Dioxin and Furan
Work Plan Addendum

Area B: Parcel B5
Tradepoint Atlantic
Sparrows Point, Maryland

Prepared for:
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Revision 1
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ARM Project 150300M-3

Respectfully Submitted,

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Vice President

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1.0 INTRODUCTION

1.1. BACKGROUND

ARM Group Inc. (ARM), on behalf of EnviroAnalytics Group (EAG), has prepared the following Work Plan Addendum to perform sampling of dioxins and furans on a portion of the Tradepoint Atlantic property located within Area B: Parcel B5 (the Site). Parcel B5 is comprised of approximately 305 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

In an e-mail to EAG from MDE, dated November 30, 2015, MDE requested that samples from the borings in the vicinity of the former Sinter Plant be analyzed for dioxins and furans. Seven (7) of the borings identified for the Phase II Investigation of Parcel B5 were associated with the former Sinter Plant shown on Historical Site Drawing Sets 5000, 5100, and 5500 provided by Tradepoint Atlantic. These boring locations (B5-142-SB; B5-164-SB through B5-169-SB) are consistent with the request from MDE, and as indicated on **Figure 2** are within and surrounding the approximate boundary and layout of the former Sinter Plant area.

The Sinter Plant produced sinter from iron-bearing fine materials. Burnt lime and the fine materials were combined and passed through an ignition furnace, which fused the materials into cohesive lumps. The finished sinter was collected and stored before being transferred to be included as a raw material in the blast furnaces. Additional background information specific to Parcel B5 can be found in the approved Parcel B5 Work Plan submission dated December 3, 2015.

Historical wind data (including frequency of wind direction and speed data) relevant for the Sinter Plant area was collected from the Baltimore-Washington International (BWI) airport in order to determine the most likely areas that the plant waste stack gas would have dispersed. BWI is located approximately 10 miles southwest of the Site and its climate data was previously used to describe the Site in the Description of Current Conditions (DCC) Report prepared by Rust Environmental and Infrastructure (dated January 1998) as provided in the Phase I Environmental Site Assessment (ESA) prepared by Weaver Boos Consultants dated May 19, 2014. The wind data used for the Sinter Plant analysis was compiled from 1976 to 2012 since the plant was operational during that time period. The Iowa State University of Science and Technology supplied the BWI wind speed data as well as a wind rose generator. The wind rose displays the relative frequency of wind directions for the area of interest. From 1976 to 2012, the data from BWI shows the prevailing winds generally coming from the west-northwest. It was determined from historical images that there were four waste gas stacks associated with the Sinter Plant. The location of the stacks combined with the information provided by the wind rose indicates that the stack gas would disperse predominantly to the east and southeast across the

Sinter Plant area toward the proposed sample locations. The wind rose and waste gas stacks are indicated on **Figure 3**.

There is currently no evidence to show that the waste stack gasses of the Sinter Plant have been previously sampled for dioxins and furans. Offshore sampling around Coke Point was previously conducted by EA Engineering, Science, and Technology, Inc. (EA) in their Final Risk Assessment of Offshore Areas Adjacent to the Proposed Coke Point Dredged Material Containment Facility at Sparrows Point, which was included in Weaver Boos' Phase I ESA. However, the Coke Point and related offshore areas are located to the southwest of the Sinter Plant, indicating that the findings of this report are not directly applicable to Parcel B5. The estimated risks in the Coke Point offshore area associated with dioxins were found to be similar to the background environmental data collected during the investigation from the Patapsco River, so dioxins were not considered to be a site-related constituent of potential concern (COPC).

1.2. OBJECTIVE

The primary objective of the supplemental sampling and analysis is to determine the presence or absence of dioxins or furans in shallow soil surrounding the former Sinter Plant area. The dioxin and furan sampling activities will be performed in compliance with requirements pursuant to the following:

- Administrative Consent Order (ACO) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the Maryland Department of the Environment (effective September 12, 2014); and

- Settlement Agreement and Covenant Not to Sue (SA) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the United States Environmental Protection Agency (effective November 25, 2014).

1.3. SAMPLING DESIGN AND RATIONALE

Surface soil samples from boring locations associated with the Sinter Plant area (B5-142-SB; B5-164-SB through B5-169-SB) will be analyzed to determine the presence or absence of these groups of compounds at levels above the Project Action Limits (PALs).

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1. PROJECT PERSONNEL

The additional dioxin and furan sampling activities in Parcel B5 will be conducted by ARM under a contract with EAG. ARM will provide project planning, field sampling and reporting support. Any required drilling and laboratory services will be contracted directly by EAG. The management, field, and laboratory responsibilities of key project personnel are defined in this section.

