BrightFields, Inc.

Appendix 17

HARPER THIEL PROPERTY

WILMINGTON, DELAWARE

SIRS ID: DE-0197

GENERAL SITE INFORMATION

Site Name: Harper Thiel Property

SIRS ID Number: DE-0197

Site Location and Description:

The Harper Thiel property is located at 3101 & 3201 Miller Road in Wilmington, Delaware. The site is approximately 2.4 acres in size and consists of two tax parcels (#2600820001 and #2600820021) (Figure 1). Miller Road runs along the southeast edge of the property with Haynes Park on the other side of the road. Railroad tracks run on the northwest edge parallel to Miller Road. To the northeast, east, and southwest are commercial, residential, and recreational properties.

Based on 2012 Site Specific Assessment, site topography causes surface water from the Site to flow southwest toward a small unnamed ephemeral creek located approximately 20 feet west of the Site in Haynes Park. The creek flows into the Brandywine Creek, which is approximately 570 feet west of the Site, and eventually joins the Christina River. However, there is a public sewer system in Miller Road which captures the majority of runoff.

The property is currently owned by Wilmington Urban Development Action Grant (UDAG) Corporation but negotiations are taking place for a prospective buyer to redevelop the Site.

Previous Site Uses:

The property has been used for industrial purposes since the early 1900s. Based on the sources reviewed, it appears that Building I was the first building on the property and was constructed in the early 1900's. Early uses of the building include the Delaware Chemical Engineering Company and a possible research laboratory for the Darco Division of the Atlas Powder Company. The property was sold to Harper-Thiel in 1946 and operated as an electroplating facility until it closed in 2000. Electroplating is the process of depositing a metallic coating onto an object immersed in an electrolyte solution. The Harper-Thiel Electroplating Facility included the use of chrome, nickel, cadmium, copper, gold, and silver. Electroplating liquids and other chemicals were spilled and/or leached into the ground over the years. The Harper-Thiel Plating Facility closed in 2000 and the property has remained vacant since this time.

Site Regulatory Status:

This section briefly summarizes previous investigations performed on the site through the SIRS program. A current SIRS regulatory status is also included.

Chronology of Investigations and Regulatory Actions

Investigation or Regulatory Action	Date	Description
Preliminary Assessment of Estate of Mary Thiel Site (DNREC)	1988	All generated waste was kept on site in double lined tanks and in a drum storage building. After assessing the site, DNREC recommended no further action.
Environmental Investigation Reports (DNREC-HWMB and DNREC Superfund Branch)	1992	These investigations were summarized in the 2002 Draft Remedial Investigation Work Plan (RIWP) prepared by Environmental Alliance, Inc. The summary did not provide the full laboratory data and only had approximate sample locations for the second investigation. Therefore, the samples were not included in the analysis. The purpose of the first investigation, performed by DNREC-HWMB, was to determine if Haynes Park was impacted by the operations at Harper Thiel and other businesses in the area. Aroclor 1254 was detected in three soil samples taken from behind Building A on the Harper Thiel Property, but DNREC ruled that all constituents detected in the park were within acceptable limits. DNREC recommended no further environmental investigation at Haynes Park and that DNREC's HWMB and EPA Region III supervise corrective action activities at the Harper Thiel Site. During the second investigation, the DNREC Superfund Branch (now SIRS) collected soil and surface water samples in two phases to supplement existing data. During the first phase, 11 of the 18 total surficial sediment/soil samples were collected from the Harper Thiel Property. During the second phase, two of the four subsurface soil samples were collected from the Property. All of the samples were analyzed for PCBs, however the summary in the 2002 RIWP did not state if PCBs were detected.

