

B15-004-SB-10
Benzo[a]pyrene: 2.2
Benzo[b]fluoranthene: 4.5
Dibenz[a,h]anthracene: 0.3

B15-013-SB-1

B15-013-SB-4
Benzo[a]anthracene: 28.0
Benzo[a]pyrene: 21.5
Benzo[b]fluoranthene: 32.0
Dibenz[a,h]anthracene: 2.4
Indeno[1,2,3-c,d]pyrene: 5.2

B15-013-SB-10
Benzo[a]anthracene: 4.0
Benzo[a]pyrene: 6.3
Benzo[b]fluoranthene: 11.2
Dibenz[a,h]anthracene: 0.95
Indeno[1,2,3-c,d]pyrene: 3.9

B15-006-SB-1
Benzo[a]pyrene: 0.98
Benzo[b]fluoranthene: 3.5

B15-006-SB-4
Benzo[a]anthracene: 112
Benzo[a]pyrene: 67.9
Benzo[b]fluoranthene: 124
Benzo[k]fluoranthene: 41.5
Dibenz[a,h]anthracene: 7.4
Indeno[1,2,3-c,d]pyrene: 30.5

B15-007-SB-1
Benzo[a]pyrene: 1.5
Benzo[b]fluoranthene: 4.5

B15-007-SB-4
Benzo[a]anthracene: 25.3
Benzo[a]pyrene: 17.6
Benzo[b]fluoranthene: 40.7
Benzo[k]fluoranthene: 29.7
Dibenz[a,h]anthracene: 3.2
Indeno[1,2,3-c,d]pyrene: 6.6

B15-010-SB-1
Benzo[a]pyrene: 0.91

B15-010-SB-5
Benzo[a]anthracene: 25.3
Benzo[a]pyrene: 19.7
Benzo[b]fluoranthene: 26.4
Dibenz[a,h]anthracene: 2.2
Indeno[1,2,3-c,d]pyrene: 5.2

Parcel B15 Soil Borings
Phase II SVOC Exceedances (mg/kg)
October 5, 2016

Figure
S-1

EnviroAnalytics Group

ARM Project 160443M-4

Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 50 100 200
Feet

Phase II Soil Borings

Brick Sheds

Limit of Disturbance

Parcel Boundary

Parcel B15 Soil Borings
Phase II PCB Exceedances (mg/kg)

October 5, 2016

Figure
S-2

EnviroAnalytics Group

ARM Project 160443M-4

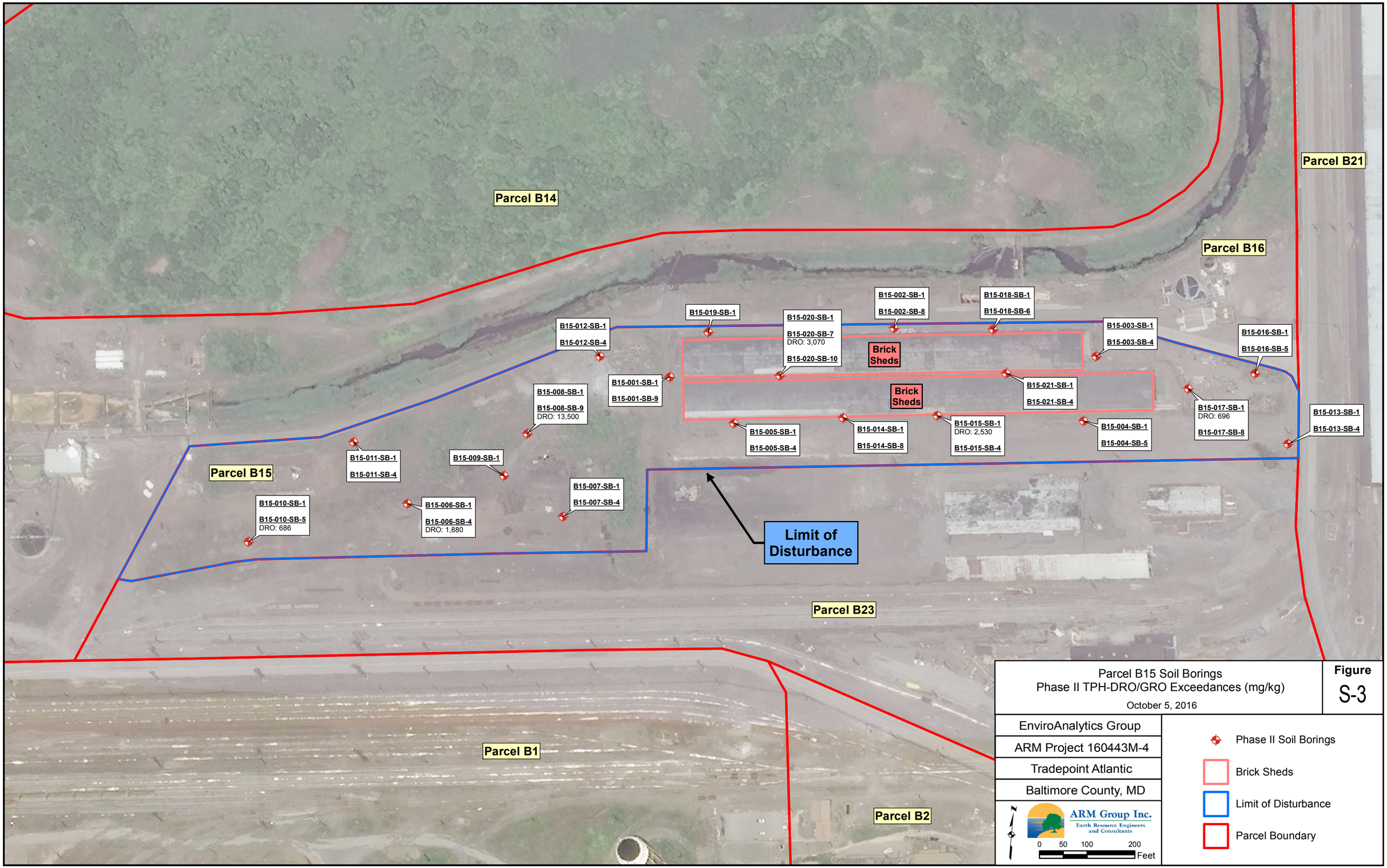
Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 50 100 200
Feet

- Phase II Soil Borings
- Brick Sheds
- Limit of Disturbance
- Parcel Boundary



Parcel B15 Soil Borings
Phase II TPH-DRO/GRO Exceedances (mg/kg)
October 5, 2016

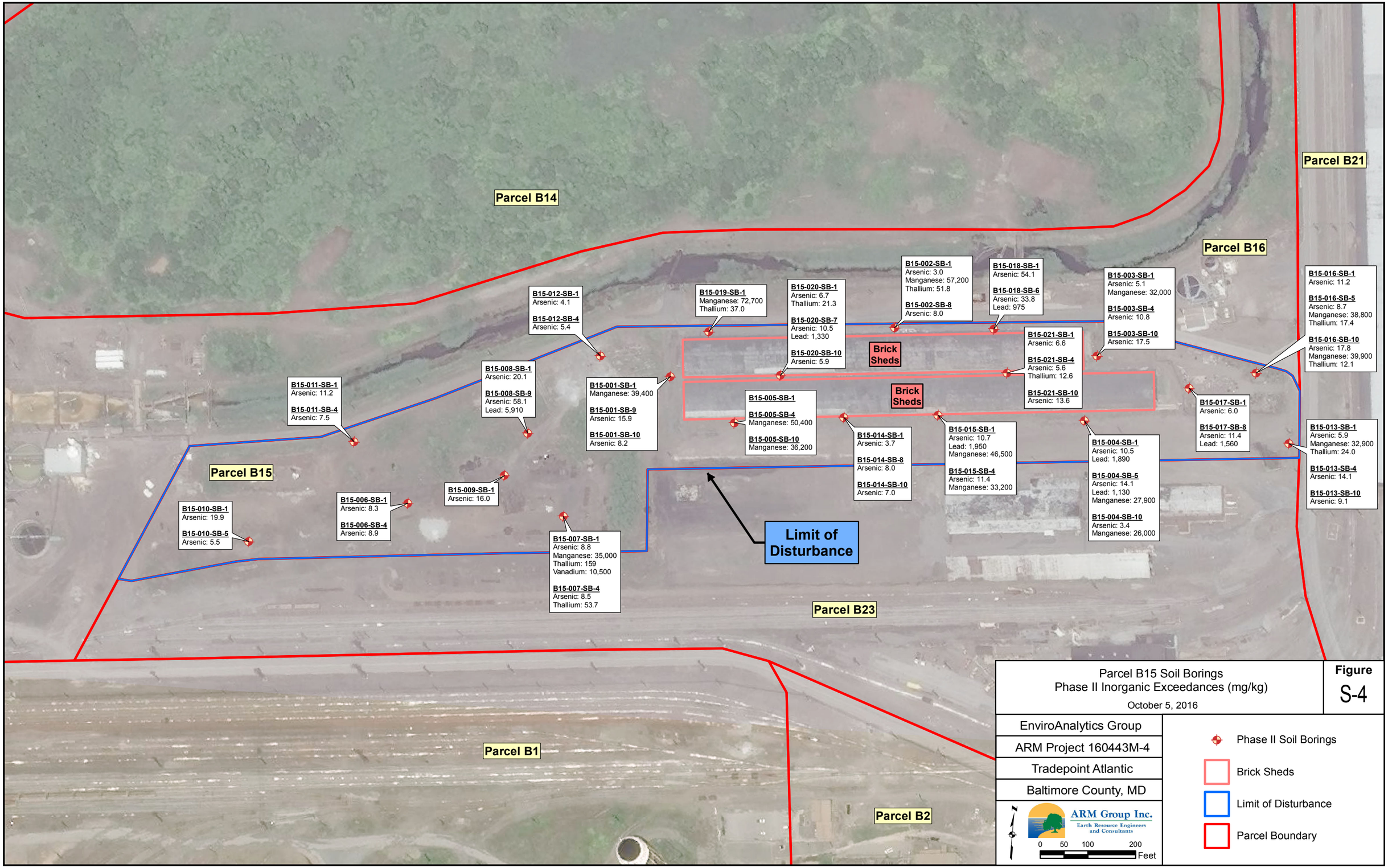
Figure
S-3

EnviroAnalytics Group
ARM Project 160443M-4
Tradepoint Atlantic
Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 50 100 200 Feet

Phase II Soil Borings
Brick Sheds
Limit of Disturbance
Parcel Boundary



Parcel B15 Soil Borings
Phase II Inorganic Exceedances (mg/kg)
October 5, 2016

Figure
S-4

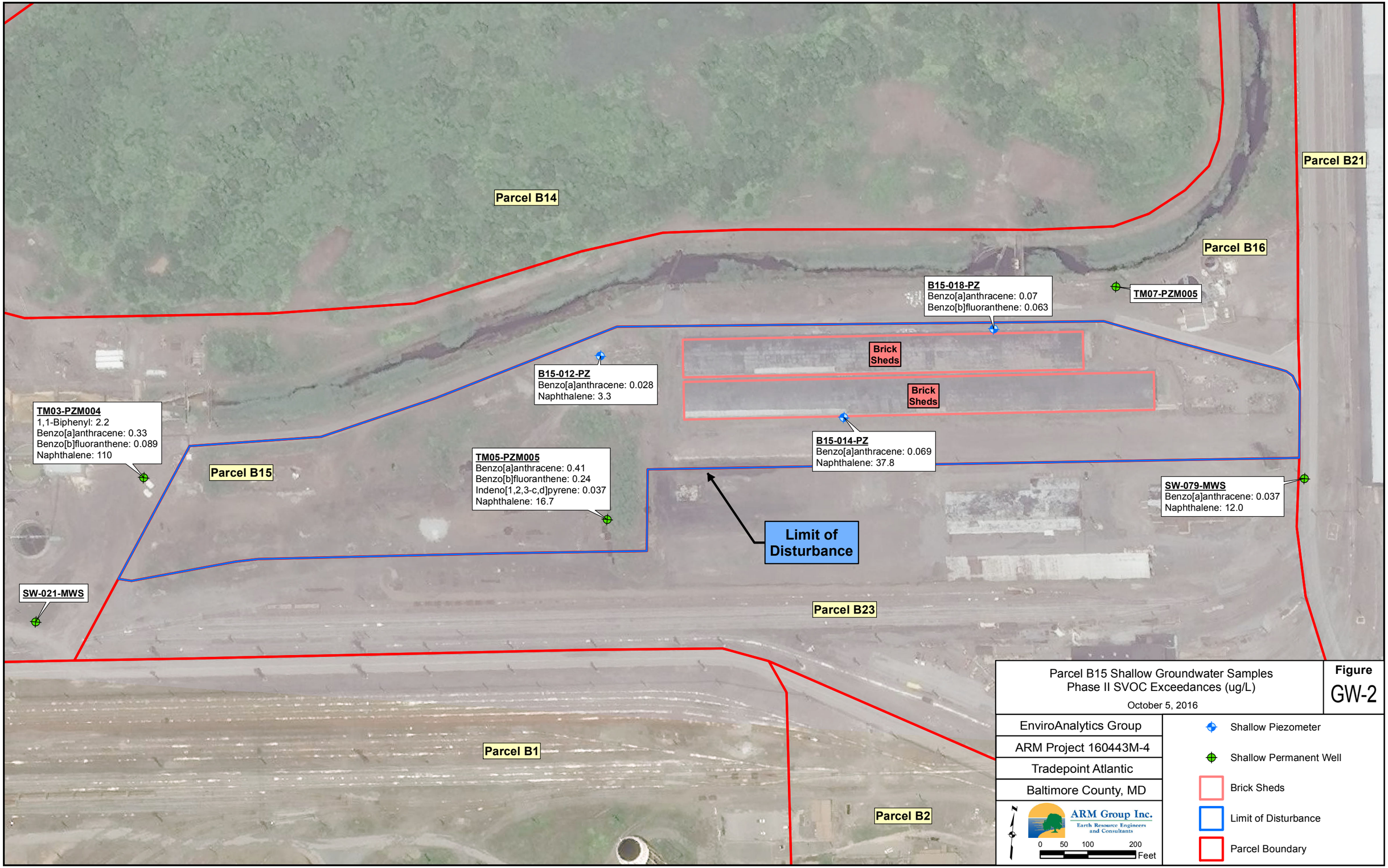
EnviroAnalytics Group
ARM Project 160443M-4
Tradepoint Atlantic
Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

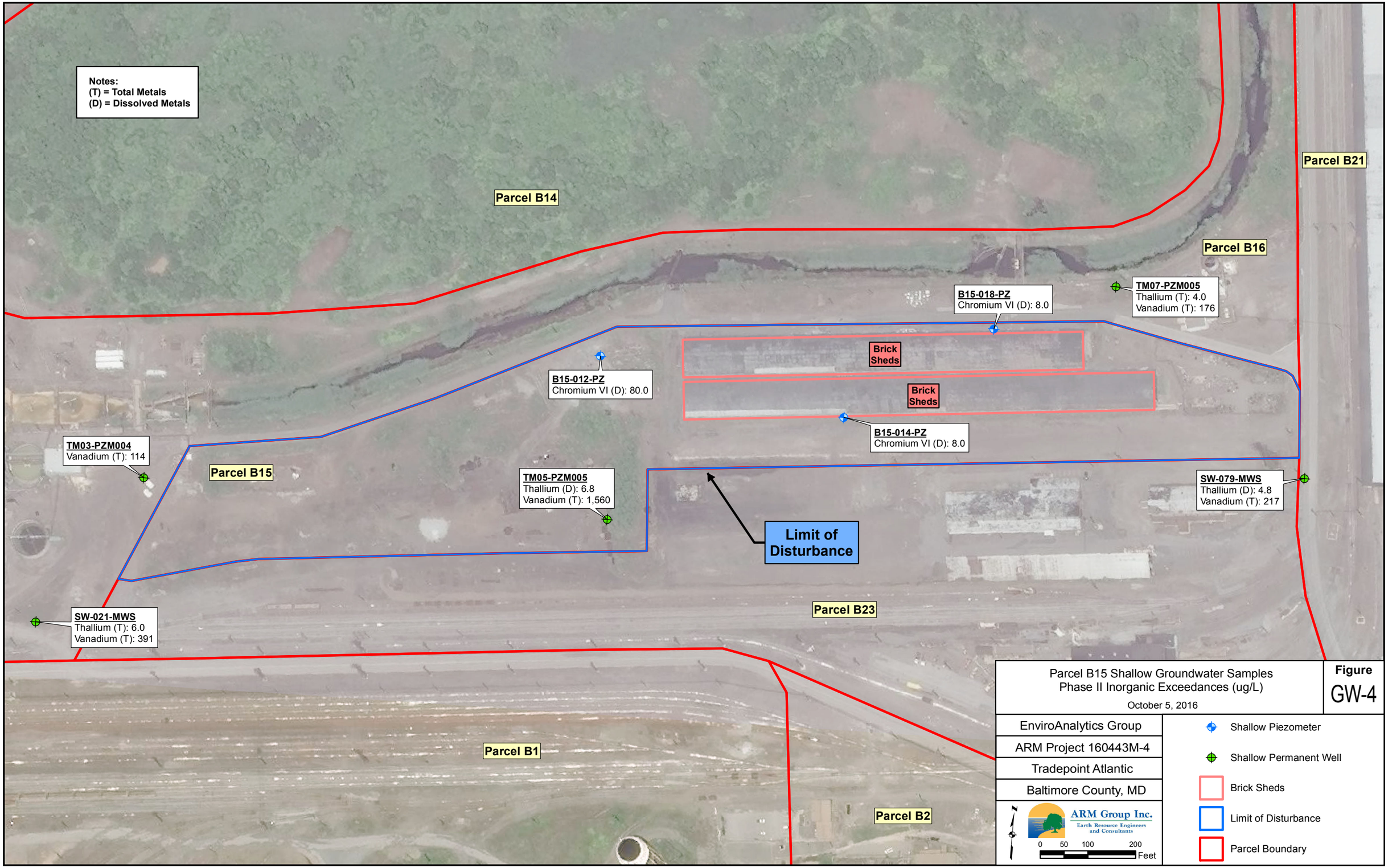
0 50 100 200
Feet

Phase II Soil Borings
Brick Sheds
Limit of Disturbance
Parcel Boundary


Parcel B14
Parcel B21
Parcel B16
TM07-PZM005
B15-018-PZ
Brick Sheds
Brick Sheds
B15-012-PZ
B15-014-PZ
Tetrachloroethene: 6.3
TM03-PZM004
Parcel B15
TM05-PZM005
Chloroform: 1.8
SW-079-MWS
Limit of Disturbance
SW-021-MWS
Chloroform: 4.7
Parcel B23
Parcel B1
Parcel B2
Parcel B15 Shallow Groundwater Samples
Phase II VOC Exceedances (ug/L)
October 5, 2016
Figure
GW-1
EnviroAnalytics Group
ARM Project 160443M-4
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 50 100 200
Feet
Shallow Piezometer
Shallow Permanent Well
Brick Sheds
Limit of Disturbance
Parcel Boundary


