

**Memo**

---

<b>To</b>	Tauren Beggs, WDNR
<b>From</b>	John Roberts, David de Courcy-Bower, Robert Fetter
<b>Date</b>	30 August 2022
<b>Reference</b>	0383990
<b>Subject</b>	2022 Work Plan Addendum II – Pre-Design Groundwater and Soil Investigation Former Hamilton Industries Facility 1316 East 18 <sup>th</sup> Street Two Rivers, WI 54241 BRRTS # 0236578316

---

This work plan addendum was developed on behalf of Fisher Scientific International, LLC, a wholly owned subsidiary of Thermo Fisher Scientific, Inc. (the “Client”), for the Former Hamilton Industries Facility (Site) located in Two Rivers, Wisconsin.

**Background**

This work plan describes proposed additional Site investigation activities for continued groundwater monitoring, pre-remediation soil sampling, and evaluation of the potential for select contaminants to be present at the Site. Specifically, this work plan is based on the following:

- The results of remedial investigation work presented in the April 19, 2021 remedial options actions report (ROAR)
- The March 18, 2022 ERM memorandum entitled *October and November 2021 Additional Groundwater and Soil Investigation*
- The May 4, 2022 WDNR letter - Response to Technical Assistance Request – Contaminants of Concern and Media Evaluation Hamilton Industries Site (Former)

A WDNR response letter to the Status Report and Remedial Action Options Evaluation dated July 16, 2021 identified additional investigation activities that were necessary to address the requirements of the July 16, 2021 letter with the investigation results to be submitted to WDNR for review. WDNR subsequently provided a May 4, 2022 response that confirmed prior approved/completed items and presented additional assessment, sampling and analysis requirements. Based on the WDNR July 16, 2021 and May 4, 2022 comment letters, the completed investigation items include:

- Contaminant Evaluation
  - The upland investigation for volatile organic compounds (VOCs) is considered complete for soil, groundwater, and vapor.
  - No Further evaluation and sampling for metals, polycyclic aromatic hydrocarbons (PAHs) in soil or groundwater is required.

Completion of the upland area VOC investigation preceded moving forward with selection and implementation of a groundwater remedial action for the Central groundwater contaminant plume located immediately south of 17<sup>th</sup> Street and west of the East Twin River (Figure 1). This work plan includes additional, pre-design sampling and well installation activities to obtain data to determine the viability of several insitu injection remediation technologies.

According to the WDNR's correspondence, the outstanding investigation items include:

- Environmental Media Evaluation
  - The media evaluation for sediment and surface water should be completed for chlorinated VOCs and 1,4-Dioxane.
  - Written justification of why all the contaminants sampled at the site should or should not be sampled for in sediment and surface water in the adjacent East Twin River.
- Contaminant Evaluation
  - Further evaluation and sampling are required for polychlorinated biphenyls (PCBs) associated with transformers and building materials in close proximity to SB-06 and SB-07 to define the degree and extent of PCB soil impacts.

### ***Planned Scope of Work***

To further evaluate these items, the additional Site investigation activities include:

1. Perform a surface water and sediment media evaluation to assess the potential for site contaminants (including CVOCs and 1,4-Dioxane) to have migrated from upland areas to the East Twin River at concentrations that could exceed applicable surface water and sediment regulatory criteria. The assessment will involve updating the site conceptual model (SCM) by utilizing available Site-collected data and published river and sediment data along with records of historical site operations.
2. Advance soil borings to collect soil samples from the upper and lower portions of the Central TCE groundwater plume area. Samples will be collected for evaluation of soil oxidant demand and response to zero valent iron treatment. Additionally, the soil borings will be converted into plume treatment performance monitoring wells. Update the site 3-dimensional data visualization model with the new site boring and well data.
3. Advance eight shallow soil borings to define the extent of PCB impacted soil surrounding the November 2021 investigation SB-6 and SB-7.
4. Perform pre-injection outfall reconnaissance. Typical locations include but are not limited to storm and sanitary sewer piping, backfill, and outfalls; changes in land slope; and river sheet-pile joints and ends.
5. Reporting

## 1. **Media Evaluation Surface Water and Sediment –**

River-upland factors will be added to the existing SCM to assess the potential for site contaminants to have migrated from the upland areas to the East Twin River at concentrations exceeding applicable surface water and sediment regulatory criteria. These factors will include:

- Review historic site operations relative to the potential for discharges to the East Twin River.
- The evaluation will utilize to the extent practicable, existing published contaminant data for the East Twin River to determine the contribution of potential sources located upstream of the former Thermo Fisher property.
- Assess historical dredging, seawall, and bridge construction upstream and on the reach of the East Twin River located adjacent to the former Thermo Fisher property.
- Evaluate the ability for Site contaminants to migrate via groundwater flow into the River.