Investigation or Regulatory Action	Date	Description
Hazardous Waste Closure Report (JCA Associates)	1995	This report was summarized in the 2002 Draft RIWP. James C. Anderson Associates, Inc. prepared the Hazardous Waste Closure Plan in 1993 describing removal of wastes from the hazardous waste management units and post-closure sampling of soils. Soil samples were collected from all five units and analysis showed concentrations of cadmium and lead that exceeded URS restricted use standards.
Sampling of Harper-Thiel Property (DNREC)	2001	The 2001 sampling was summarized in the 2002 Draft RIWP. Ten surface soil samples were collected from the southwest portion of the property. Results exceeded URS standards for restricted use for arsenic, chromium, and mercury. Samples were not analyzed for PCBs.
Remedial Investigation Report, OU-I & OU-II of the Former Harper-Thiel, Inc. (Environmental Alliance)	2002-2005	RI Site investigation activities included collecting soil, sediment, groundwater, and surface water samples. An Interim Action soil removal was conducted in October 2002 to excavate PCB-impacted soil based on areas with soil concentrations above the DNREC's restricted use URS values. The Human Health Risk Assessment (HHRA) indicated that the contaminants of concern (COCs) in the soil for an industrial/construction worker exposure scenario were antimony, arsenic, hexavalent chromium, iron, Aroclor-1254, and benzo(a)pyrene.
Feasibility Study Report for the Former Harper-Thiel Electroplating Facility (EA Engineering)	2007	The Feasibility Study (FS) was compiled based on the findings of the RI Report for OU-I and OU-II. EA determined that the COCs with unacceptable non-carcinogenic risks were PCBs (specifically Aroclor 1254), hexavalent chromium, and lead for the industrial/construction worker use scenario. Remedial action objectives (RAOs) were developed to prevent human/ecological exposure to site COCs and to prevent off-site migration of contaminants in the soil that exceed risk-based industrial preliminary remediation goals (PRGs) in the soil. Based on the exposure scenarios, the PRGs were set at 4 mg/kg for PCBs (Aroclor-1254), 635 mg/kg for hexavalent chromium, and 1,000 mg/kg for lead.

Investigation or Regulatory Action	Date	Description
Final Plan of Remedial Action for the Former Harper-Thiel Site (DNREC)	2007	The Final Plan of Remedial Action (FPRA) stated that due to the past operations, surface and subsurface soils had become contaminated with heavy metals (hexavalent chromium and lead) and PCBs. The groundwater in the area was also contaminated with hexavalent chromium at concentrations exceeding Maximum Contaminant Levels (MCLs) for drinking water. Based on the investigations performed on the site, DNREC recommended excavation and off-site disposal for soils near the former chromium plating tanks impacted with hexavalent chromium, soil beneath the wooden floor of Building I impacted with lead and PCBs, and the vegetated portion of the site that contained surface soils impacted with PCBs.
Draft Remedial Action Report for the Former Harper-Thiel Electroplating Facility (EA Engineering)	2009	EA demolished five buildings (Buildings IV, VI, IX, XI, and XIV), several concrete slabs, and auxiliary structures. During the excavations, a 300-gallon heating oil underground storage tank (UST) was discovered and removed. A UST Closure Report (EA, 2009) detailing the tank removal activities was submitted to DNREC-TMS, and in February 2009, a No Further Action with Conditions letter was issued for this tank. They excavated approximately 3,600 tons of contaminated soil from the five areas. Post excavation confirmation soil samples were collected from excavated areas to determine whether soils with COCs above the RAOs had been removed. EA also removed miscellaneous chemicals, materials, and containers that had been left at the site. After remediation was completed, EA prepared an Operation and Maintenance (O&M) Plan to provide a framework for required ongoing maintenance and monitoring. According to the O&M Plan, there are existing areas on the site where soil exceeding the RAOs was left in place. Due to the historic significance of Building I, some asbestos containing materials were also left undisturbed to minimize building damage.
Site Specific Assessment Report for the Harper Thiel Site (BrightFields)	2012	BrightFields conducted a Site Specific Assessment (SSA) of the property to supplement the previous investigations of the former plating facility area and to evaluate current conditions in the wooded area southwest of the Site. In addition, the results of the investigation could be used to assess additional remedial steps needed to allow the site to meet applicable standards for redevelopment. A total of 42 soil samples were collected