Parcel B14
Parcel B21
Parcel B16
B15-018-PZ
Benzo[a]anthracene: 0.07
Benzo[b]fluoranthene: 0.063
TM07-PZM005
Brick Sheds
Brick Sheds
B15-012-PZ
Benzo[a]anthracene: 0.028
Naphthalene: 3.3
TM03-PZM004
1,1-Biphenyl: 2.2
Benzo[a]anthracene: 0.33
Benzo[b]fluoranthene: 0.089
Naphthalene: 110
B15-014-PZ
Benzo[a]anthracene: 0.069
Naphthalene: 37.8
Parcel B15
TM05-PZM005
Benzo[a]anthracene: 0.41
Benzo[b]fluoranthene: 0.24
Indeno[1,2,3-c,d]pyrene: 0.037
Naphthalene: 16.7
SW-079-MWS
Benzo[a]anthracene: 0.037
Naphthalene: 12.0
Limit of Disturbance
SW-021-MWS
Parcel B23
Parcel B1
Parcel B2
Parcel B15 Shallow Groundwater Samples
Phase II SVOC Exceedances (ug/L)
October 5, 2016
Figure
GW-2
EnviroAnalytics Group
ARM Project 160443M-4
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 50 100 200
Feet
Shallow Piezometer
Shallow Permanent Well
Brick Sheds
Limit of Disturbance
Parcel Boundary


Parcel B14
Parcel B21
Parcel B16
TM07-PZM005
DRO: 237
B15-018-PZ
Brick Sheds
Brick Sheds
B15-012-PZ
DRO: 214
B15-014-PZ
DRO: 114
TM03-PZM004
DRO: 583
Parcel B15
TM05-PZM005
DRO: 262
SW-079-MWS
DRO: 408
Limit of Disturbance
SW-021-MWS
Parcel B23
Parcel B1
Parcel B2
Parcel B15 Shallow Groundwater Samples
Phase II TPH-DRO/GRO Exceedances (ug/L)
October 5, 2016
Figure
GW-3
EnviroAnalytics Group
ARM Project 160443M-4
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 50 100 200
Feet
Shallow Piezometer
Shallow Permanent Well
Brick Sheds
Limit of Disturbance
Parcel Boundary


Notes:
(T) = Total Metals
(D) = Dissolved Metals
Parcel B14
Parcel B21
Parcel B16
Parcel B15
Parcel B23
Parcel B1
Parcel B2
B15-018-PZ
Chromium VI (D): 8.0
TM07-PZM005
Thallium (T): 4.0
Vanadium (T): 176
B15-012-PZ
Chromium VI (D): 80.0
Brick Sheds
Brick Sheds
B15-014-PZ
Chromium VI (D): 8.0
TM03-PZM004
Vanadium (T): 114
TM05-PZM005
Thallium (D): 6.8
Vanadium (T): 1,560
SW-079-MWS
Thallium (D): 4.8
Vanadium (T): 217
Limit of Disturbance
SW-021-MWS
Thallium (T): 6.0
Vanadium (T): 391
Parcel B15 Shallow Groundwater Samples
Phase II Inorganic Exceedances (ug/L)
October 5, 2016
Figure
GW-4
EnviroAnalytics Group
ARM Project 160443M-4
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 50 100 200
Feet
Shallow Piezometer
Shallow Permanent Well
Brick Sheds
Limit of Disturbance
Parcel Boundary

TYPICAL PAVING SECTION
NOT TO SCALE

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

designed JMA | scale 1" = 200'
checked TNP | date 10/7/2016
drawn JMA | project no. 160443M-4-1

0 200 400
SCALE IN FEET

drawing title
ENVIRONMENTAL CAPPING PLAN AND DETAIL

project title
SPARROWS POINT AREA B
ENVIROANALYTICS GROUP

SPARROWS POINT
BALTIMORE COUNTY, MARYLAND

Figure 6

P:\EnviroAnalytics Group\160443M EAG_TPA Redevelopment\Drwg\B15\Production\Figure 8 - Environmental Capping Detail.dwg Plotted: October 7, 2016

Parcel B15 Groundwater Network
Abandonment: All Hydrogeologic Zones

October 5, 2016

Figure 7

EnviroAnalytics Group

ARM Project 160443M-4

Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 50 100 200 Feet

- Piezometer (abandon)
- Permanent Well (abandon)
- Permanent Well (retain)
- Brick Sheds
- Limit of Disturbance
- Parcel Boundary

TABLES

Table 1
Summary of Organics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-001-SB-1	B15-001-SB-10	B15-001-SB-9	B15-002-SB-1	B15-002-SB-8	B15-003-SB-1	B15-003-SB-10	B15-003-SB-4	B15-004-SB-1	B15-004-SB-10
Volatile Organic Compounds												
2-Butanone (MEK)	mg/kg	190,000	0.012 U1c	N/A	0.011 U1c	N/A	0.012 UL3	N/A	N/A	0.0088 U1c	N/A	N/A
Acetone	mg/kg	670,000	0.012 UL31c	N/A	0.011 UL31c	N/A	**0.0096 JL1B**	N/A	N/A	0.0088 UL31c	N/A	N/A
Benzene	mg/kg	5.1	0.0058 U1c	N/A	0.0053 U1c	N/A	0.0058 U	N/A	N/A	**0.002 J1c**	N/A	N/A
Ethylbenzene	mg/kg	25	0.0058 U1c	N/A	0.0053 U1c	N/A	0.0058 U	N/A	N/A	0.0044 U1c	N/A	N/A
Toluene	mg/kg	47,000	0.0058 U1c	N/A	0.0053 U1c	N/A	0.0058 U	N/A	N/A	0.0044 U1c	N/A	N/A
Xylenes	mg/kg	2,800	0.017 U	N/A	0.016 U	N/A	0.017 U	N/A	N/A	0.013 U	N/A	N/A
Semi-Volatile Organic Compounds*												
1,1-Biphenyl	mg/kg	200	0.071 U	N/A	**0.029 J**	0.07 UL3	0.074 UL3	0.07 U	N/A	**0.024 J**	**0.033 J**	N/A
1,2,4,5-Tetrachlorobenzene	mg/kg	350	0.071 U	N/A	0.072 U	0.07 UL3	0.074 UL3	0.07 U	N/A	0.073 U	0.074 U	N/A
2,4-Dimethylphenol	mg/kg	16,000	0.071 U	N/A	0.072 U	0.07 U	0.074 U	0.07 U	N/A	0.073 U	0.074 U	N/A
2-Methylnaphthalene	mg/kg	3,000	**0.021 J**	N/A	**0.16**	**0.067**	0.074 U	**0.028 J**	N/A	**0.14**	**0.071 J**	N/A
2-Methylphenol	mg/kg	41,000	0.071 U	N/A	0.072 U	0.07 U	0.074 U	0.07 U	N/A	0.073 U	0.074 U	N/A
2-Nitroaniline	mg/kg	8,000	0.18 U	N/A	0.18 U	0.18 UL3	0.18 UL3	0.18 U	N/A	0.18 U	0.19 U	N/A
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.14 U	N/A	0.14 U	0.14 UL3	0.15 UL3	0.14 U	N/A	0.15 U	0.15 U	N/A
Acenaphthene	mg/kg	45,000	0.073 U	N/A	**0.16**	**0.0022 J**	0.074 U	0.071 U	N/A	**0.33**	**0.026 J**	N/A
Acenaphthylene	mg/kg	45,000	**0.017 J**	N/A	**0.099**	**0.011**	**0.0072 J**	**0.011 J**	N/A	**0.11**	**0.061 J**	N/A
Acetophenone	mg/kg	120,000	0.071 U	N/A	0.072 U	0.07 UL3	0.074 UL3	0.07 U	N/A	0.073 U	0.074 U	N/A
Anthracene	mg/kg	230,000	**0.015 J**	N/A	**0.69**	**0.02**	**0.012 J**	**0.015 J**	N/A	**1.7**	**0.25**	N/A
Benzaldehyde	mg/kg	120,000	0.071 UL2	N/A	0.072 UL2	0.07 UL2	0.074 UL2	0.07 UL2	N/A	**0.033 JL2**	0.074 UL2	N/A
Benzo[a]anthracene	mg/kg	2.9	**0.07 J**	**3.4 H2**	**3.8**	**0.07**	**0.054 J**	**0.071**	**6.4 H2**	**3.9**	**1.5**	**2.8 H2**
Benzo[a]pyrene	mg/kg	0.29	**0.074**	**3 H2**	**3.7**	**0.069**	**0.044 J**	**0.063 J**	**5.2 H2**	**3.7**	**1.6 IS**	**2.2 H2**
Benzo[b]fluoranthene	mg/kg	2.9	**0.16 ip**	**4.3 H2**	**5**	**0.2 ip**	**0.12 ip**	**0.099**	**12.3 ipH2**	**5.1**	**3.3 ISip**	**4.5 ipH2**
Benzo[g,h,i]perylene	mg/kg		**0.051 J**	N/A	**1**	**0.025**	**0.017 J**	**0.042 J**	N/A	**1.6**	**0.6 IS**	N/A
Benzo[k]fluoranthene	mg/kg	29	**0.15 ip**	N/A	**2.1**	**0.14 ip**	**0.086 ip**	**0.038 J**	N/A	**1.8**	**3 ISip**	N/A
bis(2-Ethylhexyl)phthalate	mg/kg	160	**0.023 JIS**	N/A	0.072 UIS	**0.047 JIS**	0.074 UIS	**0.023 JIS**	N/A	**0.024 JIS**	**0.02 JIS**	N/A
Caprolactam	mg/kg	400,000	0.18 UL3	N/A	0.18 UL3	0.18 U	0.18 U	0.18 U	N/A	0.18 U	0.19 U	N/A
Carbazole	mg/kg		0.071 U	N/A	**0.2**	0.07 U	0.074 U	0.07 U	N/A	**0.075**	**0.054 J**	N/A
Chrysene	mg/kg	290	**0.071 J**	N/A	**3.7**	**0.088**	**0.047 J**	**0.06 J**	N/A	**3.5**	**1.6**	N/A
Dibenz[a,h]anthracene	mg/kg	0.29	0.073 U	**0.42 H2**	**0.53**	**0.011**	0.074 U	**0.014 J**	**0.59 H2**	**0.61**	**0.23 IS**	**0.3 H2**
Di-n-butylphthalate	mg/kg	82,000	0.071 U	N/A	0.072 U	0.07 U	0.074 U	0.07 U	N/A	0.073 U	0.074 U	N/A
Fluoranthene	mg/kg	30,000	**0.071 J**	N/A	**6.5**	**0.13**	**0.077**	**0.1**	N/A	**7.5**	**2.3**	N/A
Fluorene	mg/kg	30,000	**0.01 J**	N/A	**0.11**	**0.0025 J**	0.074 U	0.071 U	N/A	**0.4**	**0.017 J**	N/A
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.043 J**	N/A	**1.2**	**0.025**	**0.013 J**	**0.039 J**	N/A	**1.7**	**0.63 IS**	N/A
Isophorone	mg/kg	2,400	0.071 U	N/A	0.072 U	0.07 U	0.074 U	0.07 U	N/A	0.073 U	0.074 U	N/A
Naphthalene	mg/kg	17	**0.095 B**	N/A	**0.26 B**	**0.1**	0.074 U	**0.048 J**	N/A	**0.38**	**0.11**	N/A
Phenanthrene	mg/kg		**0.057 J**	N/A	**2.9**	**0.08**	**0.05 J**	**0.072**	N/A	**5**	**0.86**	N/A
Phenol	mg/kg	250,000	0.071 U	N/A	0.072 U	0.07 UL3	0.074 UL3	0.07 U	N/A	0.073 U	0.074 U	N/A
Pyrene	mg/kg	23,000	**0.064 J**	N/A	**5.5**	**0.096**	**0.069 J**	**0.086**	N/A	**5.9**	**2.2**	N/A
PCBs												
Aroclor 1248	mg/kg	0.94	0.0531 U	N/A	N/A	0.0521 U	N/A	0.0539 U	N/A	N/A	0.0545 U	N/A
Aroclor 1254	mg/kg	0.97	0.0531 U	N/A	N/A	0.0521 U	N/A	0.0539 U	N/A	N/A	0.0545 U	N/A
Aroclor 1260	mg/kg	0.99	0.0531 U	N/A	N/A	0.0521 U	N/A	0.0539 U	N/A	N/A	**0.0365 J**	N/A
Aroclor 1262	mg/kg		0.0531 U	N/A	N/A	0.0521 U	N/A	0.0539 U	N/A	N/A	0.0545 U	N/A
PCBs (total)	mg/kg	0.97	**0.1998**	N/A	N/A	**0.21128**	N/A	**0.31108**	N/A	N/A	**0.26479**	N/A
TPH/Oil & Grease												
Diesel Range Organics	mg/kg	620	**72 L2**	N/A	**83.3 L2**	**27 L2**	**64.2 L2**	**21.3 L2**	N/A	**52.7 L2**	**142 L2**	N/A
Oil and Grease	mg/kg		**2,200**	N/A	**575**	**398**	**787**	**545**	N/A	**725**	**1,020**	N/A

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports
*PAH compounds were analyzed via sim