The above will be used to assess background PFAS concentrations in the East Twin River and whether potential contributions from the site are discernible. The evaluation will also determine the potential for Site contaminants to impact East Twin River water quality using the surface water quality criteria established by the WDNR as the endpoint of the migration pathway. Endpoint receptors will include ingestion or direct contact by humans, and where possible, biological impacts of organisms known to subsist in the East Twin River ecosystem.

## 2. **Pre-Design Investigation and Additional Soil Investigation –**

Additional soil borings and monitoring wells will be installed to obtain data necessary to design potential insitu remedial approach to address the Central Plume. Additional soil samples will be collected to determine the extents of PCB contamination around previously installed soil borings SB-6 and SB-7 (discussed in Section 3).

Prior to drilling soil borings and in accordance with State and local regulations, Wisconsin Digger's Hotline will be contacted to mark-out where public utilities enter the Site. A private utility location company will conduct an on-site utility survey to inspect and mark-out the proposed sampling locations. The locations will be verified, if possible, for the presence of underground utility lines and underground infrastructure based on available maps. Wherever possible, locations will be moved to avoid being within 10 feet of a known subsurface utility. The scope of work for the utility locator will involve the use of a precision cable locator, signal generator, and/or ground penetrating radar (GPR) to locate, trace, and map out potential services in the investigation target areas. An area of sufficient size will be scanned for utilities to allow for flexibility in boring location during drilling. Each location will be hand cleared to 6' below ground surface (bgs) using air knife equipment or hand digging tools in order to avoid damaging underground utilities that may not have been detected through prior subsurface clearance activities.

### *Central Plume Remedial Pre-Design Sampling -*

Advance five soil borings to collect soil samples from each of the three plume matrix lithologies (sand, silt, and clay) for soil oxidant demand and zero valent iron (ZVI) treatability testing (Figure 1). Oxidant demand testing will be performed in anticipation of performing chemical oxidation treatment of permeable sand matrices in the upland portion of the Central Plume. The ZVI treatability testing will be performed in anticipation of potentially using ZVI to treat TCE contamination in silt matrices that contain high concentrations of total organic carbon. Two locations will be in the upper plume and three will be in the lower plume area. Three soil samples from each matrix lithology (sand, silt, clay) will be submitted for oxidant demand testing. Three soil samples will be collected from only the silt unit located in the lower plume area for the ZVI treatability study.

Samples for the oxidant demand testing will be collected in plastic zip-lock bags and dispatched to the PeroxyChem laboratory of Tonawanda, New York. Alkaline activated persulfate will be the oxidant used for the oxidant demand testing. The ZVI treatability samples will be collected and placed into 1-liter wide mouth glass jars and sent to Resolution Partners, LLC located in Madison, Wisconsin. Each sample container will be labelled, showing the boring location, sample depth, and sample collection date/time. Both oxidant demand and ZVI treatability testing samples do not need to be kept on ice, but will be shipped in cooler-style containers to the respective laboratories under full chain-of-custody tracking documentation. The ZVI treatability samples will be retained at the laboratory pending receipt of groundwater samples collected from the newly installed remediation performance monitoring wells (described below).

The five soil borings will be converted into remediation performance monitoring wells. The two upper plume area monitoring wells will be completed in the shallow sand interval (similar to MW-13S). One shallow depth interval (sand) and two intermediate depth interval (similar to MW-15S and MW-15I) monitoring wells will be completed in the lower plume area.

Shallow aquifer groundwater samples will be collected for use in ZVI treatability testing. The samples will be collected from two of the lower area newly installed remedy performance monitoring wells and MW-15I using standard groundwater sampling procedures as described in the site 2017 site investigation work plan. The groundwater samples will be identified so they can be paired with the ZVI treatability testing soil samples previously collected from the same location. The groundwater samples will be collected in standard 40 ml VOA vials. Eighteen VOA vials will be collected from each of the three monitoring well locations.

The ZVI treatability testing will be performed as a series of 250 ml beaker tests where approximately 50 grams of site soil are combined with varying amounts of ZVI and 200 ml of site water (site impacted or laboratory spiked with TCE). Up to 12 test container set-ups per boring sample will be prepared and allowed to react over time. The headspace of each test container will be periodically sampled for laboratory analysis to determine concentrations of the volatile reaction

products. The monitoring results will be used to calculate the VOC mass that was reacted by the ZVI.

#### *Dissolved Plume Morphology –*

Using the most recent sampling results for CVOCs and emerging contaminants, the Site three-dimensional plume model will be updated to depict current morphology and areas where remedial action should be focused. The model, created using CTECH-Software's Earth Volumetric Studio (EVS) is capable of allowing the visualization of plume morphology in any direction and at any desired concentration. Volume and contaminant mass estimates will be made of plume constituents for use in the remedial design and for placement of remedial measures. Additionally, the most recent groundwater elevations will be included in the model to depict the direction of groundwater migration towards and into the East Twin River. The model will then be coupled with the outfall reconnaissance (below) and incorporated into a refined SCM.