Investigation or Regulatory Action	Date	Description
Site Specific Assessment Report for the Harper Thiel Site (BrightFields)	2012	and screened for metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and PCBs. 12 samples were analyzed for selected parameters using HSCA methods. Analytical results indicated that Aroclor 1254 was detected in five surface soil samples at concentrations ranging from 0.092 mg/kg to 10 mg/kg and in two subsurface samples at concentrations of 0.11 mg/kg and 0.13 mg/kg. The report concluded that despite the previous soil removals, there are still areas impacted with cadmium, lead, and PCBs with concentrations above residential and commercial standards in the former plating facility area.
Focused Feasibility Study (BrightFields)	2012	The Focused Feasibility Study (FFS) was a follow up to the SSA in order to evaluate the remedial actions that would be necessary for the site to meet unrestricted use requirements. BrightFields advanced ten hand auger borings to collect additional soil samples at the property and further evaluate the extent of impacted soil left at the property. A total of 22 soil samples were collected and screened, then select samples were chosen for confirmatory analysis. The screening results indicated that PCBs were not detected in any of the samples and only two soil samples were submitted for confirmatory analysis. Analytical results indicated that PCBs were detected in both samples at concentrations exceeding the unrestricted use URS of 0.3 mg/kg. The results indicated that additional soil would need to be excavated from the property to meet unrestricted use criteria.
Summary of Additional Soil Delineation Sampling (EA Engineering)	2012	EA performed additional soil sampling at the Harper Thiel property in June 2012 in an effort to delineate lead and PCB concentrations in the vicinity of the February and April 2012 soil sample locations. Based on the results of the delineation sampling, EA Engineering estimated the total extent of PCB-impacted surface soil greater than 0.3 mg/kg to be approximately 4,296 ft^2 with a volume of 8,592 ft^3.

<u>Current Regulatory Status:</u>

In 2012, the Delaware Center for Horticulture signed a Brownfields Development Agreement. The site is currently unoccupied and there is no evidence of immediate plans for further investigation

or remediation at this time on the DNREC Environmental Navigator. However, the property may be sold and redeveloped in the future by a prospective buyer.

SUMMARY OF SITE PCB INFORMATION

Site Investigation PCB Findings:

For purposes of the PCB loading estimates, surface soil is defined as 0 to 2 feet below ground surface (bgs). Samples collected from soil depths spanning 2 feet bgs were included in both the surface and subsurface data sets.

PCBs were detected in 37 surface soil samples, with concentrations ranging from 0.027 mg/kg to 70 mg/kg, as well as an additional seven screening samples without ranges of detection. In the unsaturated subsurface soil, PCBs were detected in 14 samples, with concentrations ranging from 0.025 mg/kg to 11 mg/kg, as well as one additional soil screening sample with low PCBs. PCBs were not detected in subsurface saturated soil samples.

Based on the analytical data available, the 95% upper confidence limit (UCL) of the mean of the concentration of total PCBs observed in the surface soil (for overland flow calculations) is 2.9 mg/kg. There were no PCBs detected in groundwater.

Concentrations of PCBs on Site			
Sample Matrix	**Corresponding Figure**	**Analytical Methods**	**Range of Total PCBs**
Surface Soil	Figure 2	Method 8082 and Screening Data	Not detected to 70 mg/kg
Subsurface Soil (unsaturated)	Figure 3	Method 8082 and Screening Data	Not detected to 11 mg/kg
Subsurface Soil (saturated)	Figure 4	Screening Data	Not Detected
Groundwater	Figure 5	Method 8082	Not Detected

A summary of all samples collected for PCB analyses are presented in Tables 1 through 3.

Acreage where PCBs detected:

The estimated surface soil area impacted by PCBs is 0.55 acres (Figure 2). The estimated subsurface unsaturated soil area impacted by PCBs is 0.28 acres (Figure 3). Based on the data available and reviewed by BrightFields, the subsurface saturated soil and groundwater is not impacted by PCBs.

PCB Remediation Status:

In 2009, 3,600 tons of contaminated soil were excavated from the site. Additional PCB remediation will be required at the Harper Thiel site for unrestricted use; however, according to the DNREC Environmental Navigator, no work plans have been submitted to DNREC.

PCB MASS LOADING SUMMARY

The PCB mass loading rate to surface water via overland flow was estimated for the Harper Thiel Property. There were no reported concentrations of PCBs in the subsurface saturated zone or in the groundwater; therefore, groundwater transport cannot be evaluated as a mechanism of transport for PCBs at the Property. A summary of the results is included below and the details of the calculations are included as attachments to this Appendix.

Overland Flow:

Overland flow has been determined on this site by using the Revised Universal Soil Loss Equation (RUSLE). The RUSLE predicts the long term average annual rate of erosion on an area based on rainfall patterns, soil type, topography, cover/canopy factors and support management practices. These specific factors are site specific and rely on local information of the site. A breakdown of the individual factors is presented below with a brief explanation of their choice.

Ground Cover and Canopy:

The surface cover and flow paths were assessed through aerial photography and available contour mapping (Delaware Data Mil, 2007). The cover/management factor (C) assigned to the erodible area and associated flow paths was 0.003, which corresponds to grass or grass like vegetation with greater than 95% coverage in pervious areas.