Table 1
Summary of Organics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-004-SB-5	B15-005-SB-1	B15-005-SB-4	B15-006-SB-1	B15-006-SB-4	B15-007-SB-1	B15-007-SB-4	B15-008-SB-1	B15-008-SB-9	B15-009-SB-1
Volatile Organic Compounds												
2-Butanone (MEK)	mg/kg	190,000	N/A	0.009 U1c	0.0086 U1c	0.008 U1c	0.012 U1c	N/A	0.0084 UL3	N/A	0.017 U1c	N/A
Acetone	mg/kg	670,000	N/A	0.009 UL31c	0.0086 UL31c	**0.019 L11c**	0.012 UL31c	N/A	**0.0087 L1BM0R1**	N/A	**0.046 L11c**	N/A
Benzene	mg/kg	5.1	N/A	0.0045 U1c	0.0043 U1c	0.004 U1c	0.0062 U1c	N/A	0.0042 UM1R1	N/A	**0.0039 J1c**	N/A
Ethylbenzene	mg/kg	25	N/A	0.0045 U1c	0.0043 U1c	0.004 U1c	0.0062 U1c	N/A	0.0042 U	N/A	0.0087 U1c	N/A
Toluene	mg/kg	47,000	N/A	0.0045 U1c	0.0043 U1c	0.004 U1c	0.0062 U1c	N/A	0.0042 UR1	N/A	**0.0044 J1c**	N/A
Xylenes	mg/kg	2,800	N/A	0.014 U	0.013 U	0.012 U	0.019 U	N/A	0.013 U	N/A	0.026 U	N/A
Semi-Volatile Organic Compounds*												
1,1-Biphenyl	mg/kg	200	**0.049 J**	0.072 U	**0.017 J**	0.071 U	**2.3**	**0.022 JL1**	**0.25 L1**	**0.031 J**	**10.7**	0.07 U
1,2,4,5-Tetrachlorobenzene	mg/kg	350	0.075 U	0.072 U	0.069 U	0.071 U	0.072 U	**0.019 JL1**	0.076 UL3	0.075 U	1 U	0.07 U
2,4-Dimethylphenol	mg/kg	16,000	0.075 U	0.072 U	0.069 U	0.071 U	**0.033 J**	0.07 U	**0.016 J**	0.075 U	**0.93**	0.07 UM1
2-Methylnaphthalene	mg/kg	3,000	**0.095**	**0.025 J**	**0.067**	**0.028**	**5.8**	**0.12**	**0.36 M6R1**	**0.071 J**	**18.8**	**0.032 M1**
2-Methylphenol	mg/kg	41,000	0.075 U	0.072 U	0.069 U	0.071 U	**0.028 J**	0.07 U	**0.018 J**	0.075 U	**0.66**	0.07 U
2-Nitroaniline	mg/kg	8,000	0.19 U	0.18 U	0.17 U	0.18 U	0.18 U	0.18 UL3	0.19 UL3	0.19 U	2.6 U	0.18 UM1R1
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.15 U	0.14 U	**0.022 J**	0.14 U	**0.14 J**	0.14 UL3	**0.068 JL1**	0.15 U	**3**	0.14 U
Acenaphthene	mg/kg	45,000	**0.028**	**0.0058 J**	**0.0041 J**	**0.0097**	**20.1**	**0.022 J**	**1.8 M6R1**	**0.35**	**88.7**	**0.029**
Acenaphthylene	mg/kg	45,000	**0.054**	**0.033 J**	**0.0082**	**0.28**	**0.42**	**0.29**	**0.72 M6**	**0.053 J**	**0.95**	**0.15 M1**
Acetophenone	mg/kg	120,000	0.075 U	0.072 U	0.069 U	0.071 U	**0.019 J**	0.07 UL3	0.076 UL3	0.075 U	**0.11**	0.07 U
Anthracene	mg/kg	230,000	**0.28**	**0.036 J**	**0.021**	**0.43**	**58.6**	**0.29**	**11 M6R1**	**0.3**	**117**	**0.31 M1**
Benzaldehyde	mg/kg	120,000	**0.038 JL2**	0.072 UL2	0.069 UL2	0.071 UL2	**0.068 JL2**	0.07 UL2	**0.045 JL2M0**	**0.035 JL2**	**0.07 JL2**	0.07 UL2R1
Benzo[a]anthracene	mg/kg	2.9	**2.7**	**0.068 J**	**0.08**	**0.76**	**112**	**1.4**	**25.3 M6**	**1.4**	**136**	**0.75 M1R1**
Benzo[a]pyrene	mg/kg	0.29	**2.4**	**0.05 J**	**0.079**	**0.98**	**67.9**	**1.5**	**17.6 M6R1**	**2.3 IS**	**102**	**0.92 ISM1R1**
Benzo[b]fluoranthene	mg/kg	2.9	**6.1 ip**	**0.13 ip**	**0.2 ip**	**3.5 ip**	**124**	**4.5 ip**	**40.7 ipM6**	**3.4 IS**	**153**	**1.6 ipM6R1**
Benzo[g,h,i]perylene	mg/kg		**0.65**	**0.08 M6**	**0.052**	**0.44**	**12.1 IS**	**0.4**	**5.5 M6R1**	**0.73 IS**	**58.9**	**0.23 ISM1**
Benzo[k]fluoranthene	mg/kg	29	**5.5 ip**	**0.12 ipM6**	**0.18 ip**	**0.82**	**41.5**	**3.3 ip**	**29.7 ipM6**	**1.2 IS**	**73.9**	**1.5 ipM1R1**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.075 UIS	**0.055 JIS**	0.069 U	**0.026 JIS**	0.072 UIS	**0.055 JIS**	0.076 UISM6	**0.74 J**	1 UIS	0.07 UISM1
Caprolactam	mg/kg	400,000	0.19 U	0.18 UL3	0.17 UL3	0.18 U	0.18 U	0.18 U	0.19 U	0.19 U	0.26 U	0.18 U
Carbazole	mg/kg		**0.19**	0.072 U	0.069 U	**0.035 J**	**32.7**	**0.13**	**3.7 ISM6**	**0.19**	**120**	**0.08 M1**
Chrysene	mg/kg	290	**3.6**	**0.07 J**	**0.12**	**1**	**97.6**	**1.4**	**20.2 M6**	**1.4**	**111**	**0.78 M1R1**
Dibenz[a,h]anthracene	mg/kg	0.29	**0.33**	**0.021 JM6**	**0.02**	**0.18**	**7.4 IS**	**0.18**	**3.2 M6R1**	**0.28 IS**	**27.8**	**0.11 ISM1**
Di-n-butylphthalate	mg/kg	82,000	0.075 U	0.072 U	0.069 U	0.071 U	0.072 UIS	**0.043 J**	0.076 UM1	**0.18**	1 U	0.07 U
Fluoranthene	mg/kg	30,000	**4**	**0.12 M6**	**0.16**	**1**	**291**	**2**	**51.2 M6**	**1.9**	**319**	**1.1 M1M6R1**
Fluorene	mg/kg	30,000	**0.013**	**0.016 JM6**	**0.0043 J**	**0.02**	**20.2**	**0.025 J**	**2.7 M6R1**	**0.07 J**	**99.1**	**0.032**
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.81**	**0.062 JM6**	**0.051**	**0.48**	**30.5**	**0.46**	**6.6 M6R1**	**0.81 IS**	**65.1**	**0.27 ISM1**
Isophorone	mg/kg	2,400	0.075 U	0.072 U	0.069 U	0.071 U	0.072 U	0.07 U	0.076 U	0.075 U	0.1 U	0.07 U
Naphthalene	mg/kg	17	**0.29**	**0.066 JBM6**	**0.13 B**	**0.045**	**11.8**	**0.22**	**0.64 M6R1**	**0.12**	**70.1**	**0.041 M1**
Phenanthrene	mg/kg		**1.9**	**0.11 R1**	**0.093**	**0.13**	**243**	**0.67**	**41.1 M6**	**0.83**	**328**	**0.35 M1R1**
Phenol	mg/kg	250,000	0.075 U	0.072 U	**0.017 J**	0.071 U	**0.12**	0.07 UL3	**0.063 JL1M0R1**	0.075 U	**1.8**	0.07 U
Pyrene	mg/kg	23,000	**3.6**	**0.09 M6**	**0.15**	**1.2**	**215**	**1.8**	**35.1 M6**	**1.7**	**244**	**1.1 M1M6R1**
PCBs												
Aroclor 1248	mg/kg	0.94	N/A	0.0564 U	N/A	0.0524 U	N/A	0.0635 U	N/A	0.0556 U	N/A	0.0515 U
Aroclor 1254	mg/kg	0.97	N/A	0.0564 U	N/A	**0.148**	N/A	**0.924**	N/A	**0.641**	N/A	0.0515 U
Aroclor 1260	mg/kg	0.99	N/A	0.0564 U	N/A	**0.054**	N/A	**0.343**	N/A	**0.461**	N/A	0.0515 U
Aroclor 1262	mg/kg		N/A	0.0564 U	N/A	0.0524 U	N/A	0.0635 U	N/A	0.0556 U	N/A	0.0515 U
PCBs (total)	mg/kg	0.97	N/A	**0.29072**	N/A	**0.202**	N/A	**1.267**	N/A	**1.102**	N/A	**0.24415**
TPH/Oil & Grease												
Diesel Range Organics	mg/kg	620	**310 L2**	**31.8 L2**	**27.9 L2**	**33.2 L2**	**1,880 L2**	**55.8 L2**	**385 L2M0**	**86.5 L2**	**13,500 L2**	**38.6 L2**
Oil and Grease	mg/kg		**1,480**	**631**	**1,040**	**377**	**7,010**	**756**	**1,050**	**937**	**24,900**	**659**

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports
*PAH compounds were analyzed via sim

Table 1
Summary of Organics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-010-SB-1	B15-010-SB-5	B15-011-SB-1	B15-011-SB-4	B15-012-SB-1	B15-012-SB-4	B15-013-SB-1	B15-013-SB-10	B15-013-SB-4	B15-014-SB-1
Volatile Organic Compounds												
2-Butanone (MEK)	mg/kg	190,000	0.0087 U1c	0.014 U1c	N/A	N/A	N/A	0.011 U1c	N/A	N/A	0.014 UL3	**0.0061 J**
Acetone	mg/kg	670,000	0.0087 UL31c	0.014 UL31c	N/A	N/A	N/A	0.011 UL31c	N/A	N/A	0.014 UL3	**0.027 L1B**
Benzene	mg/kg	5.1	0.0043 U1c	**0.0023 J1c**	N/A	N/A	N/A	**0.0017 J1c**	N/A	N/A	0.0068 U	0.0061 U
Ethylbenzene	mg/kg	25	0.0043 U1c	0.007 U1c	N/A	N/A	N/A	0.0054 U1c	N/A	N/A	0.0068 U	0.0061 U
Toluene	mg/kg	47,000	0.0043 U1c	0.007 U1c	N/A	N/A	N/A	**0.002 J1c**	N/A	N/A	0.0068 U	0.0061 U
Xylenes	mg/kg	2,800	0.013 U	0.021 U	N/A	N/A	N/A	0.016 U	N/A	N/A	0.02 U	0.018 U
Semi-Volatile Organic Compounds*												
1,1-Biphenyl	mg/kg	200	**0.022 J**	**0.17**	0.078 U	**0.034 J**	0.078 U	0.072 U	0.075 UL3	N/A	0.08 UL3	**0.27**
1,2,4,5-Tetrachlorobenzene	mg/kg	350	0.072 U	0.074 U	0.078 U	0.075 U	0.078 U	0.072 U	0.075 UL3	N/A	0.08 UL3	0.072 U
2,4-Dimethylphenol	mg/kg	16,000	0.072 U	0.074 U	0.078 U	0.075 U	0.078 U	0.072 U	0.075 U	N/A	0.08 U	0.072 U
2-Methylnaphthalene	mg/kg	3,000	**0.061 J**	**1.3**	**0.023**	**0.073**	**0.013**	**0.0032 J**	**0.045**	N/A	**0.53**	**1 L2**
2-Methylphenol	mg/kg	41,000	0.072 U	0.074 U	0.078 U	0.075 U	0.078 U	0.072 U	0.075 U	N/A	0.08 U	0.072 U
2-Nitroaniline	mg/kg	8,000	**0.016 J**	0.19 U	0.19 U	0.19 U	0.2 U	0.18 U	0.19 UL3	N/A	0.2 UL3	0.18 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.14 U	**0.039 J**	0.15 U	0.15 U	0.16 U	0.14 U	0.15 UL3	N/A	0.16 UL3	0.14 U
Acenaphthene	mg/kg	45,000	**0.054 J**	**5.7**	**0.011**	**0.0086**	**0.0079**	**0.0016 J**	**0.0013 J**	N/A	**4**	**0.97**
Acenaphthylene	mg/kg	45,000	**0.15**	**0.094**	**0.019**	**0.023**	**0.016**	**0.0025 J**	**0.0087**	N/A	**0.18**	**0.082**
Acetophenone	mg/kg	120,000	0.072 U	0.074 U	0.078 U	**0.032 J**	0.078 U	0.072 U	0.075 UL3	N/A	0.08 UL3	0.072 U
Anthracene	mg/kg	230,000	**0.23**	**13**	**0.037**	**0.066**	**0.036**	**0.0069 J**	**0.01**	N/A	**12**	**0.86**
Benzaldehyde	mg/kg	120,000	**0.021 JL2**	**0.023 JL2**	0.078 UL2	**0.023 JL2**	0.078 UL2	0.072 UL2	0.075 UL2	N/A	0.08 UL2	**0.043 JL2**
Benzo[a]anthracene	mg/kg	2.9	**0.76**	**25.3**	**0.17**	**0.3**	**0.16**	**0.056**	**0.043**	**4 M1H2**	**28**	**0.74**
Benzo[a]pyrene	mg/kg	0.29	**0.91**	**19.7**	**0.18 IS**	**0.33 IS**	**0.11**	**0.034**	**0.042**	**6.3 M1H2**	**21.5**	**0.37 IS**
Benzo[b]fluoranthene	mg/kg	2.9	**1.7**	**26.4**	**0.38 ISip**	**1.1 ISip**	**0.26**	**0.1**	**0.13 ip**	**11.2 ipM1H2**	**32**	**1.2 ISip**
Benzo[g,h,i]perylene	mg/kg		**0.41**	**4.4**	**0.054 IS**	**0.12 IS**	**0.049**	**0.022**	**0.023**	N/A	**4**	**0.13 IS**
Benzo[k]fluoranthene	mg/kg	29	**0.63**	**7.5**	**0.35 ISip**	**1 ISip**	**0.089**	**0.035**	**0.097 ip**	N/A	**10.5**	**0.85 ISip**
bis(2-Ethylhexyl)phthalate	mg/kg	160	**0.4 IS**	**0.017 JIS**	0.078 U	**0.078 IS**	**0.029 J**	0.072 U	0.075 U	N/A	0.08 UIS	**0.2 IS**
Caprolactam	mg/kg	400,000	0.18 U	**0.021 J**	0.19 U	0.19 U	0.2 UL3	0.18 UL3	0.19 U	N/A	0.2 U	0.18 U
Carbazole	mg/kg		**0.26**	**2.7**	**0.039 J**	**0.035 J**	**0.036 J**	0.072 U	0.075 U	N/A	**0.27**	**0.075**
Chrysene	mg/kg	290	**0.85**	**22.7**	**0.17**	**0.51**	**0.23**	**0.092**	**0.038**	N/A	**23.5**	**0.68**
Dibenz[a,h]anthracene	mg/kg	0.29	**0.15**	**2.2**	**0.023 IS**	**0.05 IS**	**0.02**	**0.0085**	**0.0086**	**0.95 M1H2R1**	**2.4**	**0.051 JIS**
Di-n-butylphthalate	mg/kg	82,000	**0.084**	0.074 U	0.078 U	0.075 U	0.078 U	0.072 U	0.075 U	N/A	0.08 U	0.072 U
Fluoranthene	mg/kg	30,000	**1.2**	**60.1**	**0.29**	**0.46**	**0.19**	**0.071**	**0.052**	N/A	**55.4**	**2.1**
Fluorene	mg/kg	30,000	**0.036 J**	**5.6**	**0.0091**	**0.0097**	**0.005 J**	0.0072 U	**0.0014 J**	N/A	**3.5**	**0.79**
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.41**	**5.2**	**0.061 IS**	**0.14 IS**	**0.05**	**0.021**	**0.023**	**3.9 M1H2**	**5.2**	**0.14 IS**
Isophorone	mg/kg	2,400	0.072 U	0.074 U	0.078 U	0.075 U	0.078 U	0.072 U	0.075 U	N/A	0.08 U	0.072 U
Naphthalene	mg/kg	17	**0.081**	**3.1**	**0.064**	**0.45**	**0.019 B**	**0.0034 JB**	**0.039**	N/A	**0.69**	**1.9**
Phenanthrene	mg/kg		**0.42**	**54.4**	**0.13**	**0.22**	**0.048**	**0.026**	**0.03**	N/A	**38**	**2.4**
Phenol	mg/kg	250,000	0.072 U	**0.028 J**	0.078 U	0.075 U	0.078 U	0.072 U	0.075 UL3	N/A	0.08 UL3	0.072 U
Pyrene	mg/kg	23,000	**1.2**	**45.5**	**0.25**	**0.64**	**0.31**	**0.059**	**0.047**	N/A	**42.5**	**1.5**
PCBs												
Aroclor 1248	mg/kg	0.94	0.0606 U	N/A	0.0563 U	N/A	0.0551 U	N/A	0.0584 U	N/A	N/A	0.064 U
Aroclor 1254	mg/kg	0.97	**0.686**	N/A	0.0563 U	N/A	0.0551 U	N/A	0.0584 U	N/A	N/A	0.064 U
Aroclor 1260	mg/kg	0.99	**0.301**	N/A	0.0563 U	N/A	0.0551 U	N/A	0.0584 U	N/A	N/A	0.064 U
Aroclor 1262	mg/kg		0.0606 U	N/A	**0.0398 J**	N/A	0.0551 U	N/A	0.0584 U	N/A	N/A	0.064 U
PCBs (total)	mg/kg	0.97	**0.987**	N/A	**0.29776**	N/A	**0.31105**	N/A	**0.27924**	N/A	N/A	**0.2425**
TPH/Oil & Grease												
Diesel Range Organics	mg/kg	620	**56.6 L2**	**686 L2**	**21.5 L2**	**215 L2**	**35.8 L2**	**21.8 L2**	**56.6 L2**	N/A	**81.8 L2**	**204 L2**
Oil and Grease	mg/kg		**596**	**1,680**	**377**	**853**	**316**	**310**	**407**	N/A	**535**	**4,220**

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports
*PAH compounds were analyzed via sim