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

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

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

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

Pace Analytical
1700 Elm Street SE
Minneapolis MN 55414

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

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

2.2. HEALTH AND SAFETY ISSUES

Because of the potential presence of metals, petroleum hydrocarbons and chlorinated hydrocarbons in the soil and groundwater at the Site, the investigation will be conducted under a site-specific Health and Safety Plan to protect investigation workers from possible exposure to contaminated soil and groundwater. This investigation will be conducted according to the site-specific HASP for Parcel B5, provided as **Appendix C** in the approved Work Plan submission (dated December 3, 2015).

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

3.0 FIELD ACTIVITIES AND PROCEDURES

3.1. UTILITY CLEARANCE

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

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

3.2. SAMPLING PLAN

A summary of the area that will be investigated, along with the proposed boring identification numbers, has been provided as **Figure 3**. This figure indicates the sample collection points as well as the former waste gas stacks of the Sinter Plant. A wind rose is also included in the figure depicting the relative frequency of wind directions from 1976 to 2012 (using wind data from BWI) when the plant was operational. The wind rose shows that the waste gas from the stacks would generally flow toward the east-southeast. The proposed borings are distributed in the eastern direction from the former stacks, and are located in the directions where historical stack emissions may be most likely to disperse. Borings will be completed as close as possible to the proposed locations, which correspond to the Phase II investigation borings completed from December 2015 to January 2016 at the Site.

Methods and procedures of this Work Plan Addendum follow the MDE-VCP and EPA guidelines. Information regarding the project organization, field activities and sampling methods, sampling equipment, sample handling and management procedures, the laboratory analytical methods and selected laboratory, quality control and quality assurance procedures, investigation-derived waste (IDW) management methods, reporting requirements are described in detail in the QAPP that has been developed to support the investigation and remediation of the Tradepoint Atlantic property (Quality Assurance Project Plan Rev. 3, ARM Group Inc., April 5, 2016).

The proposed schedule of this investigation is contained at the close of this Work Plan Addendum. All site characterization activities will be conducted under the site-specific HASP developed for the Phase II Investigation of Parcel B5 (**Appendix C** in the approved Work Plan submission dated December 3, 2015).

3.3. SOIL INVESTIGATION

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

A shallow soil sample will be collected from the 0 to 1 foot depth interval at each sample location using a hand auger. If concrete is present at a proposed location and the boring cannot be completed with a hand auger, the soil sample will be relocated as close as possible outside of the area of concrete. After soil sampling has been concluded at a location, all down-hole soil sampling equipment will be decontaminated according to procedures referenced in the QAPP Worksheet 21—Field SOPs, SOP No. 016 Equipment Decontamination. The decontamination procedures that will be used during the course of this investigation include Decontamination Area (Section 3.1 of the SOP), Decontamination of Sampling Equipment (Section 3.5) and Document and Record Keeping (Section 5).

Soil samples will be analyzed for dioxins and furans using USEPA Method 8290. Analytical methods, sample containers, preservatives, and holding times for dioxin and furan analysis are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

3.4. SAMPLE DOCUMENTATION

3.4.1. Sample Numbering

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

3.4.2. Sample Labels & Chain-of-Custody Forms

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

3.5. LABORATORY ANALYSIS

EAG has contracted PACE of Greensburg, Pennsylvania to perform the laboratory analysis for this project. The samples will be submitted for analysis with a standard turnaround time (approximately 15 work days). Soil samples will be analyzed for dioxins and furans using USEPA Method 8290. The quantitation limits and project action limits are provided in QAPP Worksheet 15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

All soil samples will be collected using dedicated equipment including new nitrile gloves and sample kits. Each cooler temperature will be measured and documented by the laboratory upon receipt.

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

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

- Blind Field Duplicate – one for the set of seven samples
  - Soil – dioxins and furans
- Matric Spike/Matrix Spike Duplicate – one for the set of seven samples
  - Soil – dioxins and furans
- Field Blank and Equipment Blank– one for the set of seven samples
  - Soil – dioxins and furans

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

5.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

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

6.0 DATA VALIDATION

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

7.0 REPORTING

Following the receipt of all sampling results from the dioxin and furan sampling in the Sinter Plant area, ARM will incorporate this information into a letter report which will summarize the findings. All results will be presented in tabular and graphical formats as appropriate to best summarize the data for future use.

The letter report will indicate whether any additional site investigation activities are required to characterize the nature and extent of dioxins and furans in the Sinter Plant area if found to be present.

8.0 SCHEDULE

The schedule for the field activities is shown below. The investigation report will be submitted to the regulatory authorities within two (2) months of completion of the field activities in accordance with these approximate timeframes:

- the sample collection activities will take approximately one (1) week to complete (including mobilization activities) once approval of the work plan is received;
- the soil analysis, data validation and review is expected to require an additional six (6) weeks to complete; and
- the preparation of the letter report, including an internal Quality Assurance Review cycle, will require another four (4) weeks.