Site Sediment and Erosion Control Practices:

Based on the aerial photography evaluation and review of site documents it does not appear that any sediment and erosion control practices are being implemented on Site.

Input Factors and Results:

A breakdown of the individual factors is presented below with a brief explanation of their choice.

Harper Thiel Property

RUSLE Factors	Values Provided	Explanation of choice
R = rainfall-runoff erosivity index (10^2 ft-tonf-in/ac-hr-yr)	175	An appropriate value for R for the Site was determined using the Isoerodent Map of the Eastern U.S. from the Stormwater Phase II Final Rule Construction Rainfall Erosivity Waiver (USEPA, 2012).
K = soil erodibility (0.01 ton-ac-hr/ ac-ft-tonf-in)	0.42	The soil erodibility factor was assigned using surface soil descriptions from soil logs to assess the soil composition and equate them to a corresponding generic soil type and organic material content within the RUSLE program.
ls = topographic factor (dimensionless)	0.16	The topographic factor was derived based on the slope and flow accumulation grids created in ArcGIS. An output LS grid was created and the average value for the grid is provided.
C = cover/management factor (dimensionless)	0.003	The cover/management factor C assigned to the erodible area and associated flow paths was 0.003, which corresponds to grass like vegetation with greater than 95% coverage in pervious areas.
P = support practice factor (dimensionless)	1	No documentation was provided indicating that any sediment and erosion controls are in place.
A = average annual soil loss estimate (ton/ac-yr)	0.032	The average soil loss estimate was generated by ArcGIS using the input factors listed above.
Erodible Area (acres)	0.48	The erodible area was calculated based on the pervious surfaces within the area of concern polygon for surface soil (Figure 6).

For factors that were not consistent across the site, rasters were used to characterize the variations. Due to the methodology utilized to derive the soil loss estimate, the numbers listed above cannot simply be multiplied.

The total estimated PCB loading via overland flow for the Harper Thiel Property is **0.041 grams per year**. Please see attached table for specific variables.

Uncertainty Analysis Associated with Overland Flow

Specific Areas and Degree of Uncertainty for the Harper Thiel Property

	Samples Per Acre (site)	Chemical Data Quality*	Soil Type	Site Coverage	Map Quality	Average Distance to Discharge Point
Site Specific Information	95	Screening Data	Detailed site logs	Based on a site assessment	Well Scaled Map; GPS Points	Approximately 254 feet
Degree of Uncertainty	Low	High	Moderate	Moderate	Low to Moderate	Low to Moderate

* Primary analysis used in the historical samples

Sources of uncertainty for the Harper Thiel Property site include: Most of the data was Immunoassay screening data, some of which did not have a range of concentrations. There were also some samples that had Aroclor lab data. The majority of the sample locations were from well scaled maps and some of the sample locations had GPS coordinates. Based on this evaluation the level of uncertainty associated with overland flow PCB mass loading from the Harper Thiel Property is **Moderate.**

Groundwater Discharge Analysis:

No groundwater discharge analysis was performed for this site.

Site References:

BrightFields, Inc., 2012, Site Specific Assessment Report, April 2012.

BrightFields, Inc., 2012, Focused Feasibility Study, September 2012.

Delaware Department of Natural Resources and Environmental Control (DNREC), 1988, A Preliminary Assessment of Estate of Mary Thiel Site, March 1988.

DNREC, 1992, Harper Thiel, Inc. and Haynes Park Environmental Investigation Report, May 1992, Revised June 1992.

DNREC, 2007, Final Plan of Remedial Action, Harper-Thiel Site, July 2007.

EA Engineering, Science, and Technology, Inc., 2007, Feasibility Study Report for the Former Harper-Thiel Electroplating Facility, May 2007.

EA Engineering, Science, and Technology, Inc. to DNREC, Summary of Additional Delineation Sampling at the Former Harper-Thiel Electroplating Facility (DE-0197), August 2012.

Environmental Alliance, Inc. and MIG Environmental, Inc., 2002, Draft Remedial Investigation Work Plan, Former Harper-Thiel, Inc., July 2002, Revised October 2002.

Environmental Alliance, Inc. and MIG Environmental, Inc., 2003, Interim Action Report- Soil Removals, March 2003.