Table 1
Summary of Organics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-014-SB-10	B15-014-SB-8	B15-015-SB-1	B15-015-SB-4	B15-016-SB-1	B15-016-SB-10	B15-016-SB-5	B15-017-SB-1	B15-017-SB-8	B15-018-SB-1
Volatile Organic Compounds												
2-Butanone (MEK)	mg/kg	190,000	N/A	0.011 U	0.019 U	0.011 U	N/A	N/A	0.1 U	N/A	0.0094 UR1	N/A
Acetone	mg/kg	670,000	N/A	**0.012 L1B**	**0.011 JL1**	**0.0093 JL1B**	N/A	N/A	0.1 UL3	N/A	**0.0057 JL1BM0R1**	N/A
Benzene	mg/kg	5.1	N/A	0.0053 U	0.0095 U	**0.0024 J**	N/A	N/A	0.051 U	N/A	0.0047 UR1	N/A
Ethylbenzene	mg/kg	25	N/A	0.0053 U	**0.016**	0.0053 U	N/A	N/A	0.051 U	N/A	0.0047 UR1	N/A
Toluene	mg/kg	47,000	N/A	0.0053 U	0.0095 U	**0.0033 J**	N/A	N/A	0.051 U	N/A	0.0047 UR1	N/A
Xylenes	mg/kg	2,800	N/A	0.016 U	**0.1**	0.016 U	N/A	N/A	0.15 U	N/A	0.014 U	N/A
Semi-Volatile Organic Compounds*												
1,1-Biphenyl	mg/kg	200	N/A	**0.041 J**	**10.4**	**0.019 J**	**0.031 J**	N/A	**0.018 J**	0.075 U	**0.059 J**	**0.15 L1**
1,2,4,5-Tetrachlorobenzene	mg/kg	350	N/A	0.076 U	0.09 U	0.069 U	0.073 U	N/A	0.071 U	0.075 U	0.072 U	0.074 UL3
2,4-Dimethylphenol	mg/kg	16,000	N/A	0.076 U	0.09 U	0.069 U	0.073 U	N/A	0.071 U	0.075 U	0.072 U	0.074 U
2-Methylnaphthalene	mg/kg	3,000	N/A	**0.079 L2**	**33.2 L2**	**0.028 L2**	**0.077 L2**	N/A	**0.039 L2**	**0.025 JL2**	**0.069 JL2M6**	**0.39**
2-Methylphenol	mg/kg	41,000	N/A	0.076 U	0.09 U	0.069 U	0.073 U	N/A	0.071 U	0.075 U	0.072 U	0.074 U
2-Nitroaniline	mg/kg	8,000	N/A	0.19 U	0.23 U	0.17 U	0.18 U	N/A	0.18 U	0.19 U	0.18 U	0.18 UL3
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	N/A	0.15 U	**0.032 J**	0.14 U	0.15 U	N/A	0.14 U	0.15 U	**0.022 J**	**0.022 JL1**
Acenaphthene	mg/kg	45,000	N/A	**0.061 J**	**37.1**	**0.06**	**0.043**	N/A	**0.082**	0.076 U	**0.15 M6R1**	**0.022 J**
Acenaphthylene	mg/kg	45,000	N/A	**0.053 J**	**4.6**	**0.029**	**0.05**	N/A	**0.29**	**0.0067 J**	**0.018 J**	**0.28**
Acetophenone	mg/kg	120,000	N/A	0.076 U	0.09 U	0.069 U	0.073 U	N/A	0.071 U	0.075 U	0.072 U	**0.06 JL1**
Anthracene	mg/kg	230,000	N/A	**0.39**	**58.4**	**0.39**	**0.33**	N/A	**0.69**	**0.021 J**	**1.3 M6**	**0.25**
Benzaldehyde	mg/kg	120,000	N/A	**0.063 JL2**	0.09 UL2	0.069 UL2	0.073 UL2	N/A	0.071 UL2	0.075 UL2	**0.02 JL2M0**	**0.14 L2**
Benzo[a]anthracene	mg/kg	2.9	N/A	**1.2**	**53.5**	**1.7**	**3.1**	**1.4 H2**	**3.6**	**0.11**	**6.6 M6R1**	**1.3**
Benzo[a]pyrene	mg/kg	0.29	**1.3 H2**	**1.1**	**26.9**	**1.3**	**2.9**	**1.4 H2**	**3.4**	**0.11 IS**	**5.9 ISM6R1**	**1.3 IS**
Benzo[b]fluoranthene	mg/kg	2.9	N/A	**2.1**	**63.4 ip**	**2.1**	**5.2**	**2.4 H2**	**4.8**	**0.36 ISip**	**11.1 ISM6R1**	**3.3 ISip**
Benzo[g,h,i]perylene	mg/kg		N/A	**0.47**	**15.3**	**0.52**	**2.4**	N/A	**2**	**0.029 JIS**	**1.4 ISM6**	**0.28 IS**
Benzo[k]fluoranthene	mg/kg	29	N/A	**0.81**	**56 ip**	**0.7**	**1.8**	N/A	**1.8**	**0.26 ISip**	**3.8 ISM6R1**	**2.4 ISip**
bis(2-Ethylhexyl)phthalate	mg/kg	160	N/A	0.076 UIS	0.09 UIS	**0.029 JIS**	**0.039 JIS**	N/A	**0.036 JIS**	**0.65 IS**	**0.029 JISM1R1**	**0.096 IS**
Caprolactam	mg/kg	400,000	N/A	0.19 U	0.23 U	0.17 U	0.18 U	N/A	0.18 U	0.19 U	0.18 U	0.18 U
Carbazole	mg/kg		N/A	**0.16**	**7.4**	**0.44**	**0.13**	N/A	**0.29**	0.075 U	**0.6 M1**	**0.091**
Chrysene	mg/kg	290	N/A	**1.4**	**63**	**1.8**	**3.4**	N/A	**3.7**	**0.16**	**5.9 M6R1**	**1.1**
Dibenz[a,h]anthracene	mg/kg	0.29	N/A	**0.2**	**6.8**	**0.25**	**0.94**	**0.25 H2**	**0.82**	0.076 UIS	**0.63 ISM6**	**0.13 IS**
Di-n-butylphthalate	mg/kg	82,000	N/A	0.076 U	0.09 UIS	0.069 U	0.073 U	N/A	0.071 U	0.075 UIS	0.072 U	0.074 U
Fluoranthene	mg/kg	30,000	N/A	**1.9**	**176**	**3**	**4**	N/A	**6.3**	**0.16**	**8.8 M6R1**	**2**
Fluorene	mg/kg	30,000	N/A	**0.034 J**	**37.7**	**0.051**	**0.033**	N/A	**0.061**	0.076 U	**0.13 M6**	**0.031 J**
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	N/A	**0.49**	**15.1**	**0.58**	**2.5**	N/A	**2.1**	**0.025 JIS**	**1.6 ISM6**	**0.33 IS**
Isophorone	mg/kg	2,400	N/A	0.076 U	0.09 U	0.069 U	0.073 U	N/A	0.071 U	**0.032 J**	0.072 U	0.074 U
Naphthalene	mg/kg	17	N/A	**0.26**	**71.7**	**0.07**	**0.18**	N/A	**0.089**	0.076 U	**0.11 M6R1**	**0.96**
Phenanthrene	mg/kg		N/A	**1.1**	**186**	**1.7**	**1.2**	N/A	**2.6**	**0.1**	**3.5 M6R1**	**0.73**
Phenol	mg/kg	250,000	N/A	0.076 U	0.09 U	0.069 U	0.073 U	N/A	0.071 U	0.075 U	**0.022 J**	0.074 UL3
Pyrene	mg/kg	23,000	N/A	**2.3**	**128**	**2.4**	**3.7**	N/A	**5**	**0.16**	**6.9 M6R1**	**1.6**
PCBs												
Aroclor 1248	mg/kg	0.94	N/A	N/A	0.0562 U	N/A	0.0529 U	N/A	N/A	0.0569 U	N/A	0.055 U
Aroclor 1254	mg/kg	0.97	N/A	N/A	0.0562 U	N/A	0.0529 U	N/A	N/A	0.0569 U	N/A	0.055 U
Aroclor 1260	mg/kg	0.99	N/A	N/A	0.0562 U	N/A	0.0529 U	N/A	N/A	0.0569 U	N/A	0.055 U
Aroclor 1262	mg/kg		N/A	N/A	0.0562 U	N/A	0.0529 U	N/A	N/A	0.0569 U	N/A	0.055 U
PCBs (total)	mg/kg	0.97	N/A	N/A	**0.33707**	N/A	**0.22888**	N/A	N/A	**0.2292**	N/A	**0.29603**
TPH/Oil & Grease												
Diesel Range Organics	mg/kg	620	N/A	**265 L2**	**2,530 L2**	**39.8 L2**	**138 L2**	N/A	**75.1 L2**	**696 L2**	**240 L2M0**	**110 L2**
Oil and Grease	mg/kg		N/A	**1,730**	**5,130**	**290**	**702**	N/A	**527**	**6,310**	**874**	**3,250**

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports
*PAH compounds were analyzed via sim

Table 1
Summary of Organics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-018-SB-6	B15-019-SB-1	B15-020-SB-1	B15-020-SB-10	B15-020-SB-7	B15-021-SB-1	B15-021-SB-4
Volatile Organic Compounds									
2-Butanone (MEK)	mg/kg	190,000	**0.0081 JL1**	0.01 UL3	N/A	N/A	**0.0082 J**	N/A	N/A
Acetone	mg/kg	670,000	**0.044 L1B**	**0.012 L1B**	N/A	N/A	**0.034 L1B**	N/A	N/A
Benzene	mg/kg	5.1	0.0045 U	0.0051 U	N/A	N/A	0.0044 U	N/A	N/A
Ethylbenzene	mg/kg	25	0.0045 U	0.0051 U	N/A	N/A	0.0044 U	N/A	N/A
Toluene	mg/kg	47,000	0.0045 U	0.0051 U	N/A	N/A	0.0044 U	N/A	N/A
Xylenes	mg/kg	2,800	0.014 U	**0.0032 J**	N/A	N/A	0.013 U	N/A	N/A
Semi-Volatile Organic Compounds*									
1,1-Biphenyl	mg/kg	200	**0.042 JL1**	0.069 UL3	0.072 U	N/A	**0.9**	0.071 U	0.073 U
1,2,4,5-Tetrachlorobenzene	mg/kg	350	0.076 UL3	0.069 UL3	0.072 U	N/A	0.076 U	0.071 U	0.073 U
2,4-Dimethylphenol	mg/kg	16,000	0.076 U	0.069 U	0.072 U	N/A	**0.032 J**	0.071 U	0.073 U
2-Methylnaphthalene	mg/kg	3,000	**0.12**	0.071 U	**0.021 L2**	N/A	**2 L2**	**0.0048 JL2**	**0.029 JL2**
2-Methylphenol	mg/kg	41,000	0.076 U	0.069 U	0.072 U	N/A	**0.016 J**	0.071 U	0.073 U
2-Nitroaniline	mg/kg	8,000	0.19 UL3	0.17 UL3	0.18 U	N/A	0.19 U	0.18 U	0.18 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.15 UL3	0.14 UL3	0.14 U	N/A	**0.06 J**	0.14 U	0.15 U
Acenaphthene	mg/kg	45,000	**0.024 J**	0.071 U	**0.012**	N/A	**1.8**	**0.0055 J**	**0.0066 J**
Acenaphthylene	mg/kg	45,000	**0.092**	**0.012 J**	**0.0062 J**	N/A	**0.64**	**0.0054 J**	0.074 U
Acetophenone	mg/kg	120,000	0.076 UL3	0.069 UL3	0.072 U	N/A	0.076 U	0.071 U	0.073 U
Anthracene	mg/kg	230,000	**0.14**	**0.012 J**	**0.016**	N/A	**1.5**	**0.0072**	**0.012 J**
Benzaldehyde	mg/kg	120,000	0.076 UL2	0.069 UL2	0.072 UL2	N/A	**0.055 JL2**	0.071 UL2	0.073 UL2
Benzo[a]anthracene	mg/kg	2.9	**0.44**	**0.065 J**	**0.089**	**0.24 H2**	**3.1**	**0.054**	**0.015 J**
Benzo[a]pyrene	mg/kg	0.29	**0.42 IS**	**0.063 J**	**0.14**	**0.17 H2**	**3.1**	**0.068**	**0.019 JIS**
Benzo[b]fluoranthene	mg/kg	2.9	**1.1 ISip**	**0.18 ip**	**0.34 ip**	**0.28 H2**	**6.9 ip**	**0.17 ip**	**0.087 ISip**
Benzo[g,h,i]perylene	mg/kg		**0.11 IS**	**0.03 J**	**0.073**	N/A	**1.1**	**0.051**	0.074 UIS
Benzo[k]fluoranthene	mg/kg	29	**0.82 ISip**	**0.13 ip**	**0.25 ip**	N/A	**5 ip**	**0.13 ip**	**0.063 JISip**
bis(2-Ethylhexyl)phthalate	mg/kg	160	**0.025 JIS**	0.069 UIS	**0.021 J**	N/A	0.076 UIS	**0.069 J**	**0.38 IS**
Caprolactam	mg/kg	400,000	0.19 U	0.17 U	0.18 U	N/A	0.19 U	0.18 U	0.18 U
Carbazole	mg/kg		**0.069 J**	0.069 U	0.072 U	N/A	**2.7**	0.071 U	0.073 U
Chrysene	mg/kg	290	**0.38**	**0.05 J**	**0.11**	N/A	**3.3**	**0.052**	**0.057 J**
Dibenz[a,h]anthracene	mg/kg	0.29	**0.042 JIS**	**0.012 J**	**0.025**	**0.03 H2**	**0.43**	**0.016**	0.074 UIS
Di-n-butylphthalate	mg/kg	82,000	0.076 U	0.069 U	0.072 U	N/A	0.076 U	0.071 U	0.073 U
Fluoranthene	mg/kg	30,000	**0.73**	**0.096**	**0.17**	N/A	**5.8**	**0.058**	**0.035 J**
Fluorene	mg/kg	30,000	**0.054 J**	0.071 U	**0.004 J**	N/A	**2.4**	**0.003 J**	0.074 U
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.1 IS**	**0.031 J**	**0.07**	N/A	**1.1**	**0.039**	0.074 UIS
Isophorone	mg/kg	2,400	0.076 U	0.069 U	0.072 U	N/A	0.076 U	0.071 U	0.073 U
Naphthalene	mg/kg	17	**1.4**	0.071 U	**0.03**	N/A	**4.7**	**0.0086**	**0.032 J**
Phenanthrene	mg/kg		**0.41**	**0.06 J**	**0.08**	N/A	**6.2**	**0.026**	**0.038 JB**
Phenol	mg/kg	250,000	0.076 UL3	0.069 UL3	0.072 U	N/A	**0.033 J**	0.071 U	0.073 U
Pyrene	mg/kg	23,000	**0.69**	**0.067 J**	**0.12**	N/A	**5.7**	**0.05**	**0.028 J**
PCBs									
Aroclor 1248	mg/kg	0.94	N/A	0.0523 U	**0.0516 J**	N/A	N/A	0.0533 U	N/A
Aroclor 1254	mg/kg	0.97	N/A	0.0523 U	0.0532 U	N/A	N/A	0.0533 U	N/A
Aroclor 1260	mg/kg	0.99	N/A	0.0523 U	0.0532 U	N/A	N/A	0.0533 U	N/A
Aroclor 1262	mg/kg		N/A	0.0523 U	0.0532 U	N/A	N/A	0.0533 U	N/A
PCBs (total)	mg/kg	0.97	N/A	**0.2706**	**0.21523**	N/A	N/A	**0.26531**	N/A
TPH/Oil & Grease									
Diesel Range Organics	mg/kg	620	**219 L2**	**23.9 L2**	**44.6 L2**	**558 H2**	**3,070 L2**	**11.4 L2**	**216 L2**
Oil and Grease	mg/kg		**3,950**	**185 B**	**387**	N/A	**4,220**	**251**	**10,300**

Detections in bold
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*PAH compounds were analyzed via sim

Table 2
Summary of Inorganics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-001-SB-1	B15-001-SB-10	B15-001-SB-9	B15-002-SB-1	B15-002-SB-8	B15-003-SB-1	B15-003-SB-10
Metals									
Aluminum	mg/kg	1,100,000	**16,900**	N/A	**14,800**	**8,340**	**6,360**	**21,000**	N/A
Antimony	mg/kg	470	2.7 U	N/A	2.6 U	2.7 U	2.8 U	2.5 U	N/A
Arsenic	mg/kg	3	2.3 U	**8.2**	**15.9**	**3**	**8**	**5.1**	**17.5**
Barium	mg/kg	220,000	**176**	N/A	**184**	**159**	**64.1**	**298**	N/A
Beryllium	mg/kg	2,300	**0.62 J**	N/A	**1.3**	0.9 U	**0.21 J**	**2.1**	N/A
Cadmium	mg/kg	980	**1.7 B**	N/A	**11**	**5.7**	**2.6 B**	**1.9 B**	N/A
Chromium	mg/kg	120,000	**1,600**	N/A	**916**	**1,220**	**163**	**437**	N/A
Chromium VI	mg/kg	6.3	**0.39 JB**	N/A	**0.3 JB**	**0.6 JB**	**0.35 JB**	**0.39 JB**	N/A
Cobalt	mg/kg	350	**14**	N/A	**15.6**	**14.1**	**11.7**	**36.4**	N/A
Copper	mg/kg	47,000	**101**	N/A	**258**	**101**	**213**	**62.1**	N/A
Iron	mg/kg	820,000	**154,000**	N/A	**231,000**	**124,000**	**82,900**	**76,500**	N/A
Lead	mg/kg	800	**75.2**	N/A	**444**	**102**	**359**	**83.5**	N/A
Manganese	mg/kg	26,000	**39,400**	N/A	**14,400**	**57,200**	**2,920**	**32,000**	N/A
Mercury	mg/kg	350	**4.9**	N/A	**0.088 J**	**0.053 J**	**0.015 JB**	0.1 U	N/A
Nickel	mg/kg	22,000	**19.8**	N/A	**96.6**	**23.1**	**57.4**	**13.4**	N/A
Selenium	mg/kg	5,800	3.6 U	N/A	3.4 U	3.6 U	3.7 U	3.3 U	N/A
Silver	mg/kg	5,800	2.7 U	N/A	2.6 U	**4.5**	**1.2 J**	2.5 U	N/A
Thallium	mg/kg	12	9 U	N/A	8.6 U	**51.8**	9.3 U	8.3 U	N/A
Vanadium	mg/kg	5,800	**1,670**	N/A	**422**	**3,450**	**226**	**1,760**	N/A
Zinc	mg/kg	350,000	**758**	N/A	**771**	**650**	**844**	**557**	N/A
Other									
Cyanide	mg/kg	150	**3.4**	N/A	**1**	**0.74**	**1.2**	**0.83**	N/A