### **3. Additional PCB Soil Sampling -**

Four shallow soil borings (north, south, east and west) will be advanced around each of the previously sampled borings SB-6 and SB-7 (Figure 2; eight total soil borings) to collect soil samples for PCB analysis. Per ERM sub-surface utility clearance policy, the upper 6 feet, or one foot beyond the invert of the deepest utility within 10 feet of the location, of each soil boring will be hand cleared with a hand auger. The remainder of the soil boring depths will be advanced by using a Geoprobe drilling rig. The proposed soil boring locations are approximately of 20 feet laterally from SB-6 and SB-7 locations.

Soil cores will be continuously sampled using direct push sampling technology and screened in 2-foot intervals with a photoionization detector (PID) equipped with a 10.2 eV detector. The soil from each core will be logged and observed for visual and/ or evidence of impacted soil using the PID. If elevated PID readings are observed, the interval demonstrating the highest PID response, or the most significant indications of impacts, will be retained for laboratory analysis, along with one sample from the first 4 feet bgs. If no elevated PID readings or impacts are observed, then a sample from approximately 10 feet bgs will be collected in addition to the shallow soil sample. Samples will be shipped to Pace Analytical of Green Bay, Wisconsin, a Wisconsin-certified environmental laboratory for PCB analysis using EPA Method 8082.

Soil cuttings will be containerized in properly labelled 55-gallon drums and staged onsite until profiled for disposal at an appropriately licensed facility.

### **4. Pre-Injection Outfall Reconnaissance -**

The City of Two Rivers will be contacted to obtain the most recent layout of subsurface utilities that empty into or cross the East Twin River. Further, the United States Corps of Engineers as-built design of the East Twin River sheet pile structure will be evaluated to determine where breaches

of the wall occur to accommodate utility cross-connections or outfalls, piping, backfill, changes in land slope, and river sheet pile joints and ends.

## 5. **Reporting**

A report will be prepared that presents the groundwater sampling, emerging contaminants, soil sample results, treatability study results, and SCM. The report will include the field and laboratory data collected/received, an emerging contaminants evaluation, data review and analysis, conclusions, and recommendations. The report will be submitted to the WDNR for review.

If you have any questions or require additional information regarding this work plan addendum, please contact me via e-mail at [john.roberts@erm.com](mailto:john.roberts@erm.com) or by telephone at (414) 977-4710.

Yours sincerely,



John C. Roberts, P.G.

*Principal Consultant*

cc     Robert Fetter     Thermo Fisher Scientific (sent via e-mail)  
       Rick Podlaski     Thermo Fisher Scientific (sent via e-mail)