FIGURES

N

ARM Group Inc.
Earth Resource Engineers and Consultants

0 375 750 1,500
Feet

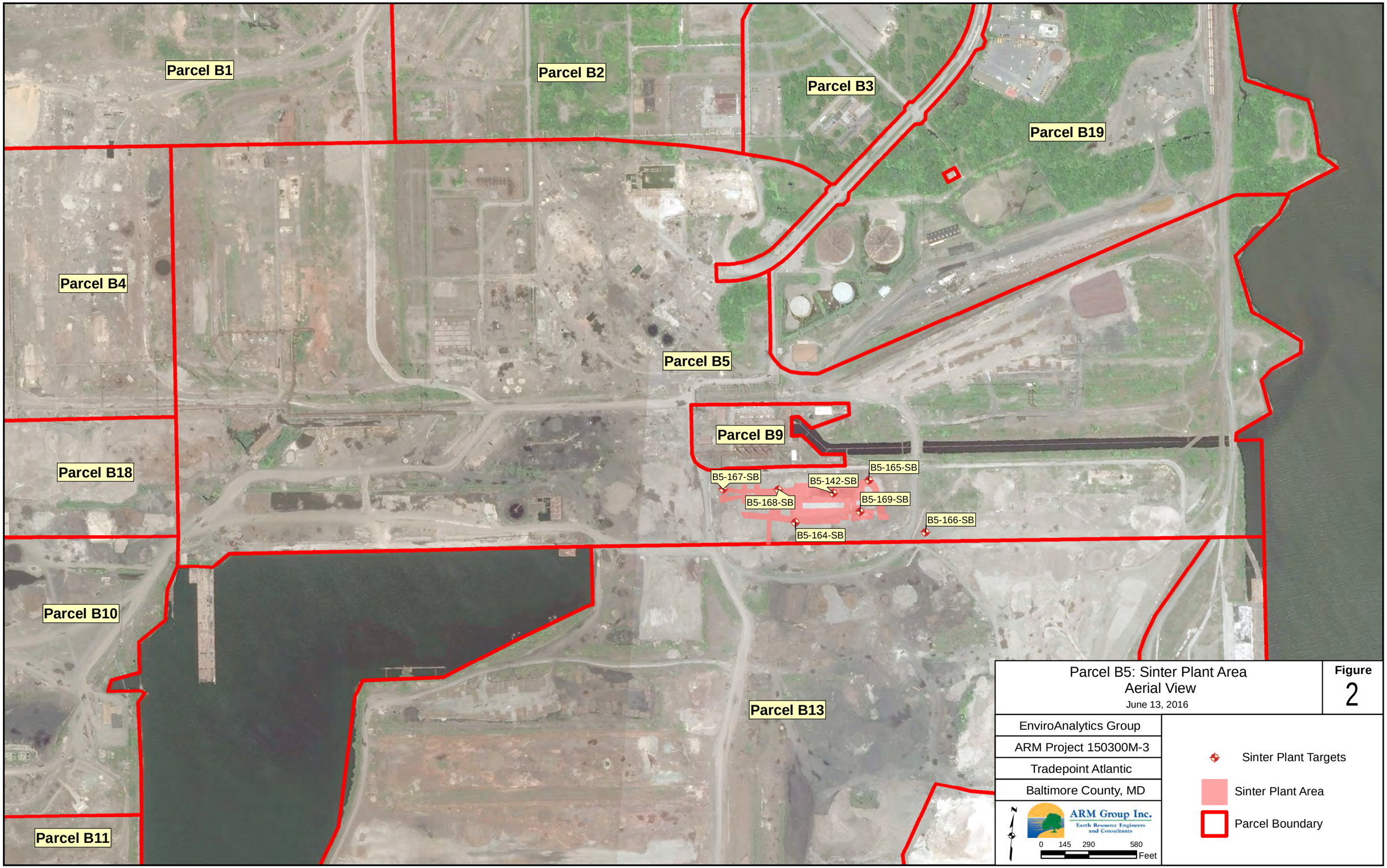
Site Boundary
Private Property
Area A Boundaries
Area B Boundaries