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Table 2
Summary of Inorganics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-003-SB-4	B15-004-SB-1	B15-004-SB-10	B15-004-SB-5	B15-005-SB-1	B15-005-SB-10	B15-005-SB-4
Metals									
Aluminum	mg/kg	1,100,000	**5,500**	**16,700**	N/A	**11,800**	**13,800**	N/A	**14,900**
Antimony	mg/kg	470	2.6 U	2.6 U	N/A	2.7 U	2.8 U	N/A	2.5 U
Arsenic	mg/kg	3	**10.8**	**10.5**	**3.4**	**14.1**	**2.6**	N/A	2.1 U
Barium	mg/kg	220,000	**91**	**331**	N/A	**135**	**168**	N/A	**126**
Beryllium	mg/kg	2,300	0.86 U	**1.4**	N/A	**0.9 J**	**1**	N/A	**0.32 J**
Cadmium	mg/kg	980	**0.75 JB**	**15.7**	N/A	**7.9**	**2 B**	N/A	**1.3 B**
Chromium	mg/kg	120,000	**550**	**503**	N/A	**1,110**	**913**	N/A	**1,850**
Chromium VI	mg/kg	6.3	**0.31 JB**	**0.31 JB**	N/A	**0.31 JB**	**0.51 JB**	N/A	**0.38 JB**
Cobalt	mg/kg	350	**13.9**	**12.4**	N/A	**7.6**	**8.4**	N/A	**4.7**
Copper	mg/kg	47,000	**278**	**178**	N/A	**76.3**	**146**	N/A	**56**
Iron	mg/kg	820,000	**103,000**	**116,000**	N/A	**172,000**	**162,000**	N/A	**144,000**
Lead	mg/kg	800	**111**	**1,890**	**315**	**1,130**	**112**	N/A	**45.6**
Manganese	mg/kg	26,000	**12,900**	**12,200**	**26,000**	**27,900**	**19,200**	**36,200 M6R1**	**50,400**
Mercury	mg/kg	350	**0.065 J**	**0.05 J**	N/A	**0.027 J**	**0.025 J**	N/A	**0.014 J**
Nickel	mg/kg	22,000	**89.3**	**61.9**	N/A	**28.3**	**34.9**	N/A	**16.2**
Selenium	mg/kg	5,800	3.4 U	3.5 U	N/A	3.6 U	3.7 U	N/A	3.4 U
Silver	mg/kg	5,800	2.6 U	2.6 U	N/A	2.7 U	2.8 U	N/A	2.5 U
Thallium	mg/kg	12	8.6 U	8.7 U	N/A	9 U	9.2 U	N/A	8.5 U
Vanadium	mg/kg	5,800	**2,770**	**223**	N/A	**391**	**911**	N/A	**1,880**
Zinc	mg/kg	350,000	**153**	**2,910**	N/A	**3,380**	**924**	N/A	**155**
Other									
Cyanide	mg/kg	150	**1.2**	**2.7**	N/A	**3.3**	**0.28 JB**	N/A	**0.88**

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Table 2
Summary of Inorganics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-006-SB-1	B15-006-SB-4	B15-007-SB-1	B15-007-SB-4	B15-008-SB-1	B15-008-SB-9	B15-009-SB-1
Metals									
Aluminum	mg/kg	1,100,000	**17,900**	**9,490**	**7,340**	**7,150 M1R1**	**13,600**	**13,800**	**2,460 M1R1**
Antimony	mg/kg	470	2.5 U	2.7 U	2.6 U	2.7 U	2.8 U	**5.1**	**2.8 M1R1**
Arsenic	mg/kg	3	**8.3**	**8.9**	**8.8**	**8.5**	**20.1**	**58.1**	**16**
Barium	mg/kg	220,000	**194**	**1,210**	**112**	**147 M1R1**	**407**	**106**	**125 M1R1**
Beryllium	mg/kg	2,300	**2.9**	**0.8 J**	0.88 U	0.89 U	**1.6**	**1.6**	**0.22 J**
Cadmium	mg/kg	980	**1.4 B**	**40.7**	**5.9**	**4.3**	**12.8**	**23.9**	**4.7**
Chromium	mg/kg	120,000	**129**	**638**	**1,480**	**1,670 M1R1**	**293**	**73.3**	**301 M1R1**
Chromium VI	mg/kg	6.3	**0.46 JB**	**0.62 JB**	**0.95 JB**	**0.86 JBM1**	**0.31 JB**	**0.68 JB**	**0.29 JBM1**
Cobalt	mg/kg	350	**7.4**	**16**	**10.7**	**26.8 M1**	**15**	**18**	**17.1**
Copper	mg/kg	47,000	**101**	**1,100**	**253**	**1,820 M6**	**162**	**141**	**164**
Iron	mg/kg	820,000	**172,000**	**160,000**	**117,000**	**270,000 M6**	**141,000**	**253,000**	**353,000 M6R1**
Lead	mg/kg	800	**86.1**	**483**	**379**	**407 M1**	**584**	**5,910**	**360 M1R1**
Manganese	mg/kg	26,000	**4,700**	**16,200**	**35,000**	**23,300 M6R1**	**4,830**	**3,670**	**6,050 M6R1**
Mercury	mg/kg	350	0.1 U	**0.14**	**0.16**	**1.2 D6M1**	**0.39**	**0.29**	**0.13 D6M1R1**
Nickel	mg/kg	22,000	**77.4**	**61.1**	**49.3**	**64.7 M1**	**101**	**36.5**	**107 M1R1**
Selenium	mg/kg	5,800	3.4 U	3.6 U	3.5 U	3.6 U	3.7 U	**4.3 JB**	**2 JB**
Silver	mg/kg	5,800	2.5 U	2.7 U	**11.1**	**4.8**	2.8 U	**18.5**	**1.7 J**
Thallium	mg/kg	12	8.4 U	9 U	**159**	**53.7 M1**	9.3 U	10.2 U	8.3 UM1
Vanadium	mg/kg	5,800	**54.2**	**296**	**10,500**	**4,240 M1**	**316**	**72.6**	**627 M1R1**
Zinc	mg/kg	350,000	**272**	**12,700**	**1,300**	**3,460 M6**	**3,390**	**13,400**	**589 M1R1**
Other									
Cyanide	mg/kg	150	**4**	**2.6**	**0.65**	**2.5 M1R1**	**2**	**11.2**	**0.23 JB**

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Table 2
Summary of Inorganics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-010-SB-1	B15-010-SB-5	B15-011-SB-1	B15-011-SB-4	B15-012-SB-1	B15-012-SB-4	B15-013-SB-1
Metals									
Aluminum	mg/kg	1,100,000	**13,700**	**14,500**	**15,000**	**12,700**	**21,000**	**5,370**	**29,300**
Antimony	mg/kg	470	**4.3**	2.7 U	2.8 U	2.7 U	2.7 U	2.5 U	2.8 U
Arsenic	mg/kg	3	**19.9**	**5.5**	**11.2**	**7.5**	**4.1**	**5.4**	**5.9**
Barium	mg/kg	220,000	**224**	**295**	**212**	**198**	**262**	**48**	**446**
Beryllium	mg/kg	2,300	**1.4**	**1.7**	**1.7**	**0.45 J**	**3.2**	0.84 U	**2.1**
Cadmium	mg/kg	980	**6.6**	**6.5**	**3.4**	**8.6**	**2.5**	**1.7 B**	**3.5**
Chromium	mg/kg	120,000	**371**	**287**	**121**	**699**	**230**	**275**	**644**
Chromium VI	mg/kg	6.3	**0.26 JB**	**0.36 JB**	**0.32 JB**	**0.53 JB**	**0.42 JB**	**0.3 JB**	**0.48 JB**
Cobalt	mg/kg	350	**18.1**	**13.2**	**6.8**	**14**	**3.7 J**	**4.4**	**19.1**
Copper	mg/kg	47,000	**316**	**210**	**67.8**	**145**	**60**	**60.6**	**48.4**
Iron	mg/kg	820,000	**188,000**	**93,400**	**89,600**	**162,000**	**45,300**	**66,100**	**82,200**
Lead	mg/kg	800	**538**	**354**	**230**	**586**	**199**	**103**	**180**
Manganese	mg/kg	26,000	**8,420**	**7,180**	**5,250**	**20,000**	**9,000**	**5,500**	**32,900**
Mercury	mg/kg	350	**0.39**	**0.3**	0.11 U	**0.052 J**	0.11 U	**0.079 J**	**0.041 J**
Nickel	mg/kg	22,000	**92.9**	**47.5**	**21.8**	**55.1**	**14.8**	**28.7**	**121**
Selenium	mg/kg	5,800	3.6 U	3.6 U	3.8 U	3.6 U	3.6 U	3.4 U	3.7 U
Silver	mg/kg	5,800	2.7 U	2.7 U	2.8 U	2.7 U	2.7 U	2.5 U	**1.6 J**
Thallium	mg/kg	12	9 U	9 U	9.4 U	9.1 U	9.1 U	8.4 U	**24**
Vanadium	mg/kg	5,800	**291**	**176**	**209**	**1,430**	**710**	**590**	**2,120**
Zinc	mg/kg	350,000	**1,560**	**2,430**	**769**	**4,640**	**1,240**	**962**	**453**
Other									
Cyanide	mg/kg	150	**2.3**	**0.65**	**2.2**	**2.9**	**8.6**	**3.3**	**2.5**

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Table 2
Summary of Inorganics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-013-SB-10	B15-013-SB-4	B15-014-SB-1	B15-014-SB-10	B15-014-SB-8	B15-015-SB-1	B15-015-SB-4
Metals									
Aluminum	mg/kg	1,100,000	N/A	**14,300**	**16,400**	N/A	**9,390**	**18,700**	**8,510**
Antimony	mg/kg	470	N/A	3.1 U	2.7 U	N/A	2.8 U	3.2 U	2.5 U
Arsenic	mg/kg	3	**9.1**	**14.1**	**3.7**	**7**	**8**	**10.7**	**11.4**
Barium	mg/kg	220,000	N/A	**176**	**144**	N/A	**121**	**596**	**147**
Beryllium	mg/kg	2,300	N/A	**1.1**	**0.69 J**	N/A	**0.65 J**	**1.5**	**0.62 J**
Cadmium	mg/kg	980	N/A	**11.8**	**1.8 B**	N/A	**6.1**	**49.4**	**15.7**
Chromium	mg/kg	120,000	N/A	**906**	**919**	N/A	**1,100**	**2,310**	**1,610**
Chromium VI	mg/kg	6.3	N/A	**0.53 JB**	**0.3 JB**	N/A	**0.37 JB**	**0.44 JB**	**0.6 JB**
Cobalt	mg/kg	350	N/A	**12.1**	**4.3 J**	N/A	**7.5**	**9.2**	**8.1**
Copper	mg/kg	47,000	N/A	**188**	**46.1**	N/A	**167**	**175**	**124**
Iron	mg/kg	820,000	N/A	**140,000**	**150,000**	N/A	**111,000**	**152,000**	**101,000**
Lead	mg/kg	800	N/A	**531**	**58.5**	N/A	**573**	**1,950**	**516**
Manganese	mg/kg	26,000	N/A	**14,900**	**22,200**	N/A	**20,800**	**46,500**	**33,200**
Mercury	mg/kg	350	N/A	**0.06 J**	**0.056 J**	N/A	**0.036 J**	**0.08 J**	**0.056 J**
Nickel	mg/kg	22,000	N/A	**74.5**	**22.7**	N/A	**39.4**	**71.4**	**58.3**
Selenium	mg/kg	5,800	N/A	4.1 U	3.6 U	N/A	3.7 U	4.2 U	3.4 U
Silver	mg/kg	5,800	N/A	**3.1**	**2.2 J**	N/A	**3.6**	**7.5**	**5.7**
Thallium	mg/kg	12	N/A	10.2 U	**10.6**	N/A	**4.2 J**	**8.4 J**	**6 J**
Vanadium	mg/kg	5,800	N/A	**335**	**725**	N/A	**382**	**798**	**565**
Zinc	mg/kg	350,000	N/A	**956**	**501**	N/A	**1,030**	**3,500**	**1,270**
Other									
Cyanide	mg/kg	150	N/A	**1.1**	**1.1**	N/A	**2.7**	**2.6**	**0.78**

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports

Table 2
Summary of Inorganics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-016-SB-1	B15-016-SB-10	B15-016-SB-5	B15-017-SB-1	B15-017-SB-8	B15-018-SB-1	B15-018-SB-6
Metals									
Aluminum	mg/kg	1,100,000	**20,000**	N/A	**10,900**	**25,000**	**10,500 M1R1**	**10,800**	**7,390**
Antimony	mg/kg	470	2.7 U	N/A	2.6 U	2.7 U	2.7 UM1R1	2.8 U	2.7 U
Arsenic	mg/kg	3	**11.2**	**17.8**	**8.7**	**6**	**11.4**	**54.1**	**33.8**
Barium	mg/kg	220,000	**372**	N/A	**238**	**613**	**405 M1**	**175**	**87.9**
Beryllium	mg/kg	2,300	**1.8**	N/A	**0.44 J**	**3**	**0.98**	**0.86 J**	**0.39 J**
Cadmium	mg/kg	980	**12.7**	N/A	**14.7**	**5.8**	**5.7**	**17.2**	**12.8**
Chromium	mg/kg	120,000	**946**	N/A	**1,950**	**421**	**1,520 M1**	**353**	**206**
Chromium VI	mg/kg	6.3	**0.35 JB**	N/A	**0.47 JB**	**0.36 JB**	**0.26 JBM1**	**0.48 JB**	**0.37 JB**
Cobalt	mg/kg	350	**11.4**	N/A	**7**	**6.2**	**10.7**	**199**	**39**
Copper	mg/kg	47,000	**137**	N/A	**150**	**138**	**166 M1R1**	**610**	**362**
Iron	mg/kg	820,000	**125,000**	N/A	**129,000**	**125,000**	**172,000 M6R1**	**111,000**	**245,000**
Lead	mg/kg	800	**679**	N/A	**704**	**119**	**1,560 M1R1**	**657**	**975**
Manganese	mg/kg	26,000	**20,700**	**39,900**	**38,800**	**14,600**	**24,900 M6**	**11,200**	**4,040**
Mercury	mg/kg	350	**0.094 J**	N/A	**0.058 J**	**0.019 JB**	**0.029 JM1**	**0.29**	**0.21**
Nickel	mg/kg	22,000	**72.4**	N/A	**54**	**39**	**67.1 M1**	**57.9**	**178**
Selenium	mg/kg	5,800	3.6 U	N/A	3.5 U	3.6 U	3.6 U	3.7 U	3.6 U
Silver	mg/kg	5,800	**3.7**	N/A	**6.1**	**1.7 J**	**4.5**	**4.6**	**5.3**
Thallium	mg/kg	12	**9.5**	**12.1**	**17.4**	8.9 U	**5.2 J**	**9.8**	9 U
Vanadium	mg/kg	5,800	**794**	N/A	**1,380**	**302**	**461 M1**	**834**	**260**
Zinc	mg/kg	350,000	**1,420**	N/A	**1,390**	**747**	**1,050 M1R1**	**6,310**	**11,500**
Other									
Cyanide	mg/kg	150	**1.7**	N/A	**1.8**	**0.5 J**	**2.8 M1**	**1.1**	**1.2**

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports

Table 2
Summary of Inorganics Detected in Soil
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-019-SB-1	B15-020-SB-1	B15-020-SB-10	B15-020-SB-7	B15-021-SB-1	B15-021-SB-10	B15-021-SB-4
Metals									
Aluminum	mg/kg	1,100,000	**12,100**	**5,240**	N/A	**12,200**	**7,430**	N/A	**16,000**
Antimony	mg/kg	470	2.6 U	2.6 U	N/A	2.8 U	2.6 U	N/A	2.8 U
Arsenic	mg/kg	3	2.2 U	**6.7**	**5.9**	**10.5**	**6.6**	**13.6**	**5.6**
Barium	mg/kg	220,000	**115**	**98.5**	N/A	**226**	**91.4**	N/A	**199**
Beryllium	mg/kg	2,300	0.87 U	0.87 U	N/A	**0.76 J**	**0.51 J**	N/A	**1.3**
Cadmium	mg/kg	980	**0.95 JB**	**1.3 JB**	N/A	**10.4**	**2.1**	N/A	**1.7 B**
Chromium	mg/kg	120,000	**1,670**	**859**	N/A	**503**	**408**	N/A	**471**
Chromium VI	mg/kg	6.3	**0.58 JB**	**1.1 JB**	N/A	**0.31 JB**	**0.3 JB**	N/A	**0.84 JB**
Cobalt	mg/kg	350	**3 J**	**11.4**	N/A	**10.4**	**6.6**	N/A	**5.4**
Copper	mg/kg	47,000	**43.7**	**112**	N/A	**161**	**53.9**	N/A	**43.6**
Iron	mg/kg	820,000	**152,000**	**240,000**	N/A	**114,000**	**57,900**	N/A	**68,700**
Lead	mg/kg	800	**22.6**	**141**	**153**	**1,330**	**142**	N/A	**86**
Manganese	mg/kg	26,000	**72,700**	**12,300**	N/A	**10,600**	**5,820**	N/A	**8,920**
Mercury	mg/kg	350	**0.022 JB**	**0.029 J**	N/A	**0.092 J**	**0.016 JB**	N/A	**0.012 JB**
Nickel	mg/kg	22,000	**22.2**	**85.2**	N/A	**40.3**	**52.5**	N/A	**37.1**
Selenium	mg/kg	5,800	3.5 U	3.5 U	N/A	3.7 U	3.5 U	N/A	3.7 U
Silver	mg/kg	5,800	**5.4**	**3**	N/A	**4.3**	2.6 U	N/A	2.8 U
Thallium	mg/kg	12	**37**	**21.3**	N/A	9.3 U	**9.2**	**8.6**	**12.6**
Vanadium	mg/kg	5,800	**2,410**	**1,680**	N/A	**269**	**617**	N/A	**985**
Zinc	mg/kg	350,000	**165**	**679**	N/A	**2,400**	**1,430**	N/A	**811**
Other									
Cyanide	mg/kg	150	**1.4**	**2.1**	N/A	**3**	**3**	N/A	**2.7**