## Attachments

### LIST OF FIGURES

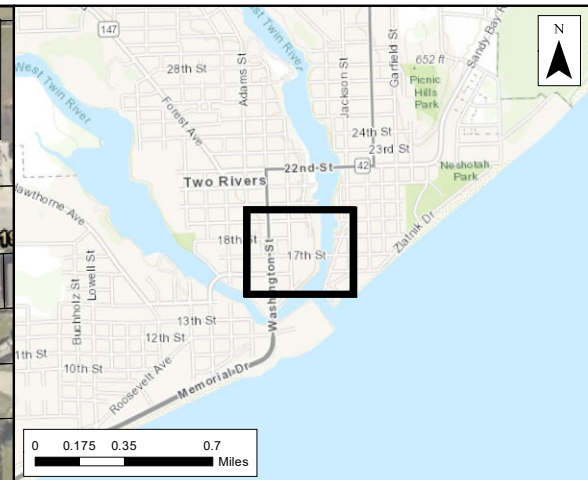
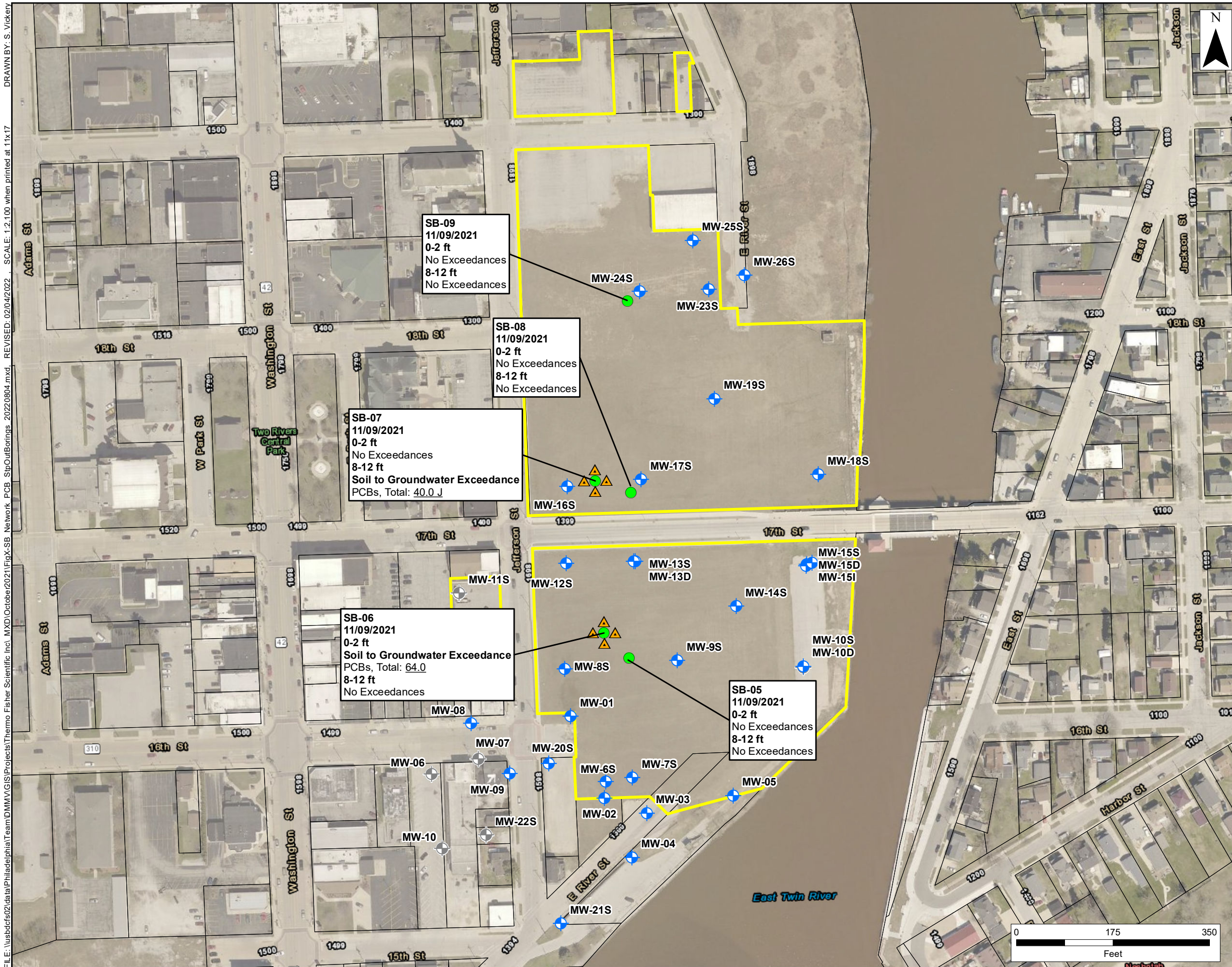
- Figure 1 Central Plume Performance Well Locations
- Figure 2 Proposed PCB Soil Boring Locations







FILE: \\usbdcs02\data\Philadelphia\Team\DMV\GIS\Projects\Thermo Fisher Scientific Inc. MxD\October2021\FigX-SB Network PCB StepOutBorings\_20220804.mxd . REVISED: 02/04/2022 . SCALE: 1:2,100 when printed at 11x17



**Legend**

- ▲ Proposed PCB Step-Out Sample Location
- Soil Boring Location
- ◆ Monitoring Well Location
- ◆ Abandoned Monitoring Well Location
- Property Boundary (Approximate)
- Parcel Boundary

Parameter	NR140	Non-Industrial		Industrial	
	Soil to Groundwater (DF-2)	NTE D-C RCL	Basis	NTE D-C RCL	Basis
Aroclor 1016	NS	4,110	nc	28,000	ca
Aroclor 1221	NS	213	ca	883	ca
Aroclor 1232	NS	190	ca	792	ca
Aroclor 1242	NS	235	ca	972	ca
Aroclor 1248	NS	236	ca	975	ca
Aroclor 1254	NS	239	ca	988	ca
Aroclor 1260	NS	243	ca	1,000	ca
PCBs (Total)	9,384	234	ca	967	ca

**Notes:**  
 1) Results reported in micrograms per kilogram (µg/kg)  
 2) Underlined values exceed the NR720 Migration from Soil to Groundwater RCL, dilution factor 2  
 3) NS = No established standard  
 4) ca = carcinogen  
 5) J = The analyte was positively identified; associated numerical value is the approximate concentration of the analyte in the sample

**Figure 2**  
**Proposed PCB Step-Out**  
**Soil Boring Locations**  
 Former Hamilton Industries  
 1316 18th Street  
 Two Rivers, Wisconsin

Source: Esri - World Topographic Map; NAD 1983 2011 StatePlane Wisconsin South FIPS 4803 Ft US