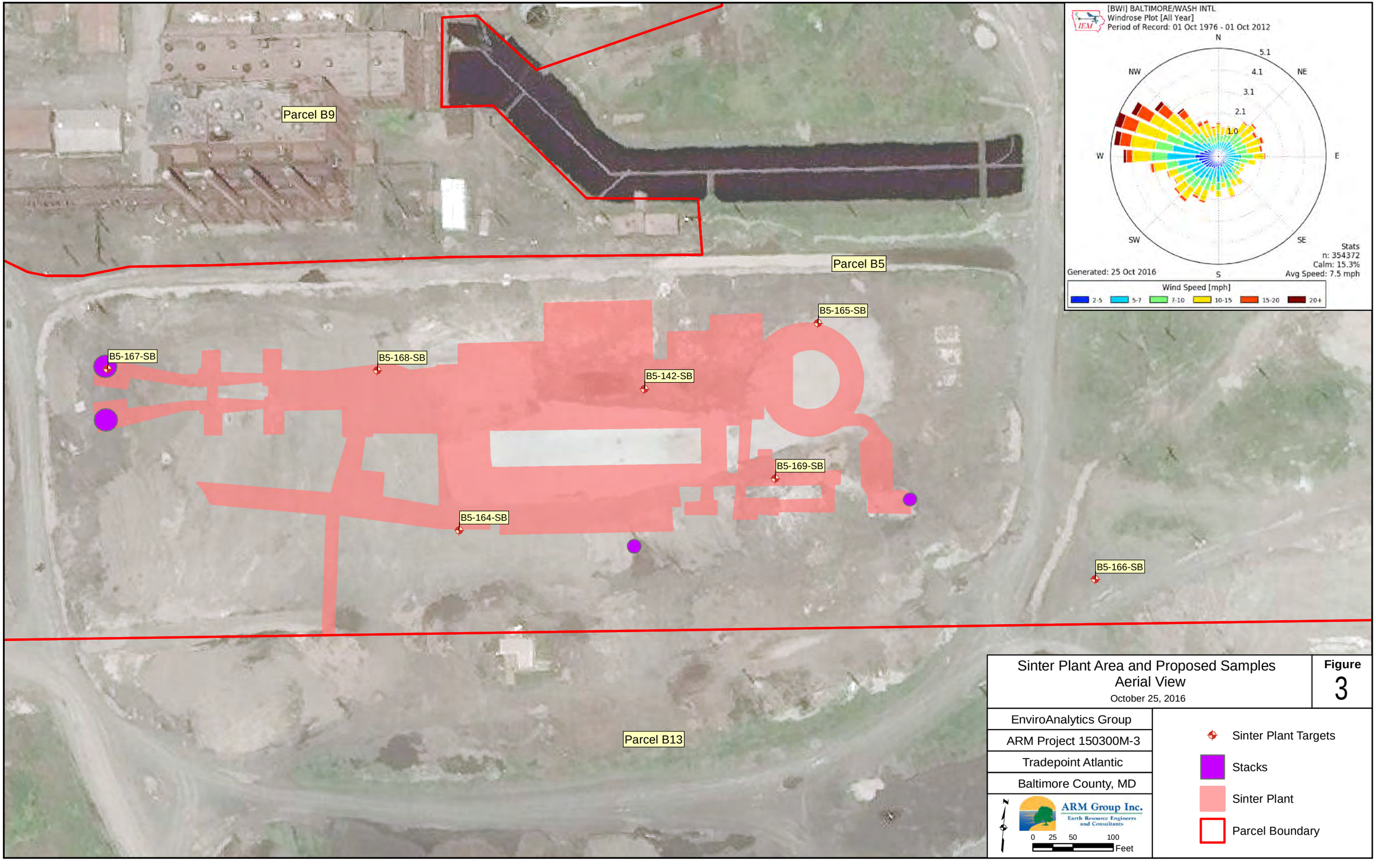
Tradepoint Atlantic
Area A and Area B Parcels

August 1, 2016

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

Figure
1


Parcel B1
Parcel B2
Parcel B3
Parcel B19
Parcel B4
Parcel B5
Parcel B9
Parcel B18
B5-165-SB
B5-167-SB
B5-142-SB
B5-168-SB
B5-169-SB
B5-166-SB
B5-164-SB
Parcel B10
Parcel B13
Parcel B11
Parcel B5: Sinter Plant Area
Aerial View
June 13, 2016
Figure
2
EnviroAnalytics Group
ARM Project 150300M-3
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 145 290 580
Feet
Sinter Plant Targets
Sinter Plant Area
Parcel Boundary


Parcel B9
Parcel B5
Parcel B13
B5-167-SB
B5-168-SB
B5-142-SB
B5-165-SB
B5-169-SB
B5-164-SB
B5-166-SB
[BWI] BALTIMORE/WASH INTL
Windrose Plot [All Year]
Period of Record: 01 Oct 1976 - 01 Oct 2012
N
NE
E
SE
S
SW
W
NW
5.1
4.1
3.1
2.1
1.0
Generated: 25 Oct 2016
Stats
n: 354372
Calm: 15.3%
Avg Speed: 7.5 mph
Wind Speed [mph]
2-5
5-7
7-10
10-15
15-20
20+
Sinter Plant Area and Proposed Samples
Aerial View
October 25, 2016
Figure
3
EnviroAnalytics Group
ARM Project 150300M-3
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 25 50 100
Feet
Sinter Plant Targets
Stacks
Sinter Plant
Parcel Boundary