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports

Table 3
Summary of Organics Detected in Groundwater
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-012-PZ	B15-014-PZ	B15-018-PZ	SW-021-MWS	SW-079-MWS	TM03-PZM004	TM05-PZM005	TM07-PZM005
Volatile Organic Compounds										
1,1-Dichloroethane	µg/L	2.7	**0.61 J**	**0.36 J**	1 U	1 U	1 U	1 U	1 U	**0.65 J**
Acetone	µg/L	14,000	10 UR1	10 U	10 U	10 U	**3 J**	10 U	10 U	10 U
Benzene	µg/L	5	**0.66 J**	**0.84 J**	1 U	1 U	**0.25 J**	**1.1**	1 U	1 U
Chloroform	µg/L	0.22	1 U	1 U	1 U	**4.7**	1 U	1 U	**1.8**	1 U
Tetrachloroethene	µg/L	5	1 U	**6.3**	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1,000	**0.21 J**	**0.6 J**	1 U	1 U	**0.21 J**	**0.7 J**	**0.36 J**	1 U
Trichloroethene	µg/L	5	1 U	1 U	**0.47 J**	1 U	1 U	1 U	1 U	1 U
Xylenes	µg/L	10,000	3 U	**0.81 J**	3 U	3 U	3 U	3 U	3 U	3 U
Semi-Volatile Organic Compounds*										
1,1-Biphenyl	µg/L	0.83	1 UM1	**0.33 J**	1 U	1 U	1 U1c	**2.2 R1**	**0.7 J**	1 U
1,4-Dioxane	µg/L	0.46	**0.07 J**	0.1 U	0.1 U	0.1 U	**0.094 J**	**0.044 J**	0.1 U	**0.085 J**
2,4-Dimethylphenol	µg/L	360	1 U	1 U	1 U	1 U	1 U1c	**0.26 J**	**0.36 J**	1 U
2-Methylnaphthalene	µg/L	36	**0.49**	**2.6**	0.1 U	0.1 U	**0.26**	**11.7**	**4.1**	**0.022 J**
2-Methylphenol	µg/L	930	1 U	1 U	1 U	1 U	1 U1c	**0.19 J**	1 U	1 U
3&4-Methylphenol(m&p Cresol)	µg/L	930	2.1 U	2 U	2 U	2 U	2 U1c	**0.65 J**	**0.96 J**	2.1 U
Acenaphthene	µg/L	530	**0.7**	**2.8**	**0.023 J**	0.1 U	**0.7**	**2.6**	**4.1**	**0.028 J**
Acenaphthylene	µg/L	530	**0.16**	**0.56**	**0.017 J**	0.1 U	**0.11**	**5.3**	**0.56**	**0.022 J**
Anthracene	µg/L	1,800	**0.088 J**	**0.67**	**0.036 J**	**0.038 J**	**0.22**	**2.3**	**2.8**	**0.021 J**
Benzo[a]anthracene	µg/L	0.012	**0.028 JR1**	**0.069 J**	**0.07 J**	0.1 U	**0.037 J**	**0.33**	**0.41**	0.1 U
Benzo[a]pyrene	µg/L	0.2	**0.0081 JR1**	**0.0083 J**	**0.045 J**	0.1 U	0.1 U	**0.035 JISM1**	**0.11**	0.1 U
Benzo[b]fluoranthene	µg/L	0.034	**0.02 JipR1**	**0.017 J**	**0.063 J**	0.1 U	0.1 Uip	**0.089 JIS**	**0.24 ip**	0.1 U
Benzo[g,h,i]perylene	µg/L		0.1 UR1	0.1 U	**0.033 J**	0.1 U	0.1 U	0.1 UISR1	**0.04 J**	0.1 U
Benzo[k]fluoranthene	µg/L	0.34	**0.019 JipR1**	0.1 U	**0.027 J**	0.1 U	**0.013 Jip**	**0.036 JIS**	**0.22 ip**	0.1 U
bis(2-chloroethoxy)methane	µg/L	59	1 U	**0.47 J**	1 U	1 U	1 U1c	1 U	1 U	1 U
bis(2-Ethylhexyl)phthalate	µg/L	6	**1.7**	**0.43 J**	**4.7**	1 U	1 U1c	**0.14 JB**	1 U	1 U
Carbazole	µg/L		**1.5**	**5.6**	1 U	1 U	**0.98 J1c**	**15.9**	**10.7**	1 U
Chrysene	µg/L	3.4	**0.014 JR1**	**0.07 J**	**0.057 J**	**0.012 J**	**0.027 J**	**0.23**	**0.31**	0.1 U
Diethylphthalate	µg/L	15,000	1 U	1 U	**0.94 J**	1 U	1 U1c	1 U	1 U	1 U
Fluoranthene	µg/L	800	**0.21 R1**	**1.8**	**0.17**	**0.018 J**	**0.38**	**4.9**	**3.6**	**0.046 J**
Fluorene	µg/L	290	**0.8**	**2.2**	0.1 U	0.1 U	**0.53**	**8.9 M1**	**5.2**	**0.036 J**
Indeno[1,2,3-c,d]pyrene	µg/L	0.034	0.1 UR1	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UISR1	**0.037 J**	0.1 U
Naphthalene	µg/L	0.17	**3.3 M1**	**37.8**	**0.051 JB**	**0.092 JB**	**12**	**110 M6R1**	**16.7**	**0.14 B**
Pentachlorophenol	µg/L	1	2.6 U	2.6 U	2.6 U	2.5 U	2.6 U1c	2.5 UM1	2.5 U	**0.9 J**
Phenanthrene	µg/L		**1.2**	**6.4**	**0.069 J**	**0.036 J**	**0.96**	**18.3 M6R1**	**11.1**	**0.07 J**
Phenol	µg/L	5,800	1 U	1 U	1 U	1 U	1 U1c	**0.27 J**	**0.31 J**	1 U
Pyrene	µg/L	120	**0.13 R1**	**1.2**	**0.13**	**0.014 J**	**0.24**	**3.6**	**2.3**	**0.03 J**
PCBs										
PCBs (total)	µg/L	0.5	N/A	N/A	N/A	**0.091396**	N/A	N/A	N/A	**0.077629**
Trichlorobiphenyl	µg/L	0.044	N/A	N/A	N/A	0.005 U	N/A	N/A	N/A	**0.008**
TPH/Oil and Grease										
Diesel Range Organics	µg/L	47	**214 N2L2M04c**	**114 N2L24c**	103 UN2L24c	101 UN2L2	**408 N2L21c**	**583 N2L2**	**262 N2L2**	**237 N2L21c**
Oil and Grease	µg/L		4,770 U	**900 J**	**3,500 J**	N/A	N/A	N/A	N/A	N/A

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports
*PAH compounds were analyzed via sim

Table 4
Summary of Inorganics Detected in Groundwater
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-012-PZ	B15-014-PZ	B15-018-PZ	SW-021-MWS	SW-079-MWS	TM03-PZM004	TM05-PZM005	TM07-PZM005
Total Metals										
Aluminum	µg/L	20,000	N/A	N/A	N/A	**576**	**109**	**297**	**183**	**146**
Antimony	µg/L	6	N/A	N/A	N/A	**3.3 J**	**3.3 J**	6 U	**2.4 JB**	6 U
Arsenic	µg/L	10	N/A	N/A	N/A	5 U	5 U	**4.5 J**	**3.1 J**	5 U
Barium	µg/L	2,000	N/A	N/A	N/A	**71.4**	**64.2**	**13.1**	**12.5**	**46.8**
Beryllium	µg/L	4	N/A	N/A	N/A	**0.47 J**	1 U	1 U	1 U	1 U
Cadmium	µg/L	5	N/A	N/A	N/A	3 U	3 U	**0.51 J**	3 U	3 U
Chromium	µg/L	100	N/A	N/A	N/A	**2.5 J**	**1.5 J**	**1 J**	**1.5 J**	**4.2 J**
Copper	µg/L	1,300	N/A	N/A	N/A	5 U	5 U	**2.1 JB**	5 U	5 U
Iron	µg/L	14,000	N/A	N/A	N/A	**74.8**	**110**	**44.2 J**	**114**	**21.5 J**
Lead	µg/L	15	N/A	N/A	N/A	5 U	5 U	5 U	**7**	5 U
Manganese	µg/L	430	N/A	N/A	N/A	**19**	**56.2**	**1.4 J**	**10.1**	5 U
Nickel	µg/L	390	N/A	N/A	N/A	**0.85 JB**	**0.73 J**	10 U	**0.93 J**	10 U
Selenium	µg/L	50	N/A	N/A	N/A	**5.2 J**	8 U	**3.2 J**	8 U	**4.2 J**
Thallium	µg/L	2	N/A	N/A	N/A	**6 J**	10 U	10 U	10 U	**4 J**
Vanadium	µg/L	86	N/A	N/A	N/A	**391**	**217**	**114**	**1,560**	**176**
Zinc	µg/L	6,000	N/A	N/A	N/A	**1.3 J**	**3.4 JB**	**0.69 J**	**17**	**1.2 JB**
Dissolved Metals										
Aluminum, Dissolved	µg/L	20,000	**178**	**267**	**34.3 J**	**512**	**88.8**	**283**	**150**	**159**
Antimony, Dissolved	µg/L	6	6 U	6 U	6 U	**2.8 J**	**4.2 J**	6 U	**3.2 JB**	6 U
Arsenic, Dissolved	µg/L	10	**7.7**	**5**	**8.4**	**5.4**	**2.9 J**	**5.3**	**4 J**	5 U
Barium, Dissolved	µg/L	2,000	**18.5**	**26.2**	**55.7**	**62.3**	**64.6**	**12.5 B**	**11.7 B**	**46.8**
Beryllium, Dissolved	µg/L	4	1 U	1 U	1 U	1 U	1 U	**0.41 J**	1 U	1 U
Cadmium, Dissolved	µg/L	5	3 U	3 U	**0.57 J**	3 U	3 U	3 U	3 U	3 U
Chromium VI, Dissolved	µg/L	0.035	**80 JB**	**8 JB**	**8 JB**	N/A	N/A	N/A	N/A	N/A
Chromium, Dissolved	µg/L	100	5 U	**1.7 J**	**6.7**	**2.1 J**	**1.1 J**	**0.95 J**	**1.3 J**	**4.4 J**
Copper, Dissolved	µg/L	1,300	5 U	5 U	**1.8 J**	**2.1 J**	5 U	5 U	5 U	**1.5 J**
Iron, Dissolved	µg/L	14,000	**78.8**	**49.7 J**	**134**	**20.4 JB**	**49.5 J**	**33.3 JB**	**28.8 JB**	**19.5 J**
Manganese, Dissolved	µg/L	430	5 U	5 U	**117**	**13.2**	**51.9**	5 U	**2.3 J**	5 U
Selenium, Dissolved	µg/L	50	**3.4 J**	8 U	**5 J**	8 U	8 U	8 U	8 U	8 U
Thallium, Dissolved	µg/L	2	10 U	10 U	10 U	10 U	**4.8 J**	10 U	**6.8 J**	**5.5 J**
Vanadium, Dissolved	µg/L	86	**13.4**	**37.3**	**44**	**376**	**228**	**119**	**1,560**	**182**
Zinc, Dissolved	µg/L	6,000	10 U	**0.87 J**	**34.5**	10 U	**1.6 JB**	10 U	**1.5 JB**	**1.4 JB**
Other										
Cyanide	µg/L	200	**152**	**23.4**	**17.5**	10 U	**31.4**	**61.4**	**52.2**	**31.4**

Detections in bold
N/A indicates that the parameter was not analyzed for this sample
Values in red indicate an exceedance of the Project Action Limit (PAL)
A glossary of laboratory flags can be viewed in the attached laboratory reports

Table 5
Summary of VOCs Detected in Sub-Slab Soil Gas
Parcel B15 - Development Area
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	B15-022-SG	B15-023-SG	B15-024-SG
Volatile Organic Compounds					
1,1,1-Trichloroethane	µg/m^3	2,200,000	**27.1**	**30**	**43.9**
1,1-Dichloroethane	µg/m^3	7,700	**10.3**	**25.8**	0.81 U
2-Butanone (MEK)	µg/m^3	2,200,000	**70.4**	**209 D**	**65.3**
4-Methyl-2-pentanone (MIBK)	µg/m^3	1,400,000	**2.05**	0.85 U	**3.21**
Acetone	µg/m^3	14,000,000	**169 D**	**158 D**	**275 D**
Benzene	µg/m^3	1,600	**2.08**	0.64 U	**4.03**
Bromodichloromethane	µg/m^3	none	**5.95**	1.34 U	**5.27**
Carbon disulfide	µg/m^3	310,000	**52.8**	**34.7**	**103**
Chloroform	µg/m^3	540	**19.4**	**27.5**	**35**
Chloromethane	µg/m^3	40,000	0.41 U	**0.72**	**0.83**
Ethylbenzene	µg/m^3	5,000	**1.31**	**1.57**	**1.03**
Methyl tert-butyl ether (MTBE)	µg/m^3	48,000	0.72 U	**1.94**	0.72 U
Methylene Chloride	µg/m^3	270,000	**1**	**11.7**	**11.6**
Toluene	µg/m^3	2,200,000	**5.38**	**6.04**	**5.91**
Vinyl chloride	µg/m^3	2,800	**0.75**	**0.85**	**1.07**
Xylenes	µg/m^3	44,000	**5.79**	**8.35**	**4.65**

Detections in bold
A glossary of laboratory flags can be viewed in the attached laboratory reports
Values in Red indicate an exceedance of the Project Action Limit (PAL)

Table 6 - Parcel B15
Development Area
Assessment of Lead

Exposure Unit	Surface/Sub-Surface	Arithmetic Mean (mg/kg)
Site-Wide (16.50 ac.)	Surface	408.95
	Sub-Surface	794.08

Table 7 - Parcel B15
Development Area EPCs - Surface Soils

Parameter	PAL (mg/kg)	EPC Type Site-Wide Exposure Unit	EPC Site-Wide Exposure Unit (mg/kg)
Arsenic	3.00	95% GROS Adjusted Gamma UCL	**21.2**
Manganese	26,000	95% Student's-t UCL	**29,631**
Thallium	12.0	Gamma Adjusted KM-UCL	**44.4**
Vanadium	5,800	95% Adjusted Gamma UCL	2,390
PCBs (total)	0.97	95% KM (t) UCL	0.36
Benzo[a]anthracene	2.90	95% Chebyshev (Mean, Sd) UCL	**14.1**
Benzo[a]pyrene	0.29	95% Chebyshev (Mean, Sd) UCL	**7.43**
Benzo[b]fluoranthene	2.90	95% Chebyshev (Mean, Sd) UCL	**17.4**
Benzo[k]fluoranthene	29.0	95% Chebyshev (Mean, Sd) UCL	15.0
Dibenz[a,h]anthracene	0.29	95% KM (Chebyshev) UCL	**1.84**
Indeno[1,2,3-c,d]pyrene	2.90	95% Chebyshev (Mean, Sd) UCL	**4.14**
Naphthalene	17.00	95% KM (Chebyshev) UCL	**18.5**

Bold indicates EPC higher than PAL

Table 8 - Parcel B15
Development Area EPCs - Sub-Surface Soils

Parameter	PAL (mg/kg)	EPC Type Site-Wide Exposure Unit	EPC Site-Wide Exposure Unit (mg/kg)
Arsenic	3.00	KM H-UCL	**15.6**
Manganese	26,000	95% Student's-t UCL	25,032
Thallium	12.0	95% GROS Adjusted Gamma UCL	**19.7**
Vanadium	5,800	95% Chebyshev (Mean, Sd) UCL	1,967
PCBs (total)	0.97	N/A	N/A
Benzo[a]anthracene	2.90	97.5% Chebyshev (Mean, Sd) UCL	**57.4**
Benzo[a]pyrene	0.29	97.5% Chebyshev (Mean, Sd) UCL	**39.0**
Benzo[b]fluoranthene	2.90	95% Adjusted Gamma UCL	**35.8**
Benzo[k]fluoranthene	29.0	95% Adjusted Gamma UCL	22.6
Dibenz[a,h]anthracene	0.29	95% KM (Chebyshev) UCL	**6.88**
Indeno[1,2,3-c,d]pyrene	2.90	Gama Adjusted KM-UCL	**21.6**
Naphthalene	17.00	99% KM (Chebyshev) UCL	**41.6**

Bold indicates EPC higher than PAL
N/A unable to calculate a EPC due to no detections