Environmental Alliance, Inc., 2005, Remedial Investigation Report, OU-I & OU-II, Former Harper-Thiel, Inc., August 2005.

Harold Gray of Wilmington UDAG Corporation to Joanne Marinelli of US Environmental Protection Agency, Region III, Harper Thiel Electroplating Company Site, 3101-3201 Miller Street, Wilmington, DE, May 2014.

Figures

PA
NJ
MD
DE
Delaware Bay
Site Location
Soil Sample
Groundwater Sample
Creek
Harper Thiel Site Boundary (2.40 acres)
Tax Parcels
Source: Delaware Data Mill, - Aerial 2012, Tax Parcels.
BrightFields, Inc.
Environmental Evaluation
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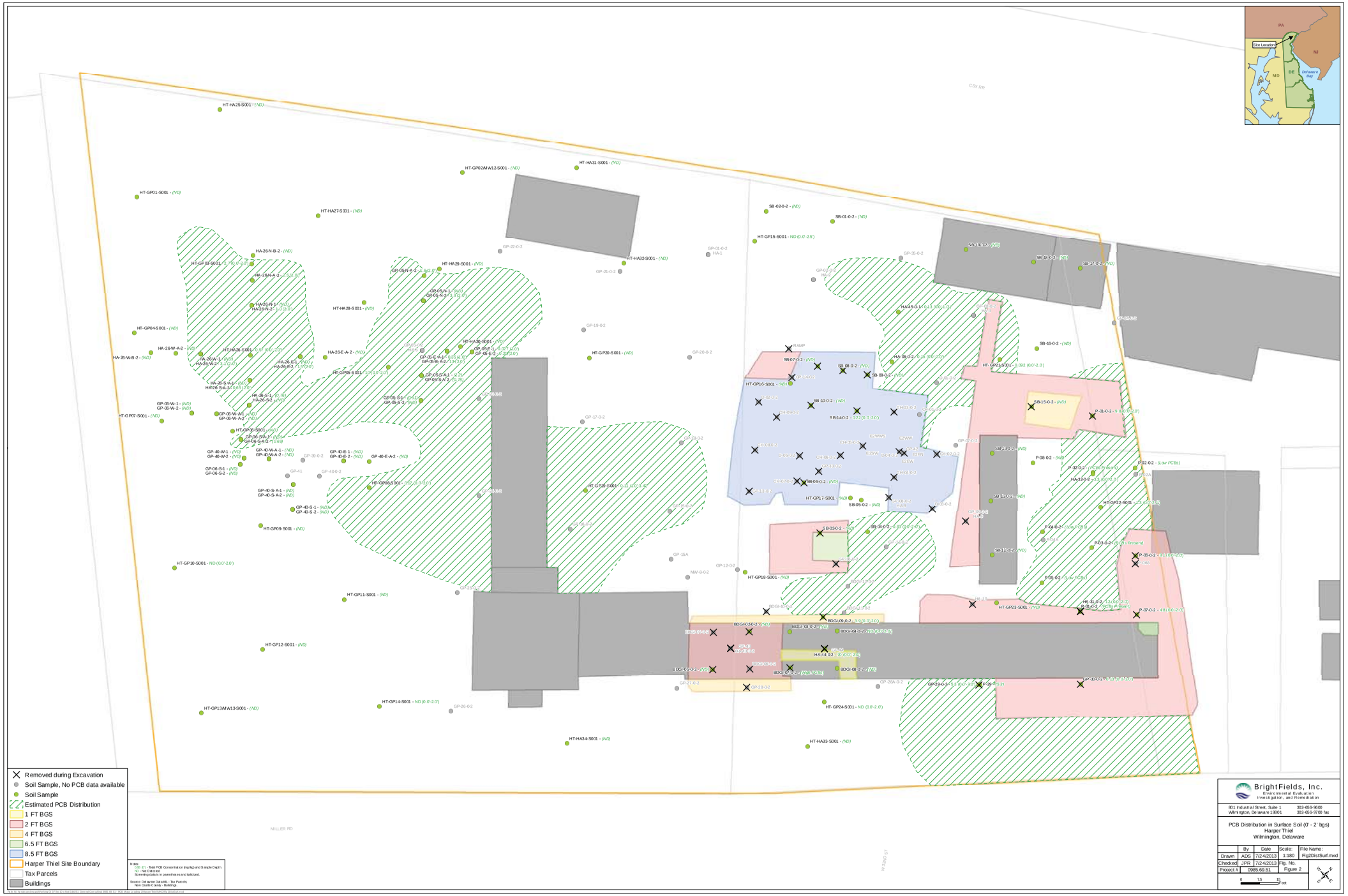
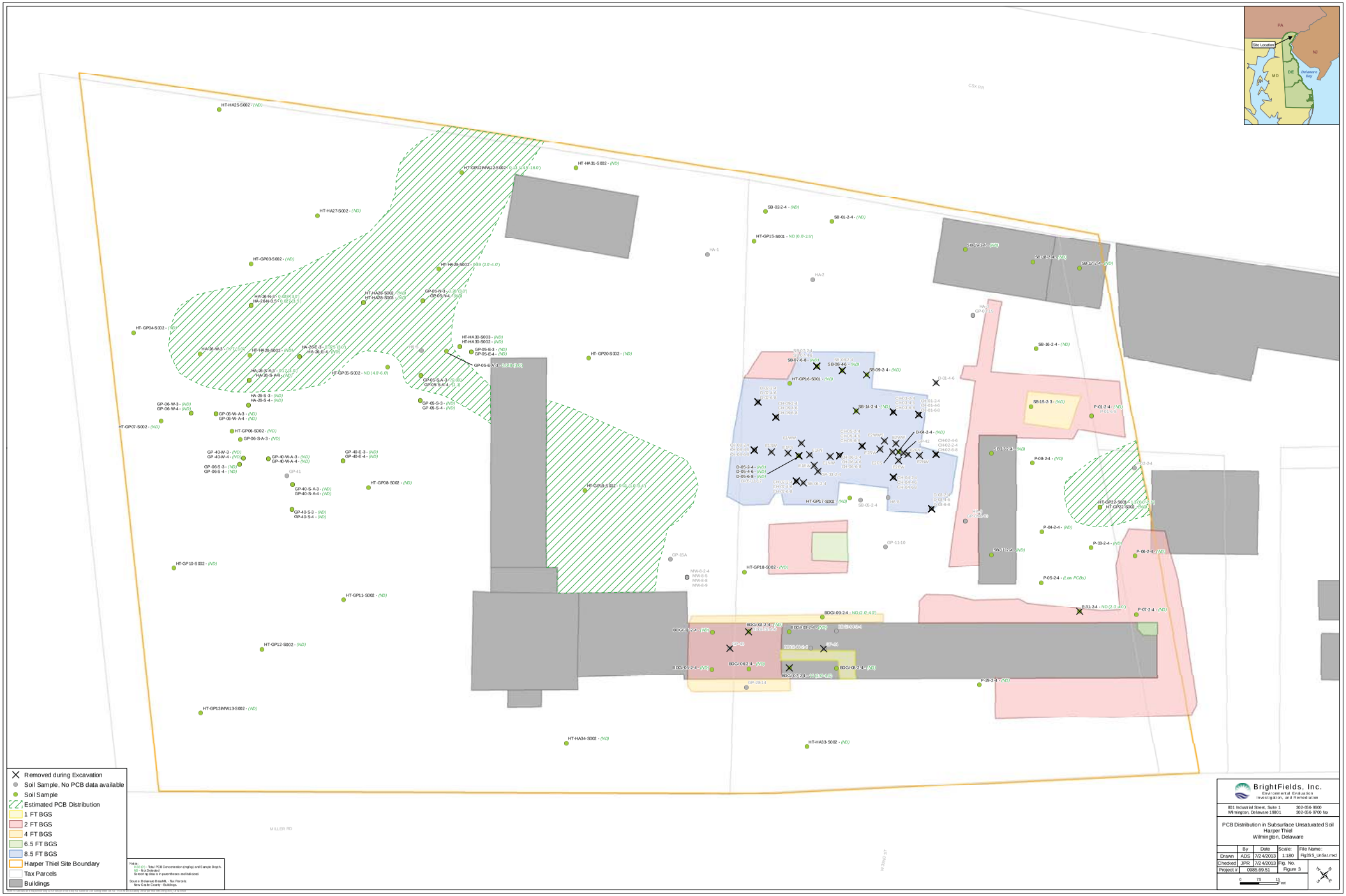
801 Industrial Street, Suite 1
Wilmington, Delaware 19801
302-656-9600
302-656-9700 fax
Historic Sample Locations
and Aerial Photograph (2012)
Harper Thiel
Wilmington, Delaware
By
Date
Scale:
File Name:
Drawn
ADS
6/18/2014
1:180
Fig1SiteLoc.mxd
Checked
KEP
6/18/2014
Fig. No.
Project #
0985.69.51
Figure 1
0
7.5
15
Feet
N
W
E
S



PA
NJ
MD
DE
Site Location
Delaware Bay
CSX RR
MILLER RD
W 32ND ST
Removed during Excavation
Soil Sample, No PCB data available
Soil Sample
Estimated PCB Distribution
1 FT BGS
2 FT BGS
4 FT BGS
6.5 FT BGS
8.5 FT BGS
Harper Thiel Site Boundary
Tax Parcels
Buildings
Notes:
0.00 (0') - Total PCB Concentration (mg/kg) and Sample Depth.
ND - Not Detected
Screening data is in parentheses and italicized.
Source: Delaware DataMIL - Tax Parcels, New Castle County - Buildings.
BrightFields, Inc.
Environmental Evaluation
Investigation, and Remediation
801 Industrial Street, Suite 1
Wilmington, Delaware 19801
302-656-9600
302-656-9700 fax
PCB Distribution in Surface Soil (0' - 2' bgs)
Harper Thiel
Wilmington, Delaware
By
Date
Scale:
File Name:
Drawn
ADS
7/24/2013
1:180
Fig2DistSurf.mxd
Checked
JPR
7/24/2013
Fig. No.
Project #
0985.69.51
Figure 2
0
7.5
15
Feet


PA
NJ
MD
DE
Delaware Bay
Site Location
CSX RR
MILLER RD
W State ST
HT-HA25-S002 - (ND)
HT-HA27-S002 - (ND)
HT-GP03-S002 - (ND)
HT-GP04-S002 - (ND)
HT-GP07-S002 - (ND)
HT-GP10-S002 - (ND)
HT-GP11-S002 - (ND)
HT-GP12-S002 - (ND)
HT-GP13MW13-S002 - (ND)
HT-HA31-S002 - (ND)
HT-HA34-S002 - (ND)
HT-HA33-S002 - (ND)
HT-GP20-S002 - (ND)
HT-GP08-S002 - (ND)
HT-GP18-S002 - (ND)
HT-GP15-S001 - ND (0.0'-2.5')
HT-GP16-S001 - (ND)
HT-GP17-S002 - (ND)
HT-GP21-S001 - 1.1 (ND-2.5')
HT-GP22-S002 - (ND)
SB-02-2-4 - (ND)
SB-01-2-4 - (ND)
SB-09-2-4 - (ND)
SB-14-2-4 - (ND)
SB-16-2-4 - (ND)
SB-15-2-3 - (ND)
SB-13-2-4 - (ND)
SB-11-2-4 - (ND)
P-01-2-4 - (ND)
P-08-2-4 - (ND)
P-04-2-4 - (ND)
P-03-2-4 - (ND)
P-06-2-4 - (ND)
P-05-2-4 - (Low PCBs)
P-31-2-4 - ND (2.0'-4.0')
P-07-2-4 - (ND)
P-29-2-4 - (ND)
D-04-2-4 - (ND)
D-05-2-4 - (ND)
D-05-4-6 - (ND)
D-05-6-8 - (ND)
BDGI-09-2-4 - ND (2.0'-4.0')
Removed during Excavation
Soil Sample, No PCB data available
Soil Sample
Estimated PCB Distribution
1 FT BGS
2 FT BGS
4 FT BGS
6.5 FT BGS
8.5 FT BGS
Harper Thiel Site Boundary
Tax Parcels
Buildings
Notes:
0.58 (0') - Total PCB Concentration (mg/kg) and Sample Depth.
ND - Not Detected
Screening data is in parentheses and italicized.
Source: Delaware DataMIL - Tax Parcels
New Castle County - Buildings
BrightFields, Inc.
Environmental Evaluation
Investigation, and Remediation
801 Industrial Street, Suite 1
Wilmington, Delaware 19801
302-656-9600
302-656-9700 fax
PCB Distribution in Subsurface Unsaturated Soil
Harper Thiel
Wilmington, Delaware
By
Date
Scale:
File Name:
Drawn
ADS
7/24/2013
1:180
Fig3HS_UnSat.mxd
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JPR
7/24/2013
Fig. No.
Project #
0985.69.51
Figure 3
0
75
15
Feet