Table 9 - Parcel B15
Development Area Surface Soils
Risk Ratios

Parameter	Target Organs	Site-Wide Exposure Unit (16.50 ac.)				
			Composite Worker			
			PRGs (mg/kg)		Risk Ratios	
		EPC mg/kg	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	21.2	3.0	480	7.06E-06	0.04
Manganese	**Nervous**	29,631		26,000		1
Thallium	**None Specified**	44.4		12		4
Vanadium	**Dermal**	2,390		5,800		0.4
PCB, Total	**None Specified**	0.36	0.94		3.79E-07	
Benzo(a)anthracene	**None Specified**	14.1	2.9		4.88E-06	
Benzo(a)pyrene	**None Specified**	7.43	0.29		2.56E-05	
Benzo(b)fluoranthene	**None Specified**	17.4	2.9		6.00E-06	
Benzo(k)fluoranthene	**None Specified**	15.0	29		5.16E-07	
Dibenz(a,h)anthracene	**None Specified**	1.84	0.29		6.36E-06	
Indeno(1,2,3-cd)pyrene	**None Specified**	4.14	2.9		1.43E-06	
Naphthalene	**Nervous; Respiratory**	18.5	17	590	1.09E-06	0.03
					5E-05	↓

Total HI	Cardiovascular	0.04
	Dermal	0.5
	Respiratory	0.03
	Nervous	1
	None Specified	4

PRGs were obtained from the EPA Regional Screening Levels at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016

Table 10 - Parcel B15
Development Area Sub-Surface Soils
Risk Ratios

Parameter	Target Organs	Site-Wide Exposure Unit (16.50 ac.)				
			Construction Worker			
			PRGs (mg/kg)		Risk Ratios	
		EPC mg/kg	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	15.6	23.7	146	6.56E-07	0.1
Manganese	**Nervous**	25,032		8,150		3
Thallium	**None Specified**	19.7		13.6		1
Vanadium	**Dermal**	1,967		3,390		0.6
PCB, Total	**None Specified**	N/A	8.55			
Benzo(a)anthracene	**None Specified**	57.4	24		2.39E-06	
Benzo(a)pyrene	**None Specified**	39.0	2.4		1.62E-05	
Benzo(b)fluoranthene	**None Specified**	35.8	24		1.49E-06	
Benzo(k)fluoranthene	**None Specified**	22.6	240		9.41E-08	
Dibenz(a,h)anthracene	**None Specified**	6.88	2.4		2.87E-06	
Indeno(1,2,3-cd)pyrene	**None Specified**	21.6	24		8.99E-07	
Naphthalene	**Nervous; Respiratory**	41.6		144000		0.0003
					2E-05	↓

Total HI	Cardiovascular	0.1
	Dermal	0.7
	Respiratory	0.0003
	Nervous	3
	None Specified	1

N/A indicates no detections
PRGs were obtained from the EPA Regional Screening Levels at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search
Construction worker parameters:

	Site-Wide
Areal Extent of Dozing (ac)	16.5
Areal Extent of Excavation (m2)	0
Areal Extent of Grading (ac)	16.5
Areal Extent of Tilling (ac)	0
Blade Lengths (m)	2
Times Dozed/Graded	1
Average Excavation Depth (m)	0
Acres (ac)	16.5

APPENDIX A

TRADEPOINT ATLANTIC
1600 Sparrows Point Boulevard
Baltimore, Maryland 21219

October 4, 2016

Maryland Department of Environment
1800 Washington Boulevard
Baltimore MD, 21230

Attention: Ms. Barbara Brown

Subject: Request to Enter Temporary CHS Review for Parcel B-15

Ms. Brown:

The conduct of any environmental assessment and cleanup activities on the Tradepoint Atlantic property, as well as any associated development, is subject to the requirements outlined in the following agreements:

- 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).

On September 11, 2014, Tradepoint Atlantic submitted an application to the Maryland Department of the Environment's (Department) Voluntary Cleanup Program (VCP). Parcel B-15 is part of the acreage that remains subject to the Multimedia Consent Decree between Bethlehem Steel Corporation, the United States Environmental Protection Agency (EPA), and the Department (effective October 8, 1997) as amended.

In consultation with the Department, Tradepoint Atlantic affirms that it desires to accelerate the assessment, remediation and redevelopment of certain sub-parcels within the larger site due to current market conditions. To that end, the Department and Tradepoint Atlantic agree that the Controlled Hazardous Substance (CHS) Act (Section 7-222 of the Environment Article) and the CHS Response Plan (COMAR 26.14.02) shall serve as the governing statutory and regulatory authority for completing the development activities on Parcel B-15 and complement the statutory requirements of the Voluntary Cleanup Program (Section 7-501 of the Environment Article).

Upon submission of a Site Response and Development Work Plan and completion of the remedial activities for the sub-parcel, the Department shall issue a "No Further Action" letter upon a recordation of an environmental covenant describing any necessary land use controls for the specific sub-parcel. At

TRADEPOINT
ATLANTIC
1600 Sparrows Point Boulevard
Baltimore, Maryland 21219

such time that all the sub-parcels within the larger parcel have completed remedial activities, Tradepoint Atlantic shall submit to the Department a request for issuing a Certificate of Completion (COC) as well as all pertinent information concerning completion of remedial activities conducted on the parcel. Once the VCP has completed its review of the submitted information it shall issue a COC for the entire parcel described in Tradepoint Atlantic's VCP application.

Alternatively, Tradepoint Atlantic or other entity may elect to submit an application for a specific sub-parcel and submit it to the VCP for review and acceptance. If the application is received after the cleanup and redevelopment activities described in this work plan are implemented and a No Further Action letter is issued by the Department pursuant to the CHS Act, the VCP shall prepare a No Further Requirements Determination for the sub-parcel.

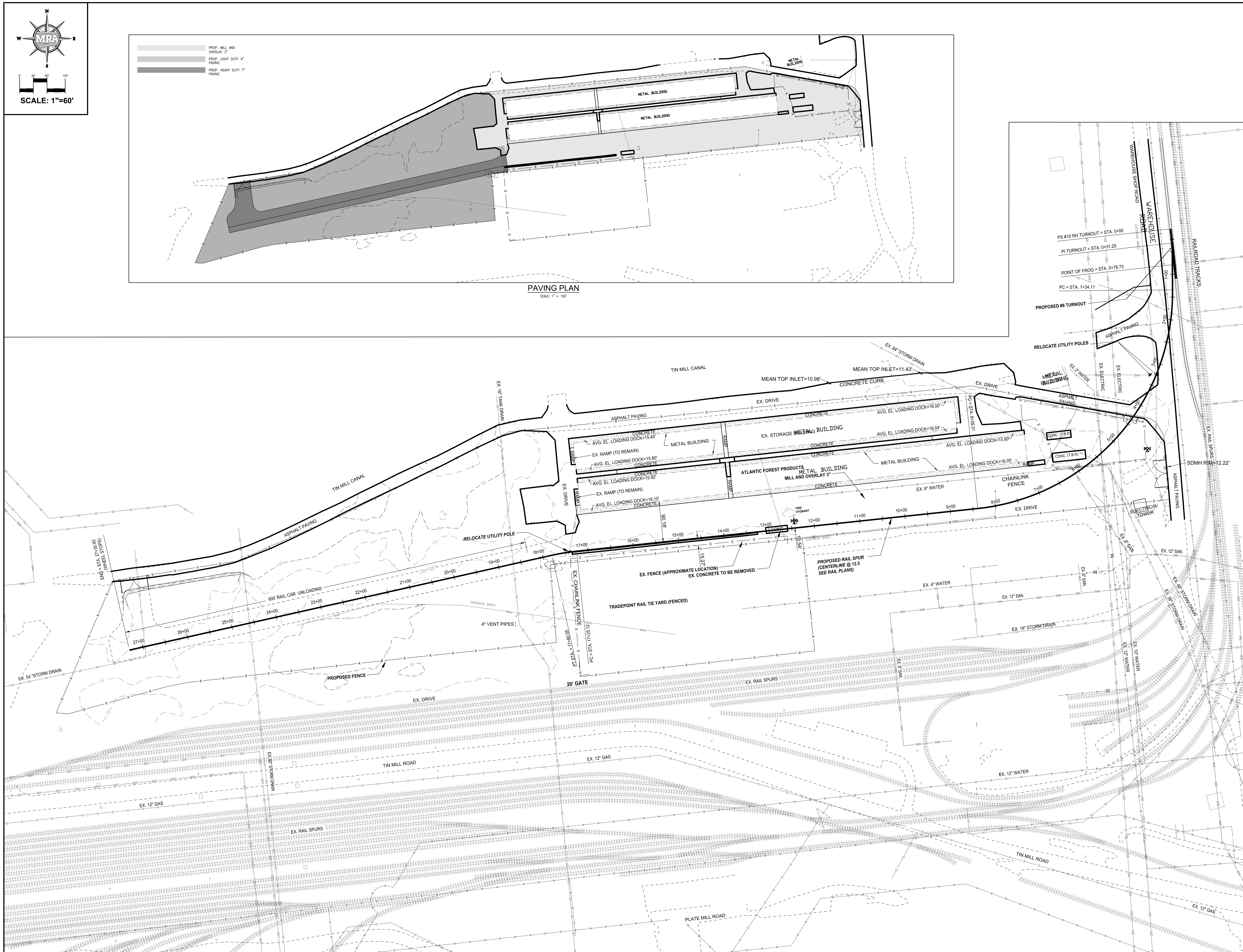
If Tradepoint Atlantic or other entity has not carried out cleanup and redevelopment activities described in the work plan, the cleanup and redevelopment activities may be conducted under the oversight authority of either the VCP or the CHS Act, so long as those activities comport with this work plan.

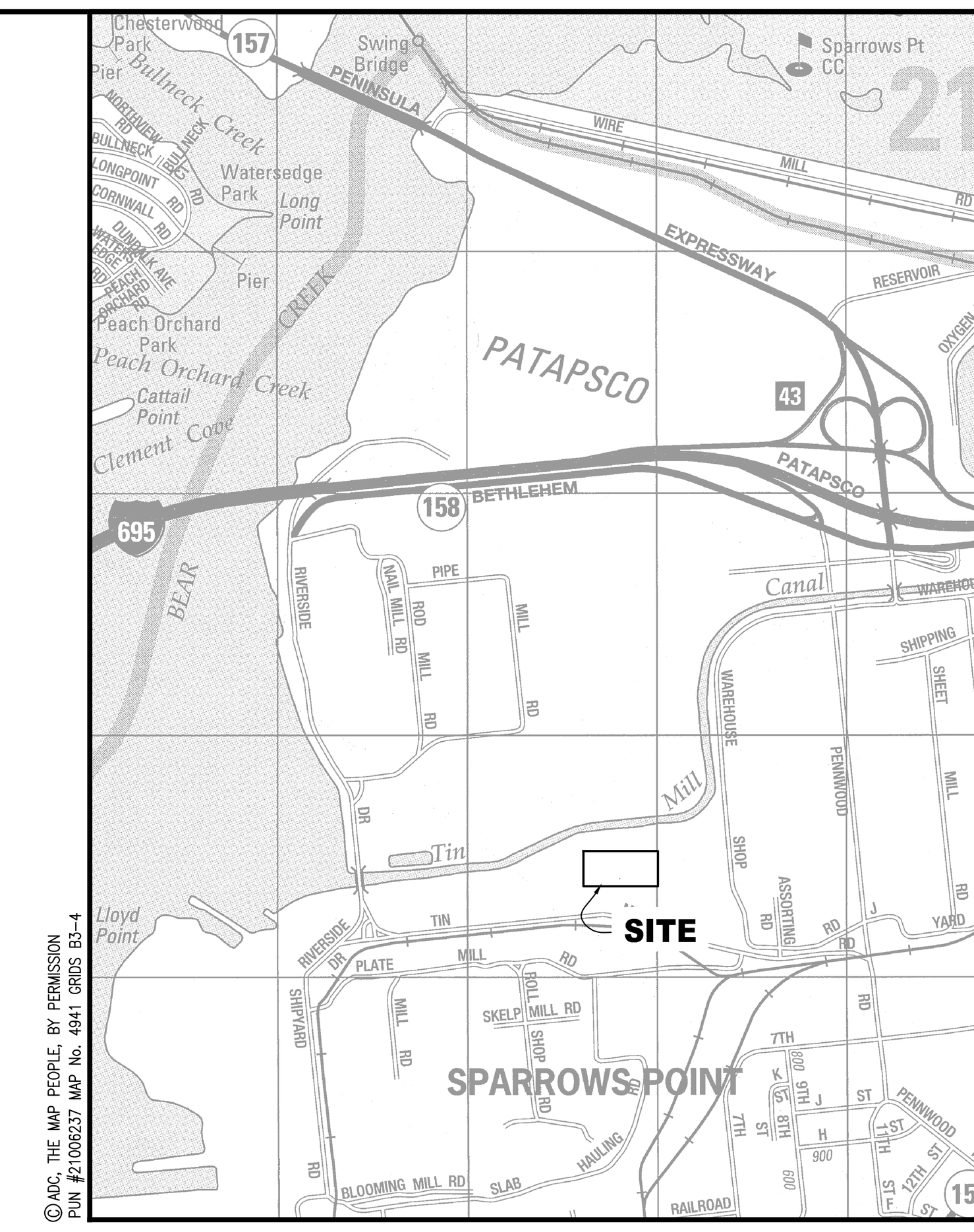
Engineering and institutional controls approved as part of this Site Response and Development Work Plan shall be described in documentation submitted to the Department demonstrating that the exposure pathways on the sub-parcel are addressed in a manner that protects public health and the environment. This information shall support Tradepoint Atlantic's request for the issuance of a COC for the larger parcel.

Sincerely,
Tradepoint Atlantic

John M. Martin III
Development Director

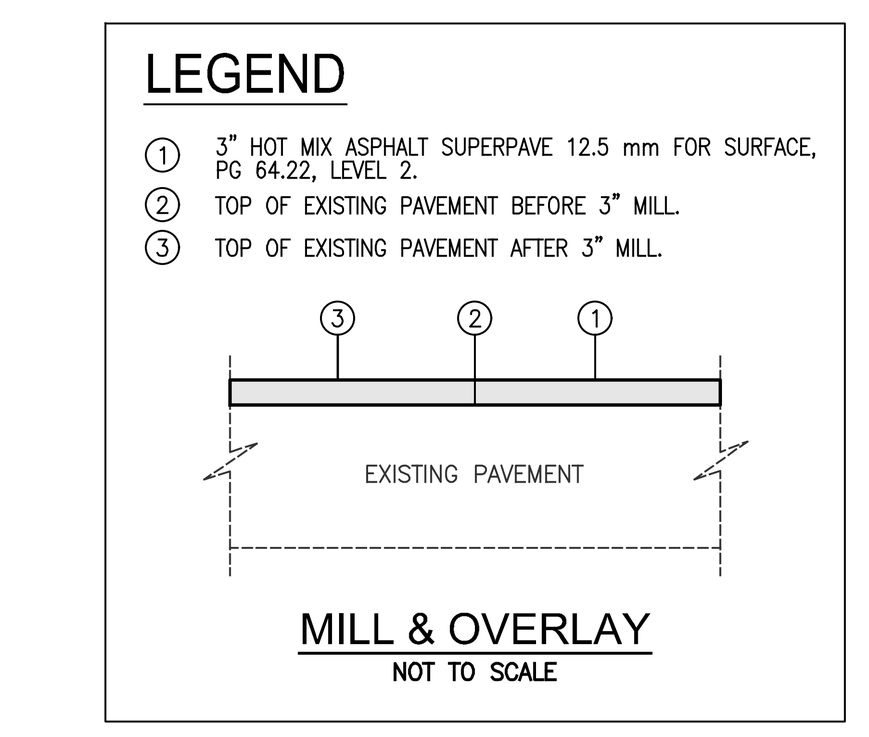
APPENDIX B

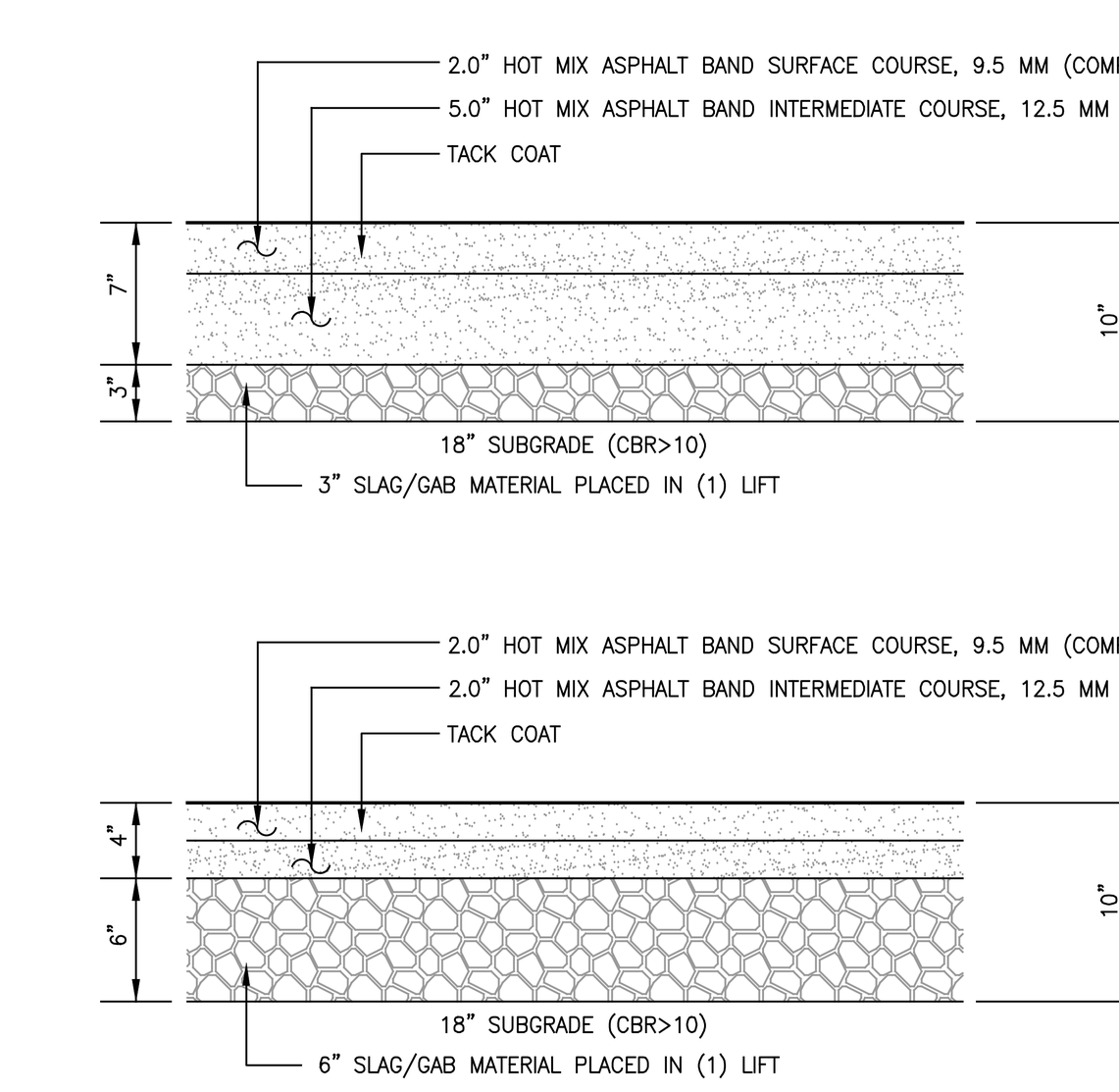


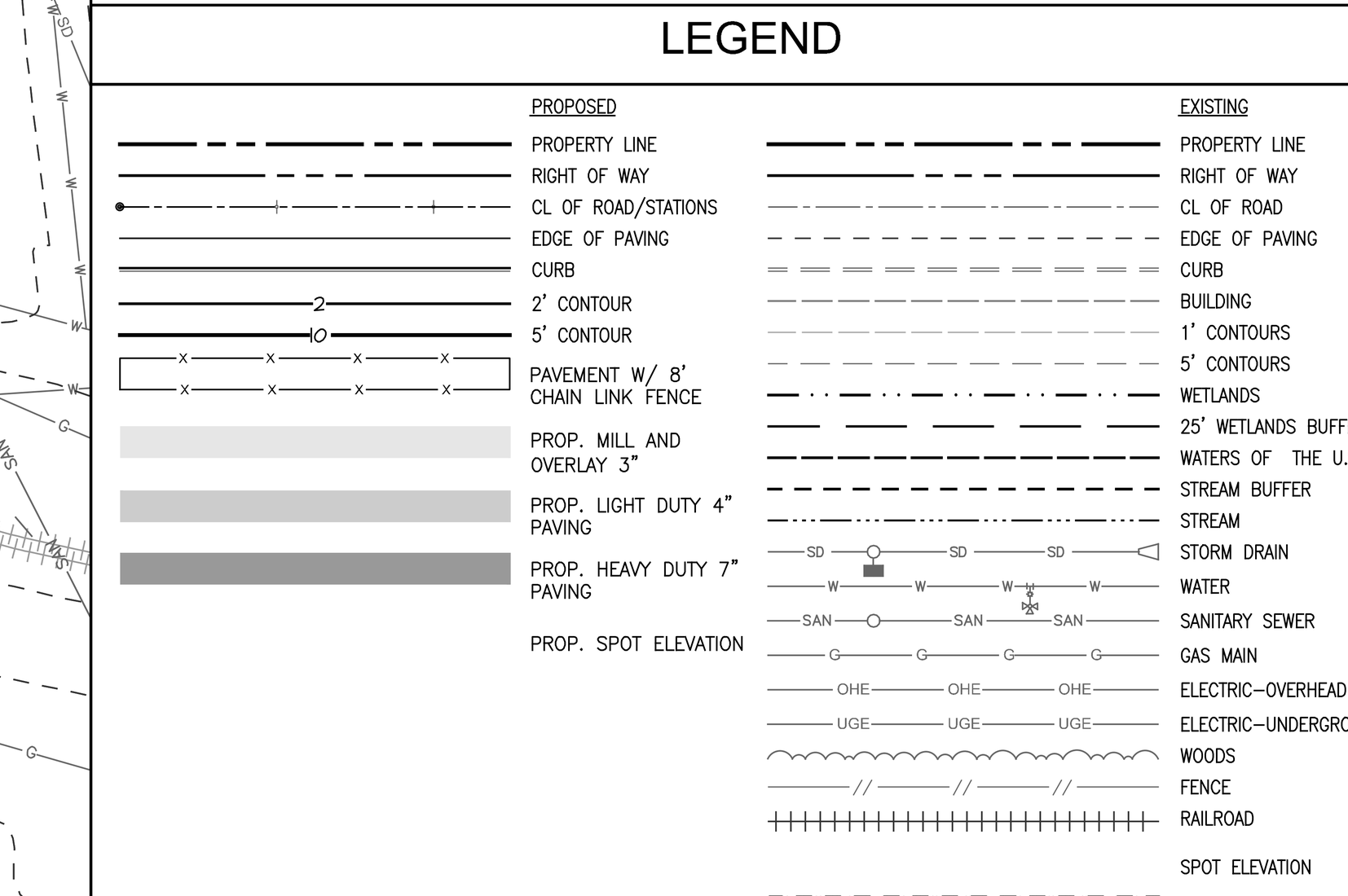


VICINITY MAP

SCALE: 1" = 1,200'







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900 N. ROCK HILL ROAD
ST. LOUIS, MISSOURI 63119

Rev | Date | Description

DEVELOPMENT PLAN
ATLANTIC FOREST PRODUCTS SITE
at Tradepoint Atlantic

Project No.: 19296
Date: OCT. 4, 2016
Drawn By: DCR
Checked By: JMK/AGD
Scale: 1"=60'

DEVELOPMENT PLAN

D-1

APPENDIX C

HEALTH AND **SAFETY PLAN**

SPARROWS POINT TERMINAL
SPARROWS POINT, MARYLAND

Prepared by:

EnviroAnalytics Group

Environmental Engineers

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
- 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)

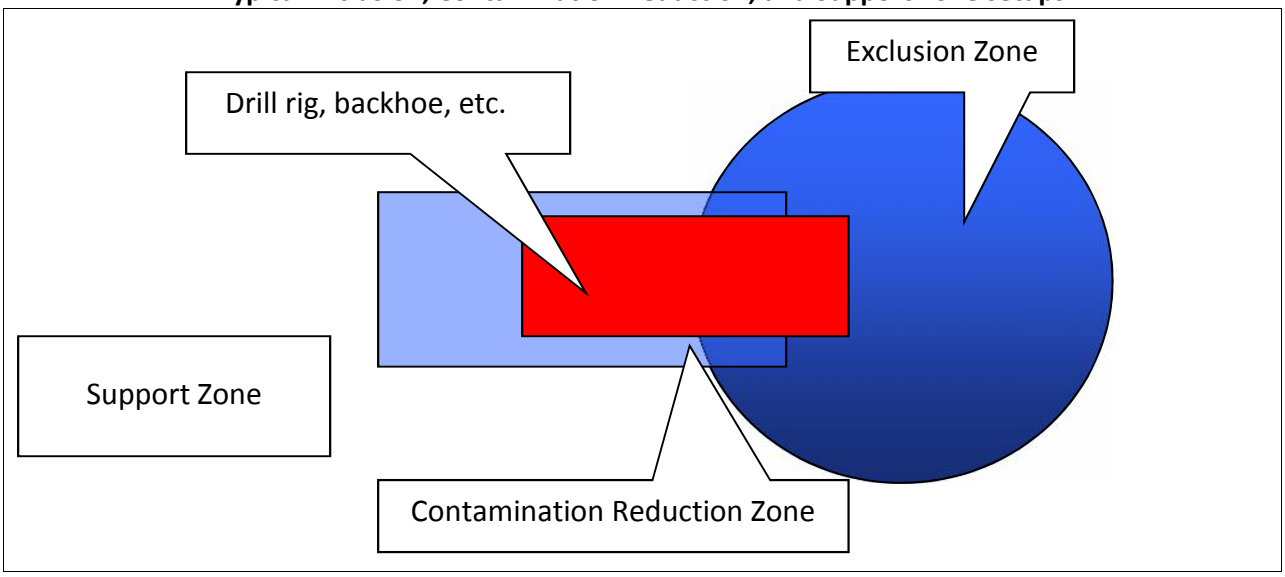
Between the EZ and the SZ will be the CRZ, which will provide a transition between the potentially contaminated EZ and the clean SZ. The CRZ (located upwind of the EZ, if possible) will be a corridor leading from the EZ and will serve as a buffer to further reduce the probability of the SZ becoming contaminated. 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

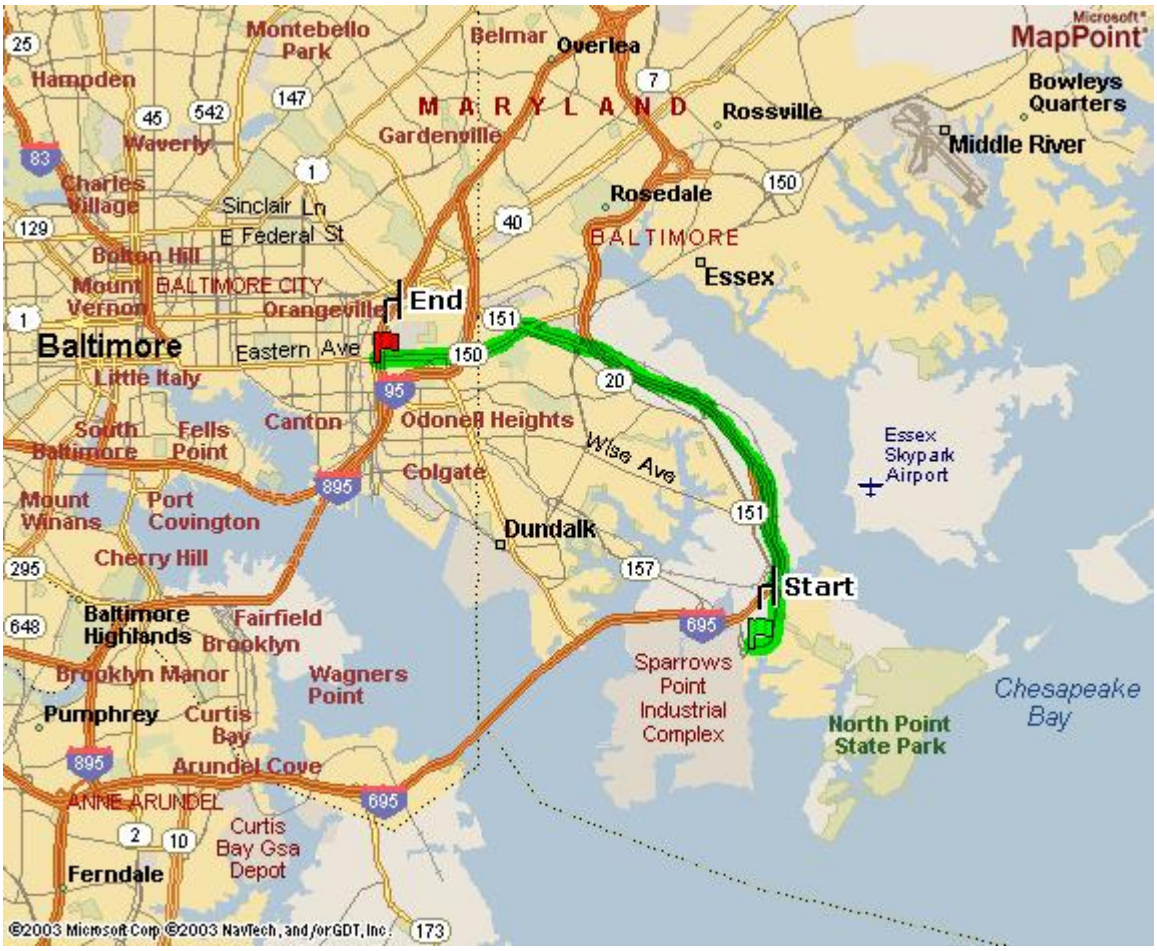
Hospital

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)

APPENDIX D

CONTAINMENT REMEDY OPERATIONS AND MAINTENANCE PLAN PARCEL "ρυ FORMER SPARROWS POINT STEEL MILL

Containment Remedy Operations and Maintenance Overview

In accordance with the Response Action Plan (RAP) for the Parcel B15 development area located on the northern portion of the Sparrows Point Peninsula in Sparrows Point, Maryland (the Site), post remediation care requirements include compliance with the conditions placed on the No Further Action Letter, Certificate of Completion, and deed restrictions recorded for the Site. In addition, maintenance will be performed on the capped areas to control degradation and exposure to the underlying soil. Inspections of the capped areas will be conducted semi-annually. The responsible party will perform cap inspections, maintenance of the cap, and retain cap inspection records. Maintenance records will include the date of the inspection, name of the inspector, any noted issues, and subsequent resolution of the issues. Maintenance records will be maintained in a designated area at the Site for Maryland Department of the Environment (MDE) inspection and review, if requested.

The containment remedy (capping) will be constructed as described in the MDE-approved RAP. The following sections provide details of the Operations and Maintenance Plan (O&M Plan) procedures to be followed at the Site to assess when maintenance of the capped areas is necessary.

Designated Pavement Area Inspections

The asphalt-paved areas will consist of a 10-inch thick combination of base and asphalt. The mill & overlay section will consist of 3 inches of asphalt over the underlying older pavement. The designated paved areas, as identified in the RAP, will be maintained to ensure the integrity of the cap.

Pavement area inspections will be conducted on a semi-annual basis to ensure that the capped areas are maintained as needed. During the inspection, the capped surfaces will be inspected to check for the following potential conditions:

- Differential settlement and significant surface-water ponding;
- Erosion or cracking of the cap materials; and
- Obstruction or blocking of drainage facilities.

When inspections indicate that cap repair is necessary, repairs will be completed as soon as practically possible in compliance with any recorded deed restrictions. The work will be documented on a form similar to the attached example Pavement Inspection Form. The inspection documentation will include the results of each inspection, recommended maintenance actions, and the actual maintenance/repair implemented. The responsible party will maintain inspection forms and any resulting repair records.

Pavement Inspection Protocol

A pavement management system (pavement condition index) will be implemented in the designated areas of the Site. The purpose of this system is to plan and prioritize future pavement maintenance needs. The system is based on a numerical rating of pavement distresses as published by the United States Army Corps of Engineers. The following chart will be used to provide an index of the pavement condition.

PAVEMENT CONDITION INDEX (PCI)		
PCI	**Characterization**	**Description**
1	New crack-free surface	Black in color, smooth texture
2	Oxidation has started	Short hairline cracks start to develop; dark gray color.
3	Oxidation in advanced state	Hairline cracks are longer and wider; gray in color
4	Oxidation complete	Cracked area 0.25 inch wide and crack lines have found base faults
5	Moisture penetrating through 0.25 inch cracks; loose material, stone and sand, evident	Texture of surface becoming rough; Preventative maintenance
6	Cracks widen and join	Cracks and shrinkage evident at curb and gutter lines
7	Potholes develop in low spots	Gatoring areas begin to break up; overall texture very rough.
8	Potholes developing	Pavement breaking up
9	Heaving due to excessive moisture in base	Distorts entire surface

PAVEMENT CONDITION INDEX (PCI)		
PCI	**Characterization**	**Description**
10	General breakup of surface	General breakup of surface

An inspection indicating a PCI of 4 or greater for designated areas of the Site will require maintenance. The intent is that repairs should be completed before the pavement degrades beyond a PCI of 4. MDE will be notified in a timely manner of any repairs that are the result of a PCI of 4 or greater. The notification will include documentation of the conditions being repaired and the location of the repair.

PAVEMENT INSPECTION FORM	Parcel B15 Development Fmr. Sparrows Point Steel Mill
Date:	Time:
Weather Conditions:	
General Pavement Conditions:	

PCI		Characterization	Description
1		New crack-free surface	Black in color, smooth texture
2		Oxidation has started	Short hairline cracks start to develop; dark gray color
3		Oxidation in advanced state	Hairline cracks are longer and wider; gray in color
RESPONSE REQUIRED	4	Oxidation complete	Crack area 0.25 inch wide and crack lines have found base faults
	5	Moisture penetrating through 0.25-inch cracks; loose material, stone and sand,evident	Texture of surface becoming rough; preventative maintenance
	6	Cracks widen and join	Cracks and shrinkage evident at curb and gutter lines
	7	Potholes develop in low spots	Gatoring areas begin to break up; overall texture very rough
	8	Potholes developing	Pavement breaking up
	9	Heaving due to excessive moisture in base	Distorts entire surface
	10	General breakup of surface	General breakup of surface

PAVEMENT INSPECTION FORM	Parcel B15 Development Fmr. Sparrows Point Steel Mill
CURB CONDITION	☐ Exists ☐ Sound ☐ Cracked ☐ Root Intrusion ☐ Deteriorated Comments: _____
SIDEWALK CONDITION	Comments: _____
RESPONSE REQUIRED	
WORK COMPLETED	
PHOTOGRAPHS / FIGURES ATTACHED	
RESPONSE CONTRACTOR	Work Completed By: _____ Date: Signature: