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FIVE-YEAR REVIEW REPORT FOR SHEBOYGAN HARBOR AND RIVER SUPERFUND SITE
SHEBOYGAN, WISCONSIN

Prepared by
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REGION 5
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Date 8/28/14

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LIST OF ACRONYMS

AOC	Administrative Order on Consent
BOD	biological oxygen demand
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
C&NW	Chicago & Northwestern
DMRs	discharge monitoring reports
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GLLA	Great Lakes Legacy Act
GLNPO	Great Lakes National Program Office
GLRI	Great Lakes Restoration Initiative
GMIT	Groundwater Monitoring/ Interceptor Trench
ICs	Institutional Controls
ICIAP	Institutional Control Implementation and Assurance Plan
ICP	Institutional Controls Plan
ICWP	Institutional Controls Work Plan
mg/L	milligrams per liter
NCP	National Contingency Plan
NTU	Nephelometric Turbidity Unit
NPL	National Priorities List
O&M	operation and maintenance
OU	Operable Unit
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated biphenyls
PMP	Post-Remediation Monitoring Plan
ppm	parts per million
PRP	Potentially Responsible Party

PRS	Pollution Risk Services
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RMU	Remedial management unit
ROD	Record of Decision
RPM	Remedial Project Manager
SWAC	Surface Weighted Average Concentration
Tecumseh	Tecumseh Products Company
TSCA	Toxic Substances Control Act
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
UU/UE	unlimited use and unrestricted exposure
VSP	Visual Sampling Plan
WDNR	Wisconsin Department of Natural Resources
WET	whole effluent toxicity
WPSC	Wisconsin Public Service Corporation
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

This is the second five-year review (FYR) for the Sheboygan Harbor and River Superfund site located in Sheboygan, Wisconsin. The purpose of this FYR is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory FYR was the signing of the previous FYR on September 1, 2009.

The site is comprised of a single operable unit but is divided into separate areas or reaches which include the former Tecumseh Products Company (Tecumseh) Plant, the Upper River, the Middle River, the Lower River, and the Inner Harbor. The site includes the lower 14 miles of the Sheboygan River from the Sheboygan Falls Dam downstream to, and including, the Inner Harbor. The primary contaminant of concern at the site is polychlorinated biphenyls (PCBs). In addition to PCB-contaminated sediment in the river and harbor, some floodplain soils are contaminated with PCBs, and groundwater and additional PCB sources associated with the former Tecumseh Plant are also part of the site. Site risks include risks to human and ecological receptors via consumption of PCB-contaminated fish. Fish and waterfowl consumption advisories have been in effect since 1987.

The U.S. Environmental Protection Agency (EPA) issued a Record of Decision (ROD) on May 12, 2000, to address PCB-contaminated sediment, PCB-contaminated floodplain soils, and groundwater contamination. The selected remedy included dredging/disposal of sediment, excavation/disposal of floodplain soils, investigation and mitigation of groundwater contamination at the former Tecumseh Plant, and institutional controls (ICs). EPA issued an Explanation of Significant Differences (ESD) on December 15, 2010 to adjust the estimate of the volume of contaminated sediment to be removed from the river, the areas from which those sediments would be removed, and the estimated cost of the remedy. The response actions at the site are being led by a potentially responsible party (PRP) with oversight by EPA.

There have been three identified PRPs at the site: Tecumseh, Kohler Company, and Thomas Industries. In 2003, Tecumseh entered into a Consent Decree (CD) with EPA for the Upper River cleanup work at the site. The Upper River CD was entered and became effective in 2004. In 2003, Tecumseh and Pollution Risk Services (PRS) entered into an agreement which transferred the site liability to PRS and funded an insurance policy for the work to be performed at the site. As a result, EPA initiated a modification of the Upper River CD to include PRS as the PRP performing the work. The amended CD was finalized in 2006 and addressed the work to be performed in the Upper River, at the former Tecumseh plant, and in the floodplains.

In 2004, PRS started the cleanup work at the site. Cleanup actions included: construction and installation of a groundwater monitoring/ interceptor trench (GMIT), excavation of source materials, river bank excavation, removal of preferential pathways, and installation of monitoring wells. These activities took place at the former Tecumseh Plant location in Sheboygan Falls. In 2006 and 2007, PRS performed dredging of PCB-contaminated sediment in the Upper River.

In 2009 PRS entered into an Administrative Order on Consent (AOC) with EPA to perform characterization and remedial design activities for the Middle River, Lower River, and Inner

Harbor. In 2011, a CD was entered between PRS and the United States requiring PRS to implement the cleanup work in these areas of the site, and the cleanup work began that same year. The construction activities in the Middle River, Lower River, and Inner Harbor were completed in September 2013. The work included dredging of PCB-contaminated sediment in the Lower River and Inner Harbor, excavation of PCB-contaminated floodplain soils, and establishment of a long-term monitoring program for the PCB-contaminated sediment in the Middle River. Two Great Lakes National Program Office (GLNPO) projects to address beneficial use impairments at the Sheboygan River Area of Concern were implemented in conjunction with the remaining Superfund construction activities at the site. GLNPO coordinated these projects with Superfund and implemented them through (1) the Great Lakes Legacy Act (GLLA) and (2) the Great Lakes Restoration Initiative (GLRI) and the U.S. Army Corps of Engineers (USACE). The GLNPO projects addressed contamination issues at the site above and beyond the Superfund cleanup requirements. This FYR report does not evaluate the effectiveness of the GLNPO actions since they were not conducted under CERCLA.

This FYR found that the remedy at the Sheboygan Harbor and River site is not protective of human health and the environment. While the remedy has been implemented in accordance with the requirements of the decision documents and design specifications, current levels of PCBs in fish tissue and sediments exceed the remedial action objectives (RAOs) and corresponding cleanup numbers, resulting in unacceptable risks to human and ecological receptors. Fish consumption advisories are in place, but fishing has been observed, with fish being taken off-site, and it is assumed that the fish are being consumed. Ecological receptors are still exposed to unacceptable risks posed by PCB contamination in sediments and fish. During the construction of the remedial action, EPA held regular meetings with local officials and community members to communicate the risks associated with the site contamination as well as the risks associated with fish consumption. In addition, signs were placed along the river shoreline explaining the fish advisories. In order for the remedy to be protective, the following actions need to be taken: monitoring data is needed to show that PCB concentrations in sediments and fish are decreasing and that they achieve the RAOs and cleanup numbers as intended in the decision documents; and that implementation of and compliance with effective ICs is taking place. Compliance with ICs will be ensured by maintaining, monitoring, and enforcing ICs, as well as maintaining the remedy components at the site.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name: Sheboygan Harbor and River

EPA ID: WID980996367

Region: 5 | **State:** WI | **City/County:** Sheboygan/ Sheboygan County

SITE STATUS

NPL Status: Final

Multiple OUs? No

Has the site achieved construction completion? Yes

REVIEW STATUS

Lead agency: EPA

Author name (Federal Project Manager): Pablo N. Valentin

Author affiliation: EPA, Region 5

Review period: 10/21/2013 - 8/29/2014

Date of site inspection: 6/3/2014

Type of review: Statutory

Review number: 2

Triggering action date: 9/1/2009

Due date *(five years after triggering action date)*: 9/1/2014

Five-Year Review Summary Form (continued)

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:

None

Issues and Recommendations Identified in the Five-Year Review:

OU(s): *OU1 (Sitewide)*	**Issue Category: Institutional Controls**
	Issue: An Institutional Control Implementation and Assurance Plan (ICIAP) needs to be developed.
	Recommendation: Prepare an ICIAP for approval. The ICIAP shall include language for addressing long-term maintenance and management of Outer Harbor breakwalls, future long-term operation and maintenance (O&M) and management of Kohler floodplains, and any additional restrictions necessary to protect remedy components. Prepare and implement an IC monitoring or Long-Term Stewardship Plan, and include further evaluation and implementation of ICs, as necessary, to enhance the long-term protectiveness of the remedy.

Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	9/30/2015

OU(s): *OU1 (Sitewide)*	**Issue Category: Institutional Controls**
	Issue: Full implementation and monitoring of effective ICs is needed.
	Recommendation: Implement effective ICs in accordance with the approved ICIAP.

Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	9/30/2016

OU1 and Sitewide Protectiveness Statement(s)

Protectiveness Determination: Not Protective
Protectiveness Statement: This FYR found that the remedy at the Sheboygan Harbor and River site is not protective of human health and the environment. While the remedy has been implemented in accordance with the requirements of the decision documents and design specifications, current levels of PCBs in fish tissue and sediments exceed the RAOs and corresponding cleanup numbers, resulting in unacceptable risks to human and ecological receptors. Fish consumption advisories are in place, but fishing has been observed, with fish being taken off-site, and it is assumed that the fish are being consumed. Ecological receptors are still exposed to unacceptable risks posed by PCB contamination in sediments and fish. During the construction of the remedial action, EPA held regular meetings with local officials and community members to communicate the risks associated with the site contamination as well as the risks associated with fish consumption. In addition, signs were placed along the river shoreline explaining the fish advisories. In order for the remedy to be protective, the following actions need to be taken: monitoring data is needed to show that PCB concentrations in sediments and fish are decreasing and that they achieve the RAOs and cleanup numbers as intended in the decision documents; and that implementation of and compliance with effective ICs is taking place. Compliance with ICs will be ensured by maintaining, monitoring, and enforcing ICs, as well as maintaining the remedy components at the site.

I. INTRODUCTION

The purpose of a five-year review is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

EPA prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA 121 states:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii) states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action."*

EPA conducted a FYR on the remedy implemented at the Sheboygan Harbor and River Superfund site in Sheboygan, Wisconsin. EPA is the lead agency for developing and implementing the remedy for the site. The Wisconsin Department of Natural Resources (WDNR), as the support agency representing the State of Wisconsin, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the second FYR for the Sheboygan Harbor and River site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The site consists of a single Operable Unit (OU) which was implemented in a phased approach.

II. PROGRESS SINCE THE LAST REVIEW

Table 1: Protectiveness Determinations/Statements from the 2009 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1 (Sitewide)	Will be Protective	The remedial action being implemented at the Sheboygan River and Harbor site is expected to be protective, although it may take some time after completion of remedial action construction activities for the site to achieve the site-wide surface weighted average concentration (SWAC) specified in the ROD and for fish tissue concentrations to decrease. It is expected that site-wide remediation activities will be completed in 2014. Following the completion of the remedial action and after evaluation of additional information, including the results of long-term monitoring, EPA will make a site-wide protectiveness determination. Long-term protectiveness of the remedy will require compliance with effective ICs. Compliance with effective ICs will be ensured through implementing effective ICs and conducting long-term stewardship by maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components.

Table 2: Status of Recommendations from the 2009 FYR

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
1 (Sitewide)	Remedy is not yet complete.	Complete remedial actions and conduct follow-up construction confirmation monitoring.	PRP	EPA/State	2014	Completed	9/30/2013
1 (Sitewide)	Long-term monitoring of fish and soft sediment needs to be conducted to evaluate remedy protectiveness and environmental recovery.	Conduct long-term monitoring of fish and soft sediment.	PRP	EPA/State	2009	Completed	10/10/2012
1 (Sitewide)	Existing ICs have not been formally evaluated and some required ICs have not been implemented.	Develop an Institutional Controls Work Plan (ICWP), or Institutional Controls Plan (ICP) if necessary, to ensure long-term stewardship.	PRP	EPA/State	Within 12 months of completion of the 2009 five year review (2010)	Ongoing	Ongoing

Recommendation 1

PRS completed the implementation of the Superfund remedial action construction work at the site with the remediation of the Lower River and Inner Harbor and the cleanup of the floodplains, as well as subsequent confirmatory sampling. Construction completion was documented in a September 30, 2013, Preliminary Close-Out Report.

Recommendation 2

PRS developed a long-term monitoring program, embodied in a document entitled *Post-Remediation Monitoring Plan* (PMP), September 2008, and has been collecting fish tissue samples on a yearly basis to assess the effectiveness of the remediation efforts. Sampling of soft sediments for the calculation of the SWAC had been conducted in 2007 (the post-dredge "baseline" event) and is now being conducted every five years. The second recommendation in the 2009 FYR, which had an original milestone date of 2009 (for initiation of long-term monitoring in the Upper River), is considered "complete" in 2012 because the first round of soft sediment sampling, for purposes of calculating a SWAC to compare to the 2007 post-dredge baseline, was conducted in 2012. The SWAC for the Upper River has decreased from 1.96 parts per million (ppm) in 2007 to 0.78 ppm in 2012. The next SWAC sampling event will be conducted in 2017 and will also include the Middle River, Lower River, and Inner Harbor, since remedy implementation activities at those additional reaches was completed in 2012.

Recommendation 3

As part of the post-remediation activities for the site, EPA and WDNR have been working with PRS to develop an Institutional Control Implementation and Assurance Plan (ICIAP) to ensure that adequate ICs are implemented at the site in order to protect the remedy. IC evaluation and implementation activities are further discussed in the "Institutional Controls" section of this FYR.

Remedy Implementation Activities

Since the last FYR, EPA issued an ESD on December 15, 2010, to adjust the estimate of the volume of contaminated sediment to be removed from the river, the areas from which those sediments would be removed, and the estimated cost of the remedy. More details about the ESD are provided in Appendix A.

The remainder of this section of the FYR discusses remedy implementation activities that occurred since the last FYR. The remedial actions completed in Phases I and II, which addressed the Upper River portion of the site and which were discussed in the 2009 FYR, are summarized in Appendix A.

Phase III of the remedial action at the site, which included the Middle River, Lower River, and Inner Harbor reaches, was initiated by PRS in 2011 following EPA's final approval of the dredge plan. The dredge plan was prepared by PRS and initially dated March 2011, with subsequent revisions and modifications dated February 2012, March 2012, and June 2012. Phase II also included the remediation of contaminated floodplain soils.

Remedy construction activities for Phase III were conducted in four main sub-phases: the 2010 Land-Based Mobilization, the 2011 Sediment Removal, the 2012 Sediment Removal, and the 2012 Floodplain Soil Removal. The 2011 and 2012 Sediment Removal work was documented in operating logs prepared by PRS and discussed in bi-weekly conference calls with EPA and WDNR. The 2011 and 2012 operating logs documenting sediment removal field measurements were presented in two tables in the *Lower River Completion Report.* The operating logs documented the following: 1) the dredge's daily run hours and downtime hours; 2) field-estimated cubic yards of sediment removed; 3) the wastewater treatment plant's (WWTP's) influent and effluent gallons; 4) disposal tons of Toxic Substances Control Act (TSCA) and non-TSCA material transported offsite; and 5) the number of loads of TSCA material transported to the Sheboygan Falls secondary staging area.

Presented below are summaries of the 2010, 2011, and 2012 activities completed by PRS, as well as the additional activities required to be performed for the successful completion of this Superfund remedial action project. Throughout the duration of the project, PRS provided EPA Superfund staff and other stakeholders[1] detailed information about ongoing activities during routine project status conference calls, held on a weekly to monthly basis depending on the level of project activity.

Remediation Standards and Remedial Action Work Plans

EPA divided the river into three sections or "reaches" during the remedial investigations (RI) based on physical characteristics such as average depth, width, and level of PCB sediment contamination. The three reaches are depicted in Figure 1 of Appendix C. The Upper River reach extends from the Sheboygan Falls Dam downstream 4 miles to the Waelderhaus Dam in Kohler. The Middle River reach extends 7 miles from the Waelderhaus Dam to the former Chicago & Northwestern (C&NW) railroad bridge. The Lower River reach extends 3 miles from the C&NW railroad bridge to the Pennsylvania Avenue Bridge in downtown Sheboygan. The Inner Harbor reach includes the Sheboygan River from the Pennsylvania Avenue Bridge to the river's outlet to the Outer Harbor. The Outer Harbor is defined as the area formed by the two breakwalls.

To meet the site's remediation objective described in the May 2000 ROD, PCB-contaminated sediment was removed so that each reach or river section would achieve a post-dredge Surface Weighted Average Concentration of 3.5 ppm or less. The Remedial Design determined that a post-dredge SWAC of 3.5 ppm PCBs would lead to achievement of the ROD Performance Standard of 0.5 ppm SWAC over time.

The areas with PCB-contaminated sediment requiring dredging were determined during the pre-design investigation study conducted by PRS in 2009. These areas were documented in the EPA-approved 100% Design dated November 2011 and the EPA-approved Remedial Action Work Plan (RAWP) dated March 2011 and revised in February 2012.

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[1] Other stakeholders include WDNR, Tecumseh, City of Sheboygan, Sheboygan County, and EPA GLNPO representatives.

No sediment was removed from the Middle River. Sediment was removed from the Lower River and from the Inner Harbor from Pennsylvania Avenue Bridge to just past the 8th Street Bridge.

In addition to addressing contaminated sediments in the river, the May 2000 ROD required the removal of floodplain soils containing an average PCB concentration above 10 ppm in addition to the removal of any identified sample location within the floodplains above TSCA levels (i.e., ≥ 50 ppm). The requirement for remediation of the floodplains was based on foraging footprints of 300 x 100 feet for American Robins. For those foraging units where the average interpolated PCB concentration exceeded 10 ppm, the size (surface area, ft^2) of the foraging unit, the pre-remediation average PCB concentration, the amount (percentage) of the foraging unit remediated, the post-remediation average concentration, and the target PCB concentration to be remediated were provided in a statistical analysis developed by the FIELDS group within EPA Region 5's Superfund Division.

The 2005 document entitled *Floodplain Pre-Design Investigation Report* identified concentrations of PCBs in various samples collected within five of the numerous floodplains associated with the river along the length of the site. Specifically, PBCs were identified in Floodplains 3, 4, 5, 6, and 7 (which were named as such during the Pre-Design Investigation). EPA determined that remedial action cleanup work needed to be conducted in Floodplains 3, 4, and 6 in order to meet the 10 ppm PCB criterion for soil established in the ROD. No remedial action work was required in the other floodplains.

The remedial action followed a set of physical activities that were performed to remove the contaminated sediments and/or soils identified in the relevant RAWP. All remedial activities or remedial actions were performed within the context of the following defined work activities:

- 2010 Land-Based Mobilization
- 2011 Dredging Activities
- 2011/2012 Winterization Activities
- 2012 Dredging Activities
- River Monitoring
- Sediment Segregation
- Dewatering Operations
- WWTP Operations
- Offsite Transportation and Disposal
- Secondary Staging Area
- 2012 Floodplain Soil Removal
- Demobilization & Restoration

All activities performed by PRS and its subcontractors were in compliance with the relevant RAWP unless otherwise noted. The Lower River work included removing sediment from 46 grids and one deposit, and the Inner Harbor work included removing sediment from 40 grids (see Figure 2 in Appendix C).

2010 Land-Based Mobilization

Land-based mobilization activities were performed by PRS in 2010 with approval from EPA in order to reduce the 2011 mobilization schedule. These activities included the construction of the dewatering and WWTP infrastructure at 2025 Maryland Avenue.

2011 Dredging Activities

The initial dredging mobilization for the Phase III work occurred between March 16 and April 11, 2011, and included all marine activities necessary to prepare the site for sediment removal using 8-inch-diameter dredge equipment. PRS was not able to dredge all areas planned for 2011 due to multiple factors. From April 12 to August 19, 2011, Lower River dredging was performed with an 8-inch-diameter swinging ladder dredge, 8-inch dredge line and boosters, geotextile tubes for sediment dewatering, and the 2010-designed and installed WWTP system. Because water levels were extremely shallow, dredging could not be undertaken from the furthest upstream grids (i.e. Grids 315 – 277). As such, dredging began upstream in Grid 275 and worked downstream, removing grids as shown in Figure 2. In June 2011, PRS investigated and initiated a second dredge mobilization, increasing the size of the dredge equipment.

Due to the daily removal volume inefficiency in the 8-inch-diameter dredge equipment from impassible objects, 10-inch-diameter dredge equipment and an enhanced WWTP[2] were mobilized to the site between July 29 and September 5, 2011. The larger dredge and enhanced WWTP system worked from September 6 to December 3, 2011. Dredging began upstream and worked downstream, removing grids as shown in Figure 2. The impassible object downtime was corrected with the 10-inch-diameter dredge equipment and daily removal volume efficiencies improved. However, the 10-inch dredge slurry/water output overwhelmed the existing WWTP's volume capabilities. In early September, operations showed that significant modifications to the WWTP operation were needed. Some modifications were made and the sediment removal activities progressed until cold weather conditions prevented effective removal.

Removal Action at Campmarina (separate site from Sheboygan Harbor and River site)

In the summer and fall of 2011, and concurrent with PRS's dredging project, Wisconsin Public Service Corporation (WPSC) conducted a time-critical removal action project at the Campmarina site for polynuclear aromatic hydrocarbon (PAH)-contaminated material, also located within the Lower River portion of the Sheboygan River. The WPSC Campmarina site is being addressed under the Superfund Alternative approach and is not part of the Sheboygan Harbor and River site. As a result, this FYR does not evaluate the protectiveness of the PAH cleanup actions implemented at the Campmarina site. The WPSC removal project required the installation of a cofferdam in the Lower River reach in areas where PRS had targeted the removal of PCB-contaminated sediment as well. Because PRS was not able to perform the removal of the targeted grids within the area of WPSC's cofferdam, WPSC removed the PCB-contaminated sediment from grids within the cofferdam, with EPA's approval, as shown in

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[2] The enhanced WWTP was approved by the EPA and WDNR during a weekly conference call conducted in August 2011. This was documented in meeting minutes distributed during the course of the project.

Figure 2. The PCB-contaminated grids that were located within WPSC's cofferdam are evaluated as part of this FYR.

2011/2012 Winterization Activities

Dredging activities were not completed during the 2011 construction season, so marine/land equipment was winterized between December 4 and December 17, 2011. Following EPA's approval[3], dredged sediment remained on the dewatering pad in geotextile tubes and a small quantity remained in a covered pile. No physical work was conducted between December 18, 2011, and April 19, 2012; however, during this period, water collected on the dewatering pad was treated through a 30-gallon-per-minute mobile treatment system consisting of a bag filter and granulated activated carbon filter operating in series. During the winter shutdown, effluent water samples were collected and analyzed for PCB and Total Suspended Solids (TSS) concentration. The results were documented on discharge monitoring reports (DMR) to the WDNR. The winter results showed one exceedance of the TSS permit limit on February 29, 2012, although real-time turbidity measurements did not indicate the potential for TSS issues. With the TSS exceedance, PRS notified EPA and WDNR and implemented corrective actions, including performing additional backwashing and reducing the micron size in the bag filter. No PCB concentration results exceeded the permit limit.

2012 Dredging Activities

Using the experience gained in 2011 and an engineering evaluation performed by PRS in the off-season[4], PRS remobilized the 10-inch-diameter dredge equipment and made modifications to the WWTP between April 4, 2012, and May 7, 2012. Dredging began on May 8, 2012, and was performed through October 11, 2012. At the request of the GLNPO GLLA project[5] to limit interference between these two concurrently-performed dredging projects, the PRS Superfund dredging in 2012 began downstream of the 8th Street Bridge (in the Inner Harbor area) and worked upstream towards the Lower River. Figure 2 shows the grids from which material was removed at both projects. The 10-inch-diameter dredge equipment and final WWTP corrected the downtime experienced in 2011 and approximately 400 cubic yards/day were removed with the 2012 equipment set-up.

In the grids upstream of the 14th Street Bridge where the water draft limited the ability of the hydraulic dredge's maneuverability, with EPA's approval, PRS engaged Terra Contracting to mechanically dredge approximately 1,600 cubic yards of Superfund project sediment. These upstream grids are shown in Figure 2. Terra Contracting completed the upstream Superfund sediment removal on December 19, 2012. In addition to the upstream grids, Deposit 3, also located in the Lower River but much further upstream of the 14th Street Bridge (see Figure 2), was inaccessible with the 10-inch-diameter dredge equipment. Deposit 3 was removed during

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[3] Approval was given during weekly conference calls documented in meeting minutes distributed during the course of the project.

[4] The design and approval of the new WWTP occurred between February and March 2012.

[5] The GLLA project was developed by the EPA's GLNPO to remove contaminated sediments at greater depths in the Lower River and Inner Harbor (Pennsylvania Avenue Bridge to 8th Street Bridge), outside the requirements of the Superfund project. The GLLA work locations were the Lower River reach from 0.25 miles upstream of the 14th Street Bridge to the end of the Lower River reach at the Pennsylvania Avenue Bridge, and the Inner Harbor reach from the Pennsylvania Avenue Bridge to the 8th Street Bridge.

activities associated with WDNR's Wildwood Island restoration project that occurred between November and December 2012.

The 2012 dredge operations had one noted incident. As it was passing the Superfund project dredge line on August 11, 2012, a GLLA project barge caught a Superfund marker buoy, stretched the dredge slurry line, and caused the slurry line to break. Fortunately, no hydraulic dredging was being performed at this time. An Incident Report was submitted to EPA and WDNR. To prevent future reoccurrences, additional notification protocols and offsets were established.

A conservative estimate of 46,189 cubic yards of contaminated sediment was removed as part of the Superfund project. This volume does not include the sediment removed as the dredge cut the repose or over-dredge outside of the clean line surface to ensure all contaminated material was removed. Disposal quantities indicate that the total may have been as high as 65,475 cubic yards[6] of sediment removed from the Lower River and Inner Harbor during the Superfund project. PRS used an estimated removal volume because the bathymetric surveys used during the project only considered the sediment volume within the grid boundaries (the neat line volume) and did not include any over-dredge volume outside the lateral grid boundaries to bench into and out of each grid. There are three other estimates for the areas that were not surveyed with bathymetry, as follows:

1) In some instances on 2012 re-dredged grids, EPA did not require the Superfund project to perform a 2012 bathymetric survey; this allowed the GLNPO personnel to keep the GLLA project on schedule. For these grids, it was assumed that the design volume estimated was the amount that was removed.

2) In some instances in 2011, sediment was removed contemporaneously with the WPSC PAH sediment removal project. PCB-contaminated sediment within the cofferdam that was removed with the PAH material was assumed to be the design volume.

3) Grids upstream of the 14th Street Bridge were inaccessible and required mechanical removal. The mechanical dredging was performed contemporaneously with the GLLA project, and in these instances, PRS assumed that the design volume was removed. This variance in quality-control bathymetry was documented in weekly conference calls held throughout the duration of the project.

River Monitoring

PRS conducted in-river monitoring, as required by the *Construction Quality Plan,* which included measuring the river water turbidity to provide an indirect measurement of TSS. The monitoring was performed every two hours when dredging took place. This occurred four to five different times during a normal dredge day. This monitoring was sometimes performed less frequently because of process equipment downtime or the dredge not operating. Turbidity measurements were recorded 150 feet upstream and 500 feet downstream of the dredge location.

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[6] Total tons of sediment sent to landfill (i.e. TSCA and non-TSCA): 75,289
Total tons of bed ash drying agent material (13 percent on average): 9,814
Cubic yard to ton ratio: 1:1
Total cubic yards: 65,475

In accordance with the *Construction Quality Plan*, any change in turbidity greater than 35 ppm (i.e., trigger level) resulted in modifications to the dredge operation. Any change in turbidity greater than 70 ppm (i.e., action level) resulted in stoppage of the dredge operation. The 2011 and 2012 results indicated no exceedances of the trigger or action levels.

Sediment Segregation

The Superfund sediment removal project required segregation of TSCA versus non-TSCA material. River grids that had been determined to contain TSCA levels of PCBs in sediment, shown in Figure 2, were routed to the identified and dedicated geotextile tube(s), whereas non-TSCA sediment was routed to other geotextile tubes. When switching from non-TSCA to TSCA grids or from TSCA to non-TSCA grids, the dredge slurry line was completely emptied of sediment and washed clean. The slurry line was determined to be clear when the water was clear by inspection through a 2-inch valve. The determination of TSCA applicability was based on the in-situ concentration found in the sediment during the 2009 pre-design investigation and additional delineation performed in 2011. EPA regulations require that any sediment found to have an in-situ PCB concentration equal to or greater than 50 ppm be segregated and disposed accordingly regardless of the resulting representative ex-situ concentration.

Dewatering Operations

The hydraulically dredged river sediment slurry was transported via a pipeline from the dredge to the dewatering pad located at 2025 Maryland Avenue. Figure 3 shows the configuration of the dewatering system, which includes geotextile tubes, header piping, and polymer injection. The dewatering system consisted of five geotextile tubes on the east side of the dewatering pad and five geotextile tubes on the west side. The PVC header pipe, air gap, and shut-off valves were installed and tested in accordance with the RAWP. Percol 3300, manufactured by CIBA, was the initial polymer added to the sediment slurry to enhance the settlement of solid particles within the geotextile tubes. PRS discovered later that this polymer was binding the media in the sand filtration process of the WWTP and discontinued its use in October 2011. AQ 200 polymer, manufactured by AquaMark, was subsequently selected to be added to the sediment slurry to enhance the settlement of solid particles within the geotextile tubes. This product was effective in settlement without binding the media in the sand filtration process and was used for the remainder of the project.

The geotextile tubes were filled to a height of between six and seven feet. Alternating filling of geotextile tubes on the dewatering pad (i.e., east/west) allowed for real-time filling while the other side was managed and its dewatered sediment off loaded.

There were two incidents that occurred in 2011 at the dewatering pad. The first occurred on July 12, 2011, when the dewatering pad carriage water overflowed the berm. An Incident Report was submitted to EPA and WDNR. To prevent future reoccurrences, an indicator was placed on the dewatering pad to notify the dewatering pad operator to contact the dredge operator to shut down the dredge when the water level reached the indicator. The second incident occurred on September 8, 2011, when water seeped from the northeast corner of the dewatering pad at the loading retaining wall onto the tracking pad. This seep continued on and off throughout the duration of the project depending on weather and dewatering pad operating conditions. An Incident Report was submitted to EPA and WDNR. To prevent future reoccurrences, a drainage ditch along the gravel drive and sump located near the road were constructed to collect this water. The sump was designed to pump collected water to the dewatering pad for future treatment.

WWTP Operations

The WWTP was used to treat carriage water removed from the sediment slurry during the dewatering process and any run-on water from rain events. This water was collected and pumped through the 2010 WWTP shown in Figure 4, the 2011 enhanced WWTP[7] shown in Figure 5, and the 2012 final WWTP shown in Figure 6. Real-time effluent turbidity (measured as NTU, which stands for Nephelometric Turbidity Unit) was determined using a continuous turbidity monitor installed on the effluent stream at the same location as the effluent sampling point to evaluate the treatment system's effectiveness. Real-time TSS monitoring was performed by creating a TSS-to-turbidity correlation during the first day of operation.

Real-time turbidity readings were manually recorded every 60 minutes of wastewater treatment.[8] A measured turbidity reading greater than 15.0 NTU in the effluent stream would result in stoppage of the dredge operations. There were 18 exceedances (April 30; May 5; September 12, 21, 22, 23, 24, 26, 27, 28, 29, 30; October 14, 24, 28; and November 16, 18, 28) of the turbidity limit in the WWTP effluent stream during the 2011 dredge season. Dredge operations were stopped, notification were made to EPA and WDNR, and corrective actions were implemented. Corrective actions included performing additional backwashing, reducing the micron size in the bag filters, and/or recirculating water through the system until levels dropped below the action level. EPA provided approval of these modifications during the weekly conference calls. There were no turbidity exceedances during the 2012 dredge season.

Regular monitoring of mercury, TSS, biological oxygen demand (BOD), pH, and PCB concentrations were required from the influent and effluent of the WWTP. The TSS and PCB effluent samples represented daily composites collected at 15-minute intervals with an ISCO sampler. The TSS and PCB influent samples were grab samples collected daily. BOD effluent (a composite sample similar to the PCB sample) and TSS were collected every two weeks. The pH was measured via a grab sample collected every month. Mercury influent and effluent samples were grab samples collected every two weeks. An annual whole effluent toxicity (WET) test was performed during the 2011 and 2012 dredge seasons.

The results of the WWTP monitoring analyses were documented on the DMRs. There were six exceedances in TSS concentrations (September 12, 24, 28, 29, 30, and November 16) and two exceedances in PCB concentrations (September 12 and 29) from the WWTP effluent during the 2011 dredge season.[9] These exceedances were attributed to the high clay content and the high

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[7] The enhanced WWTP was approved by EPA and WDNR during weekly conference calls conducted in August 2011. This was documented in meeting minutes distributed during the course of the project.

[8] The WWTP was a batch operation and backwashing of the multi-media/carbon vessels occurred daily and as such, treatment did not occur continuously. Therefore, real-time turbidity measurements did not always occur every 60 minutes. Measurements were collected when water flow was present in the effluent stream during dredging operations.

[9] TSS discharge limits were 10 milligrams per liter (mg/L) daily and 5 mg/L monthly. The PCB discharge limit was 0 mg/L daily.

concentration of PAHs in the sediment, which resulted in the polymer ineffectively aiding the coagulating process in the geotextile tubes thereby passing a high concentration of small particles through the treatment system. Notification was made to EPA and WDNR, and corrective actions were implemented as described previously. EPA provided PRS with a temporary variance letter while dredging material with high clay content and high concentrations of PAHs in the sediment. With the improved measures in the 2012 final WWTP design, no exceedances in effluent TSS and PCB concentrations occurred.

Offsite Transportation and Disposal

A drying agent (i.e., bed ash) was added at 15% by volume following the sediment dewatering activities in order to pass the paint filter test required by the landfills. The dried sediment was hauled from the dewatering pad and transported by truck to the appropriate landfill for disposal. To eliminate the potential of spilled material during sediment loading, two 15' x 30' bermed load-out areas were constructed adjacent to the dewatering pad in 2010. These areas ensured the capture of any spilled material and allowed a location for truck tires (if impacted) to be decontaminated before the truck left the asphalt pad. Water collected inside this bermed area due to rain or tire decontamination was pumped to the dewatering pad for treatment.

Sediment was removed from the geotextile tubes using a rubber tire front end loader and stockpiled in preparation for load-out using an excavator. In 2011, 3,849 tons of material containing PCBs at concentrations above 50 ppm (i.e. TSCA material) were transported and disposed at the Clean Harbors Landfill, located in Waynoka, Oklahoma. Trucks were loaded at the 2025 Maryland Avenue stockpile and transported the material to be trans-loaded into gondola railcars at the Milwaukee rail yard. From this location, the material was transported via railcars directly to the Clean Harbors' rail facility for off-loading into trucks that were shuttled to the Clean Harbors Landfill for disposal.

In 2012, 3,947 tons of TSCA material were transported and disposed at the Environmental Quality Landfill located in Wayne, Michigan. Trucks were loaded at the 2025 Maryland Avenue stockpile and directly transported material to the landfill or to the secondary staging area located at 415 Cleveland Street in Sheboygan Falls, Wisconsin. From the secondary staging area, trucks were loaded and directly transported material to the landfill.

In 2011 and 2012, 67,493 tons of non-TSCA sediment were transported and disposed at the Waste Management Landfill located in Whitelaw, Wisconsin. Trucks were loaded at the 2025 Maryland Avenue stockpile and directly transported material to landfill. Manifests for each truck were signed by a member of the PRS project team. Truck tires were visually inspected for contamination and decontaminated as necessary. Trucks were properly placarded.

The sediment offloading activities required air monitoring to assess airborne emission concerns. On April 21, 2011, two PCB air samples were collected to document background levels of air quality from the dewatering pad. PCB air samples were also collected on August 24 and 25 and November 1 and 4, 2011, to evaluate potential airborne emissions of PCBs during the sediment load-out activities, and in 2012, PCB air samples were collected on April 9 and 10. The results reported non-detectable concentrations of PCBs in the air samples collected.

Secondary Staging Area

A secondary staging area located at 415 Cleveland Street in Sheboygan Falls was constructed in 2012 in order to stockpile TSCA sediment so that dredge operation downtime could be minimized. The secondary staging area was submitted as a RAWP modification in June 2012 and approved by the EPA during the routine project conference calls. The stockpiled material was covered, when applicable, to provide dust control. Run-on water was treated using a 30-gallon-per-minute mobile treatment system (the same process was used during the winterization period). Effluent samples were collected during operation and analyzed for TSS, PCBs, and BOD. The results were reported to EPA and WDNR in real time and then for the last few months added to the DMRs. The results did not indicate any exceedances of the permit limits.

2012 Floodplain Soil Removal

Remedial action cleanup work was performed in Floodplains 3, 4, and 6 during August and September 2012. The floodplain remedial action work included a set of physical activities that were performed to remove the PCB-contaminated soil. The specific physical activities were identified in an access agreement with the property owner, the Kohler Company. The soil removal activities were performed in accordance with the *Floodplains 3 and 4 Remedial Action Work Plan*, which was approved with comments by EPA in July 2012, and the *Floodplain 6 Work Plan – Revision 3*, which was approved by EPA in September 2012. More details about the soil removal activities, including the confirmation sampling/data collection process, are provided in the "Data Review" section of this FYR.

Demobilization & Restoration

PRS conducted demobilization activities between October 12 and November 6, 2012. A walkthrough of the dewatering pad and WWTP area was conducted on November 7, 2012, with EPA and WDNR in attendance to note any deficiencies. A punch list was generated. The punch list was substantially completed on November 16, 2012, and approved by EPA.

Post-Dredge SWAC Sampling and Calculations

Post-dredge verification core samples were collected in 2011 and at the beginning of 2012 from each dredge grid/sub-grid or re-dredge grid/sub-grid at the center and at each side wall adjacent to non-dredge grids. The core sampling technique was modified halfway through the 2012 dredge season to collect post-dredge cores from river left grids only at the center and side wall next to river centerline. There was no change to the post-dredge sampling performed on river right areas. (Note: "river left" and "river right" are based on viewing the river as flowing downstream.) Additionally, in areas where re-dredging was needed, EPA did not require a second round of post-dredge verification sampling.[10] Sampling changes were approved during weekly communications and as documented in a December 10, 2012, letter from EPA.

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[10] The rational for this change was to aid in the coordination with the GLLA project schedule and began in September 2012. This was approved by EPA during routine project conference calls and documented in meeting minutes. EPA documented this approval in a letter dated October 31, 2012.

As noted in the "Remediation Standards" section of this FYR, to meet the site's remediation objective, PCB-contaminated sediment was removed so that each reach or section of river would achieve a post-dredge SWAC of 3.5 ppm or less. The Remedial Design determined that a post-dredge SWAC of 3.5 ppm PCBs would lead to the achievement of the ROD Performance Standard of 0.5 ppm SWAC over time, as required by the May 2000 ROD.

Upper River SWAC Discussion

The remedial construction activities for the Upper River were conducted in two phases (Phase I and Phase II) from 2004-2007, as discussed during the 2009 FYR. The objective of the soft sediment monitoring in the Upper River is to document changes over time in the PCB SWAC following the completion of the remedial action performed in the Upper River reach of the site. As stated in the PMP, the post-remediation sediment monitoring is being conducted in two phases consisting of the following:

- Phase 1 Sediment Monitoring – Post-remedial monitoring will be conducted to verify that the SWAC continues to decrease toward the RAO of 0.5 ppm. This includes a sampling event every five years until the 0.5 ppm sediment SWAC goal has been met.
- Phase 2 Sediment Monitoring – Once the Phase 1 results indicate the remedial SWAC of 0.5 ppm has been met, sampling will be performed annually for up to three years to confirm that the sediment SWAC goal of 0.5 ppm has been maintained.

The Upper River post-dredge baseline SWAC was calculated to be 1.96 ppm (see Table B1) as documented in PRS' *2007 Construction Documentation Report*. Where hardpan existed or PCBs were not detected, a value equal to the laboratory's detection limit was used in the SWAC calculation. The SWAC calculation methodology followed in 2007 was carried forward for the SWAC calculated in 2012. This methodology will be used for subsequent sampling events in order to maintain consistency throughout the Phase 1 and Phase 2 Sediment Monitoring evaluations.

Based on the results from the 2012 Upper River soft sediment monitoring event, the SWAC for the Upper River has decreased from 1.96 ppm in 2007 to 0.78 ppm in 2012. The second five-year SWAC calculation for the Upper River Phase 1 Sediment Monitoring will be performed in 2017.

A comparison of PCB concentrations between 2007 and 2012 shows an increase in concentrations in 2012 in certain areas (the former armored areas which were removed with the Upper River work, and between Deposits 1 and 20A). Most of this increase can be attributed to the fact that small amounts of soft-sediment deposits remained in these areas immediately following remediation (i.e., removal of the soft sediment deposits). Where only hard pan existed after the soft sediments were removed, a value equal to the detection limit was used. The presence of soft sediment in 2012 with PCB concentrations greater than the detection limit will skew the data interpretation. Overall, the SWAC in the Upper River has decreased 60% (from 1.96 ppm in 2007 immediately following dredging to 0.78 ppm in 2012) and is approaching the goal of 0.5 ppm. However, conclusions concerning the success or failure of the Upper River remediation should not be made until additional five-year monitoring events are performed.

Middle River SWAC Discussion

The Middle River SWAC, where active remediation activities were not required, was 1.71 ppm as indicated in the *100% Design* and in the Pre-Design Investigation. The next SWAC sampling event for the Middle River will be conducted in 2017, concurrent with the SWAC sampling events planned for the Lower River and Inner Harbor.

Lower River SWAC Discussion

Because there were two GLNPO sediment removal projects performed at the time of the completion of the Lower River Superfund work, a complete post-dredge sampling program did not occur in the Lower River. As such, data for calculating the SWAC is limited to the SWAC data obtained from the GLNPO project, following completion of that dredging work.

The Visual Sampling Plan (VSP) for the Superfund project stated that for the Lower River and Inner Harbor to 500 feet downstream of the last dredge grid, the post-dredge sediment surface would have samples collected at a rate of six grabs per 8,100-square-foot grid with a petite ponar dredge. These samples were not taken; instead, the Lower River surface data set are the results from the GLNPO reporting. The Lower River SWAC was calculated by using the GLNPO data associated with Samples CS-1 to CS-42, which were collected in 2012. In the areas that had sand cover placed following sediment dredging work, 0.024 ppm was used as the surface concentration. Based on the GLNPO data, the SWAC for the Lower River following completion of the dredging projects was 0.53 ppm PCB.

Inner Harbor SWAC Discussion

In addition to providing data for the Lower River, GLNPO also provided the post-dredging SWAC data from the Pennsylvania Avenue Bridge to the 8th Street Bridge following completion of the GLLA dredging project. This data was associated with Samples CS-43 to CS-81, also collected in 2012, with a calculated PCB SWAC of 0.78 ppm. Although there is no surface concentration data from the USACE GLRI navigational dredging project, it was assumed that the sediment concentration improved with the mass sediment removal. By averaging the available Inner Harbor data, including the GLNPO data for the area from the Pennsylvania Ave Bridge to the 8th Street Bridge and the Superfund Pre-Design Investigation data for the area from the 8th Street Bridge to the river's mouth, the PCB SWAC for the Inner Harbor is 1.00 ppm.

Cover Placement

Sand cover was not placed by PRS during the Superfund remedial action project because the GLLA project would have had to remove some portion (if not all) of the sand to conduct the deeper dredging associated with that project. Sand cover was subsequently placed by the GLNPO/GLLA contractor in some areas, as depicted on Figure 7. EPA authorized the deferral for the immediate placement of the cover material under Superfund as documented in a December 10, 2012, letter. The GLLA project completed sand cover placement work in 2013.

Institutional Controls

Institutional controls are required to ensure the protectiveness of the remedy. ICs are non-engineered instruments, such as administrative and/or legal controls, that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for any areas which do not allow for UU/UE. ICs are called for in the ROD, ESD, and in the Consent Decree for the site. Table 3 summarizes the areas at the Sheboygan Harbor and River site which do not allow for UU/UE and where ICs are required to ensure no inappropriate uses of the site occur.

Table 3: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	**ICs Needed?**	**ICs Called for in the Decision Documents?**	**Impacted Parcel(s)**	**IC Objective**	**Title of IC Instrument Implemented and Date (or planned)**
Groundwater*	Yes	Yes	Former Tecumseh Sheboygan Falls Plant Location	Prohibit interference with GMIT, prohibit groundwater consumption, and prohibit inconsistent uses.	Declaration of Restrictive Covenants (planned)
Soft Sediment*	Yes	Yes	Upper River, Middle River, Lower River, and Inner Harbor	Limit fish and waterfowl consumption.	WDNR fish and water fowl advisories
Soft Sediment*	Yes	Yes	Lower River and Inner Harbor	Prohibit interference with covered area and prohibit inconsistent uses.	To be determined. ICIAP being developed.
Outer Harbor Breakwalls*	Yes	Yes	Outer Harbor Breakwalls (Inner Harbor)	Maintain breakwalls and prohibit inconsistent uses	To be determined. ICIAP being developed.
Soil*	Yes	Yes	Kohler Floodplains	Prohibit excavation in clean-soil-covered area and prohibit inconsistent uses.	To be determined. ICIAP being developed.

* Areas subject to ICs will be further evaluated and delineated and maps which depict the areas where ICs are needed (i.e., non UU/UE areas) will be prepared.

Current Status of Access and Institutional Controls: Currently, EPA is working with PRS' contractor, Soil and Materials Engineers, to develop the ICIAP for the site.

System Operation/Operation and Maintenance Activities

Yearly groundwater monitoring of the GMIT, yearly fish tissue monitoring, soft sediment monitoring for SWAC calculation to be conducted every five years, and yearly floodplain monitoring and maintenance activities are all part of the *Post-Remediation Monitoring Plan* or PMP. This document was submitted by PRS and finalized in September 2008.

In 2008, PRS performed the initial baseline fish monitoring event for the Upper River as well as for the Middle River, Lower River, and Inner Harbor. The baseline fish monitoring event for the Upper River took place after the dredging of the soft sediment deposits had been completed. Fish tissue monitoring is performed on a yearly basis. In addition, the May 2000 ROD required soft sediment monitoring at least every five years to document the effectiveness of the selected remedial action in achieving the 0.5 ppm PCB SWAC over time. The initial five-year sampling event (following the baseline event in 2007) to calculate the current SWAC in the Upper River was performed in 2012. Sediment sampling to document the progression towards achieving the cleanup goal of a PCB SWAC of 0.5 ppm for the Upper River, Middle River, Lower River, and Inner Harbor reaches will be performed at a minimum once every five years.

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

The PRP was notified of the initiation of the FYR on 10/21/2013. The FYR was led by Pablo N. Valentín, EPA Remedial Project Manager (RPM) for the site, assisted by Susan Pastor, the EPA Community Involvement Coordinator (CIC). Thomas A. Wentland of the WDNR assisted in the review as the representative for the support agency.

The review, which began on 10/21/2013, consisted of the following components:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection; and
- FYR Report Development and Review.

Community Notification and Involvement

Activities to involve the community in the FYR process were initiated with a meeting in October 2013 between the RPM and CIC for the site. A notice was published in the local newspaper, the "The Sheboygan Press," on 12/22/2013, stating that there was a five-year review and inviting the public to submit any comments to EPA. The FYR Report will be made available at the site information repository located at the Mead Public Library, 710 N 8th Street, Sheboygan, Wisconsin.

Document Review

This FYR consisted of a review of relevant documents including O&M records and monitoring data. Applicable soil, groundwater, and sediment cleanup standards, as listed in the May 2000 ROD, were also reviewed.

Data Review

Upper River Sediment Monitoring

The Upper River sediment sampling was performed by PRS on September 11 through 14, September 29, and October 10, 2012, pursuant to the 2008 PMP for the Upper River reach. The Middle River, Lower River, and Inner Harbor reaches were not part of this sampling event. Sediment grab samples were collected using a Petite Ponar Dredge from up to four locations within each remedial management unit (RMU) and composited. Small RMUs (defined as less than 1,000 square feet) had less than four grab samples collected to comprise the composite sample.

A summary of the 2012 Phase 1 Sediment Monitoring results and corresponding SWAC calculation for the Upper River is provided in Table B2. Please note that different laboratories were used for each sediment monitoring event and as such the values used for hardpan and non-detects vary between the tables. As shown by comparing Table B1 and Table B2, the SWAC for the Upper River has decreased from 1.96 ppm in 2007 to 0.78 ppm in 2012. The next five-year sampling event for the Upper River Phase 1 Sediment Monitoring will be performed in 2017 for purposes of calculating a SWAC.

As noted earlier, a comparison of PCB concentrations between 2007 and 2012 shows an increase in concentrations in the former location of the armored areas (which were removed with the Upper River work) and between Deposits 1 and 20A. Most of this increase can be attributed to the fact that small amounts of residual soft-sediment deposits were present in these areas following remediation, and where only hard pan existed, a value equal to the detection limit was used. The presence of soft sediment in 2012 with PCB concentrations greater than the detection limit will skew the data interpretation. Overall, the SWAC in the Upper River has decreased 60% (from 1.96 ppm in 2007 immediately following dredging to 0.78 ppm in 2012) and is approaching the goal of 0.5 ppm.

The statistical analysis for the SWAC sample collection was performed using the Visual Sampling Plan. The working hypothesis is that the SWAC PCB value in sediments from a river reach is less than the remedial goal of 0.5 ppm. For the analysis with VSP, the following is used to determine the number of defined units to sample:

- Phase 1 (optional first and third years) following completion of remediation: the standard deviation of the detected results from the samples collected immediately after remediation to confirm the success of the removal;

- Phase 2 three-year confirmation period: the standard deviation of the detected results from the last Phase 1 sampling event.

The input parameters needed for VSP are provided below with a rationale for their selection. While this is an example for the optional Phase 1 first and third year sampling, the same approach for the Phase 2 sampling would be used but with the standard deviation of the most recent data set. Approval of the number of Phase 2 samples would be obtained from EPA and WDNR prior to sampling.

Variable	Value	Rationale
S (standard deviation)	3.76	Average for sediment in the Upper River following remediation. The applicable standard deviation will be used for other reaches during Phase 1 sampling and all reaches during Phase 2 sampling.
α (alpha error)	60%	The acceptable probability of incorrectly concluding the mean exceeds the threshold. There are few repercussions to the public or agencies of incorrectly concluding that the target has not been reached. The risk is to PRS in additional sampling and analytical costs. PRS has chosen to have a higher alpha error and lower beta error. Additional sampling could be performed to verify if the values were far outside the range of expected results. A higher acceptable probability was chosen for sediment than for earthworms since there will be more than one monitoring event and the remedial goal is actually the fish.
B (beta error)	25%	The acceptable probability of incorrectly concluding the mean is less than the threshold. The allowable probability should be less when concluding the remediation was successful. A 75% chance of making the correct decision appears satisfactory for post-remedial monitoring purposes. A higher acceptable probability was chosen for sediment than for earthworms since there will be more than one monitoring event and the remedial goal is actually the fish. In addition, Phase 2 annual conformational sampling will be conducted providing a larger data set for making decisions.
Threshold level	0.5 ppm	The level determined by EPA.
Δ (gray region)	0.25 ppm	This is the range of values where making a decision error is relatively minor. It is bounded by the threshold value. Half the action level was selected.

A more detailed explanation of the statistical analysis for the Upper River SWAC calculation is available in Appendix F of the PMP for the Sheboygan Harbor and River site.

Fish Tissue Monitoring

Monitoring of post-remedial fish tissue concentrations for PCBs is being conducted on the Sheboygan River in accordance with the PMP. As stated in the PMP, the monitoring is being conducted in three phases consisting of the following:

- Baseline monitoring was conducted after remediation of the Upper River and prior to remediation of the Lower River reaches to determine the mean PCB concentration of each fish species of interest and establish a comparison point for future sampling;

- Phase 1 annual monitoring following remediation of each reach to establish a trend in mean PCB concentration for each fish species and track the progress of the fish in meeting the remedial goals; and

- Phase 2 sampling confirmation to verify the fish have reached the remedial goals. Once data demonstrate that the fish tissue concentrations specified in the ROD have been achieved a second tier of sampling will be conducted to confirm that the fish tissue numbers have been maintained.

The *Fish Monitoring Reports* through 2013 document the Phase 1 fish monitoring performed on the Upper River and Middle River reaches. The Middle River reach fish monitoring was performed because data from the 2009 Pre-Design Investigation indicated that active remediation did not need to be performed within this reach. Remediation of the other reaches (i.e. Lower River and Inner Harbor) was completed in 2012. Phase 1 monitoring for those reaches started in the summer of 2013.

The data obtained during the Phase 1 annual monitoring will allow post-remedial fish tissue concentrations to be compared to prior annual results to monitor remedial progress. Post-remedial monitoring will be conducted until fish fillet concentrations of PCBs decrease to the target levels specified on page 32 of the ROD.

Sampling and analysis of fish species is being conducted consistent with the PMP and the *Quality Assurance Project Plan.* These plans were approved with comments on August 13, 2008. The *2011 Annual Fish Monitoring* report determined the number of fish to collect at the two sites within the Upper River and Middle River reaches.

Smallmouth bass, carp, walleye, and catfish were selected as they have assigned target goals in the ROD. According to the ROD, smallmouth bass and carp are the more contaminated resident fish species. EPA selected these species when establishing cleanup goals believing that if these fish met the goals, the lesser contaminated species such as walleye, trout, salmon, and steelhead would be protected. Therefore the monitoring included smallmouth bass and carp as well as walleye and catfish. Walleye and smallmouth bass will also help evaluate risk reduction for sport fisherman while carp and catfish will help evaluate risk reduction for sustenance fisherman. Rock bass were added because catfish and walleye are rarely caught within the river according to WDNR. White suckers were also added at the suggestion of WDNR. Longnose Dace were eliminated from the sampling requirements after failing to catch any for several years. The following table outlines the final fish species collection requirements.

Fish Species	Number of Samples Per River Reach				
	Upper (Site 1)	Upper (Site 2)	Middle (Site 1)	Middle (Site 2)	Size Range
Smallmouth Bass	12	12	8	8	10-17 inches
Adult Carp	12	8	8	8	15-25 inches
Adult Suckers	12	12	8	8	8-16 inches
Juvenile Suckers	12	12	8	8	3-8 inches
Rock Bass	12	12	8	8	5-9 inches
Walleye	0	0	8	8	12-22 inches
Catfish	0	0	8	8	12-22 inches

The WDNR requested that the Upper River and Middle River reaches be divided into two collection sites per reach. The rationale was stated as "Sampling stations should include the following number of sites per reach in order to represent the amount of contaminated sediment that will be removed and the variability expected. Specimens may be collected at different locations within a reach and collection sites within a reach can vary in exact location and length of river sampled (distance and location data should be reported in annual reports)."

The 2012 Phase 1 collection event included two sites in the Upper River: one from the former Tecumseh facility to Riverbend reach and another from the Riverbend to Waelderhaus Dam in Kohler. In addition, the 2012 Phase 1 collection event included two sites in the Middle River: one from the Waelderhaus Dam in Kohler to the Kohler Landfill and another from the Kohler Landfill to the C&NW Railroad Bridge in Sheboygan. The fish collection effort targets the habitats most conducive for each species.

Table B3 provides a statistical comparison of PCB concentrations in fish for all data from 2008 (baseline) through 2013. Since the baseline event, carp have shown an increase in PCB concentrations in all sites. Adult white suckers show little PCB concentration variation in the Upper River but show a decreasing concentration trend in the remaining reaches. Juvenile white suckers show a decreasing trend in the Upper River. The PCB concentrations in smallmouth bass have been decreasing in all reaches. A similar decreasing trend is seen for rock bass in all but Site 1 of the Middle River reach, where little variation has been observed. Below is a brief summary of PCB concentration changes by reach and collection site for each species over time:

Upper River Site 1

Adult Carp – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2009, and increased from 2009 to 2013. Based on t-test results, the 2013 PCB concentrations are not significantly different from those detected in 2008.

<u>*Adult White Sucker*</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2009, increased from 2009 to 2010, decreased from 2010 to 2011, and increased from 2011 to 2013. High flow velocity of the river prior to and during the sampling event may have contributed to the increased PCB concentration in 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

<u>*Juvenile White Sucker*</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2009, increased from 2009 to 2010, decreased from 2010 to 2011, and remained unchanged from 2011 to 2012. Juvenile white suckers were not obtained from this collection site in 2013.

<u>*Smallmouth Bass*</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2009, remained unchanged from 2009 to 2010, decreased from 2010 to 2011, and increased from 2011 to 2013. The 2013 PCB concentrations are significantly lower than those detected in 2008.

<u>*Rock Bass*</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2009, remained unchanged from 2009 to 2011, decreased from 2011 to 2012, and increased from 2012 to 2013. High flow velocity of the river prior to and during the sampling event may have contributed to the increased PCB concentration in 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

<u>*Upper River Site 2*</u>

<u>*Adult Carp*</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration increased from 2008 to 2009, decreased from 2009 to 2010, increased from 2010 to 2012, and decreased from 2012 to 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

<u>*Adult White Sucker*</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration increased from 2008 to 2009, decreased from 2009 to 2010, remained unchanged from 2010 to 2011, decreased from 2011 to 2012, and increased from 2012 to 2013. High flow velocity of the river prior to and during the sampling event may have contributed to the increased PCB concentration in 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

<u>*Juvenile White Sucker*</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2011. Juvenile white suckers were not obtained from this collection site in 2012 or 2013.

<u>*Smallmouth Bass*</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2009, increased from 2009 to

2010, decreased from 2010 to 2011, and increased from 2011 to 2013. The 2013 PCB concentrations are significantly lower than those detected in 2008.

Rock Bass – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration increased from 2008 to 2009, decreased from 2009 to 2010, increased from 2010 to 2011, decreased from 2011 to 2012, and increased from 2012 to 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

Middle River Site 1

Adult Carp – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration increased from 2008 to 2011, decreased from 2011 to 2012, and increased from 2012 to 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

Adult White Sucker – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

Juvenile White Sucker – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2010 to 2011 and increased from 2011 to 2012. Juvenile white suckers were not obtained from this collection site in 2013.

Smallmouth Bass – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2010, remained unchanged from 2010 to 2011, increased from 2011 to 2012, and decreased from 2012 to 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

Rock Bass – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2010, increased from 2010 to 2011, remained unchanged from 2011 to 2012, and decreased from 2012 to 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

Middle River Site 2

Adult Carp – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration increased from 2008 to 2012, and decreased from 2012 to 2013. The increase in 2012 is attributed to the PCB exposure during the Lower River remedial activities in 2011 and 2012. The 2013 PCB concentrations are not significantly different from those detected in 2008.

Adult White Sucker – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2011, increased from 2011 to 2012, and decreased from 2012 to 2013. The increase in 2012 is attributed to the PCB exposure during the Lower River remedial activities in 2011 and 2012. The 2013 PCB concentrations are significantly lower than those detected in 2008.

Juvenile White Sucker – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration increased from 2008 to 2010, decreased from 2010 to 2011, increased from 2011 to 2012, and decreased from 2012 to 2013. The increase in 2012 is attributed to the PCB exposure during the Lower River remedial activities in 2011 and 2012. The 2013 PCB concentrations are significantly lower than those detected in 2008.

Smallmouth Bass – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2011, increased from 2011 to 2012, and decreased from 2012 to 2013. The increase in 2012 is attributed to the PCB exposure during the Lower River remedial activities in 2011 and 2012. The 2013 PCB concentrations are significantly lower than those detected in 2008.

Rock Bass – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2010, increased from 2010 to 2011, and then decreased from 2011 to 2013. The 2013 PCB concentrations are significantly lower than those detected in 2008.

Lower River

Adult Carp – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration increased from 2008 to 2013. The 2013 PCB concentrations are not significantly different from those detected in 2008.

Adult White Sucker – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2013. The 2013 PCB concentrations are significantly lower than those detected in 2008.

Smallmouth Bass – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2013. The 2013 PCB concentrations are significantly lower than those detected in 2008.

Rock Bass – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2013. The 2013 PCB concentrations are significantly lower than those detected in 2008.

Inner Harbor

Adult Carp – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration increased from 2008 to 2013. The 2013 PCB concentrations are significantly greater than those detected in 2008.

<u>Smallmouth Bass</u> – The box plot in Appendix 3 of the *2013 Annual Fish Monitoring* report shows that the mean PCB concentration decreased from 2008 to 2013. The 2013 PCB concentrations are significantly lower than those detected in 2008.

<u>Groundwater Monitoring</u>

Pursuant to the PMP, groundwater monitoring events are performed on a yearly basis at the GMIT located at the former Tecumseh facility in Sheboygan Falls. Monitoring well samples are collected with a low-flow sampler in accordance with the Field Sampling Plan submitted and approved by EPA as part of the Phase I Design. A map identifying the location of the GMIT and the monitoring wells is provided in Figure 8. Samples collected at the monitoring wells are analyzed for total PCBs.

Table B4 shows historical groundwater sample results from 2004 through 2013 and compares them to the State of Wisconsin NR 140 groundwater criteria. There were no detections of PCBs in four of the six wells sampled in 2013. For the second year in a row, PCBs were not detected in the groundwater at monitoring well MW12. At MW13, the concentration of PCBs has decreased from a high of 2.0 milligrams per liter (mg/L) in 2010 to 0.44 mg/L in 2013. The PCB concentrations at monitoring well MW10 have remained stable for the last six years after a large decrease in 2008. Once the results of the 2014 groundwater monitoring event are obtained and evaluated, and if the results show a continuation of the trends discussed above, PRS may request a reevaluation of groundwater monitoring needs for the site. Any changes to the groundwater monitoring requirements would have to be approved by EPA, in consultation with WDNR.

<u>Floodplain Remediation and Confirmation Sampling</u>

<u>Floodplain 3</u>

Figure 9 shows the two hot spot soil removal locations within Floodplain 3 (S-01 and S-03). A 5-foot by 5-foot square centered on each location was marked. To minimize disturbance to this floodplain area, the EPA-approved Remedial Action Work Plan specified that the initial hot spot removed would be a 5-foot by 5-foot square for each removal location. Work was performed consistent with the approved RAWP for Floodplains 3 and 4. A silt fence was installed after excavation activities to distinguish the removal areas and allow for proper restoration of these areas. Each area was excavated to a depth of 18 inches using a mini-excavator and hand shovels. The work was performed on August 6 and 7, 2012. Approximately 3.0 cubic yards of soil were removed during the excavation of the S-01 and S-03 areas. The excavated soil was placed into four totes and hauled with an off-road forklift. Each tote was labeled to identify the sample location from which the soil was removed. A pick-up truck transported the four totes to PRS's staging area located at 415 Cleveland Street, Sheboygan Falls, Wisconsin, where they were securely stored until being transported by a licensed hazardous waste hauler for disposal at the Environmental Quality Landfill located in Wayne, Michigan. All soil excavated from S-01 and S-03 was characterized as TSCA material.

Confirmation soil samples were collected from each of the sidewalls of the excavated square areas. The confirmation sampling analysis indicated that each sidewall had a PCB concentration under 50 ppm with an average concentration less than 35 ppm PCBs. EPA had established the 50 ppm and 35 ppm action levels for the soil removal work in locations with TSCA materials and incorporated the action levels in the Kohler Access Agreement. These action levels were included as part of the RAWP. Additional excavation was not required at either of these hot spot locations, as the specified actions levels for the sidewalls were met and the areas had been excavated to the 18" depth determined by EPA to be protective for ecological receptors.

The SWAC for Floodplain 3 after the hot spot removal was calculated by using the confirmation sample results for the excavated locations (S-01 and S-03) and the Pre-Design Investigation results for the remaining areas within Floodplain 3 that were not excavated. The SWAC calculation assumed a zero PCB value for the sample location associated with the excavation area. Floodplain 3's Post-Remediation PCB SWAC was calculated at 8.2 ppm, as shown in Table B5.

Floodplain 4

Figure 10 identifies the hot spot soil removal location within Floodplain 4 (S-07). EPA approved a 5-feet by 5-feet removal area to minimize disturbance to high quality trees. As with Floodplain 3, the work in Floodplain 4 was performed consistent with the approved RAWP for Floodplains 3 and 4. The 5-foot by 5-foot square was centered on the location and marked. The Floodplain 4 S-07 area was excavated to a depth of 18-inches using a mini-excavator and hand shovels. Approximately 1.5 cubic yards of soil were removed during the excavation of S-07, which occurred on August 6, 2012. The excavated soil was placed into two totes, hauled with an off-road forklift, and loaded onto a trailer for transportation to the sediment disposal area.

Confirmation soil samples were collected from each of the sidewalls of the excavated square area. The confirmation sampling results for Floodplain 4 are provided in Table B6. The confirmation sampling analysis indicated that each sidewall had a PCB concentration under 50 ppm, with an average concentration greater than 15 ppm PCBs. EPA had established the 50 ppm and 15 ppm action levels for non-TSCA floodplain soil removal locations and incorporated the action levels in the Kohler Access Agreement. Although the 15 ppm action level was exceeded, EPA decided that additional excavation work was not required at this location. EPA's decision to eliminate the need for further excavation was based on the SWAC recalculated by PRS for Floodplain 4 following the soil removal work. The Post-Remediation SWAC was calculated using relevant new data for the excavated location (S-07) and the Pre-Design Investigation data for the remaining areas of Floodplain 4 that were not excavated. The SWAC calculation assumed a zero PCB value for the sample location associated with the excavation area. The final Post-Remediation PCB SWAC for Floodplain 4 was calculated at 4.61 ppm, as shown in Table B6.

Floodplain 6

Figure 11 identifies four hot spot soil removal locations within Floodplain 6 (S-09, S-12, S-13 and S-14). A 5-foot by 5-foot square was centered on each location and marked. All work was completed in accordance with the approved RAWP for Floodplain 6 and the Kohler Access Agreement, including the Floodplain 6 Work Plan. On September 24, 2012, each hot spot area was excavated to a depth of 18-inches using hand shovels. Approximately 6.0 cubic yards of soil were removed during the initial excavation of S-09, S-12, S-13, and S-14.

Initial excavation confirmation soil samples were collected from each of the sidewalls of the excavated square areas. The confirmation sampling analysis for both excavation areas S-9 and S-14 showed that each location had sidewall PCB concentrations under 50 ppm, and each location had an average concentration of all sidewalls of less than 35 ppm PCBs. The results for excavation area S-12 were well below the specified action levels. Therefore, no additional excavation beyond the initial 5-foot by 5-foot identified "hot spot" was required for the respective excavation areas of S-9, S-12 and S-14.

The initial 5-foot by 5-foot excavation confirmation sampling analysis for excavation area S-13 indicated that three sidewalls had PCB concentrations exceeding 50 ppm. The northeast, northwest, and southwest sidewalls had PCB concentrations exceeding 50 ppm and the average concentration of all results was greater than 35 ppm PCBs. In accordance with the approved RAWP, excavation area S-13 was expanded beyond the initial excavation limits. Sidewall excavation work was conducted on October 3 and again on October 12, 2012, on the northeast and northwest side walls. The results obtained following this additional excavation work, as shown in Table B7, indicated that the target concentrations were achieved. Each additional excavation was approximately 2 feet by 5 feet by 18 inches deep, consistent with the RAWP requirements. The final excavation limits for hot spot S-13 were approximately 9 feet by 9 feet, as depicted in Figure 12. The initial excavation of S-13 yielded 1.4 cubic yards of impacted soil, and then the additional iterative excavations removed approximately 2.6 more cubic yards of contaminated soil. In total, approximately 4 cubic yards of soil were removed from this area. Although the southwest sidewall of excavation area S-13 was above the target concentration, a tree marked by Kohler Co. impeded hot spot removal in that direction. Following the protocol of the Kohler Access Agreement, no further excavation occurred along this sidewall. Because the southwest sidewall was not excavated, the average PCB concentration for Area S-13 in Floodplain 6 remains greater than the target of 35 ppm. Based on the site-specific circumstances associated with this specific location, EPA determined that no further excavation work was required at this location.

As was done for Floodplains 3 and 4, the Post-Remediation SWAC for Floodplain 6 was calculated with the final results of the hot spot removal and the 2004 pre-design data. The Post-Remediation SWAC was calculated using relevant new data for the excavated locations (S-09, S-12, S-13 and S-14) and the Pre-Design Investigation data for the remaining areas of Floodplain 6 that were not excavated. The SWAC calculation assumed a zero PCB value for the sample locations associated with the excavation areas. The Post-Remediation PCB SWAC for Floodplain 6 was calculated as 9.31 ppm, which achieves the ROD cleanup objective of 10 ppm. Because there is a known high concentration remaining in Floodplain 6 at Area S-13, and to assure the protectiveness of the remedy, Area S-13 will have semi-annual monitoring conducted for two years (2013 and 2014) by PRS. Further, if Area S-13 is disturbed (i.e., if the tree falls over or is removed by Kohler), PRS will return to the location to remove additional impacted floodplain soil, consistent with the requirements of the RAWP. Should Area S-13 require any additional future excavation(s), EPA will facilitate coordination of the work with the property owner (Kohler) and PRS.

Site Inspection

The inspection of the site was conducted on 6/3/2014. In attendance were Pablo N. Valentín, EPA RPM, Thomas A. Wentland and Vic Pappas of the WDNR, and Ken Aukerman representing PRS. The purpose of the inspection was to assess current site conditions and the protectiveness of the remedy.

EPA has assumed the primary oversight role at the site, in consultation with the WDNR as the support agency. The site inspection began with an interview of the former Site Manager, Ken Aukerman. Information from the interview has been incorporated into this report and the Site Inspection Checklist, which is included as Appendix E. The inspection covered the entire site, including the GMIT located at the former Tecumseh Sheboygan Falls plant, with a walk along the entire former plant perimeter and fence. Additionally, a walk-through was conducted along portions of the 14 miles of river that comprise the site. Photographs were taken of all significant site features and are included as Appendix F. No significant issues have been identified regarding the GMIT.

There have been no incidences of trespassing, vandalism or other external problems. No complaints from nearby residents have been received by the Site Manager, the WDNR project manager, or the EPA RPM or CIC.

Interviews

No interviews were conducted during the preparation of this FYR, other than communications with PRS, Kohler Company, Soil and Materials Engineers, and the WDNR project manager.

IV. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Yes. The remedial action activities were constructed in accordance with the requirements of the ROD and the design specifications, and the post-remediation data collected and reviewed to date shows that progress is being made toward achieving the RAOs established in the ROD. For example, soft-sediment data collected from the Upper River in 2012 show that the PCB SWAC has decreased 60% since the post-dredge baseline sampling conducted in 2007, going from 1.96 ppm to 0.78 ppm. While the remedy has been implemented in accordance with the requirements of the decision documents and design specifications, current levels of PCBs in fish tissue and sediments exceed the RAOs and corresponding cleanup numbers, resulting in unacceptable risks to human and ecological receptors. Fish consumption advisories are in place, but fishing has been observed with fish being taken off-site, and it is assumed that the fish are being consumed. Ecological receptors are still exposed to unacceptable risks posed by PCB contamination in sediments and fish. All active remediation work was completed in late 2012, and long-term monitoring of the site is underway. Data will continue to be collected in accordance with the *Post-Remediation Monitoring Plan* to determine whether PCB concentrations in sediments and fish are decreasing to meet the RAOs and cleanup numbers specified in the decision documents.

The ROD and the Remedial Design anticipated that it will take some time after completion of the remedial construction activities for the site to achieve the SWAC goals specified in the ROD and for fish tissue concentrations to decrease. ICs are being evaluated through the development of an ICIAP, and any additional ICs determined to be necessary will need to be put in place.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy section still valid?

Yes. The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection remain valid. There are no new promulgated standards applicable to the site.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. At this time, no other information has come to light that would call into question the protectiveness of the remedy.

Technical Assessment Summary

The remedy appears to be functioning as intended by the decision documents. The remedial action activities were constructed in accordance with the requirements of the ROD and the design specifications, and the post-remediation data collected and reviewed to date shows that progress is being made toward achieving the RAOs established in the ROD. All active remediation work was completed in late 2012, and long-term monitoring of the site is underway. Data will continue to be collected in accordance with the *Post-Remediation Monitoring Plan* to determine whether PCB concentrations in sediments and fish are decreasing to meet the RAOs and cleanup numbers specified in the decision documents. Current levels of PCBs in fish tissue and sediments exceed the RAOs and corresponding cleanup numbers, resulting in unacceptable risks to human and ecological receptors. The ROD and the Remedial Design anticipated that it will take some time after completion of the remedial construction activities for the site to achieve the SWAC goals specified in the ROD and for fish tissue concentrations to decrease. The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid, and no new cleanup standards have been promulgated that impact the site. No other information has come to light that would call into question the protectiveness of the remedy.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 4: Issues and Recommendations/Follow-up Actions

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness?	
						Current	**Future**
1 (Sitewide)	An ICIAP needs to be developed.	Prepare an ICIAP for approval. The ICIAP shall include language for addressing long-term maintenance and management of Outer Harbor breakwalls, future long-term O&M and management of Kohler floodplains, and any additional restrictions necessary to protect remedy components. Prepare and implement an IC monitoring or Long-Term Stewardship Plan, and include further evaluation and implementation of ICs, as necessary, to enhance the long-term protectiveness of the remedy.	PRP	EPA/ WDNR	9/30/2015	No	Yes
1 (Sitewide)	Full implementation and monitoring of effective ICs is needed.	Implement effective ICs in accordance with the approved ICIAP.	PRP	EPA/ WDNR	9/30/2016	No	Yes

VI. PROTECTIVENESS STATEMENT

OU1 and Sitewide Protectiveness Statement(s)

Protectiveness Determination:
Not Protective

Protectiveness Statement:
This FYR found that the remedy at the Sheboygan Harbor and River site is not protective of human health and the environment. While the remedy has been implemented in accordance with the requirements of the decision documents and design specifications, current levels of PCBs in fish tissue and sediments exceed the RAOs and corresponding cleanup numbers, resulting in unacceptable risks to human and ecological receptors. Fish consumption advisories are in place, but fishing has been observed, with fish being taken off-site, and it is assumed that the fish are being consumed. Ecological receptors are still exposed to unacceptable risks posed by PCB contamination in sediments and fish. During the construction of the remedial action, EPA held regular meetings with local officials and community members to communicate the risks associated with the site contamination as well as the risks associated with fish consumption. In addition, signs were placed along the river shoreline explaining the fish advisories. In order for the remedy to be protective, the following actions need to be taken: monitoring data is needed to show that PCB concentrations in sediments and fish are decreasing and that they achieve the RAOs and cleanup numbers as intended in the decision documents; and that implementation of and compliance with effective ICs is taking place. Compliance with ICs will be ensured by maintaining, monitoring, and enforcing ICs, as well as maintaining the remedy components at the site.

VII. NEXT REVIEW

The next FYR report for the Sheboygan Harbor and River Superfund site is required five years from the completion date of this review.

APPENDIX A – EXISTING SITE INFORMATION

A. SITE CHRONOLOGY

Table A-1: Site Chronology

Event	Date
Sheboygan Harbor constructed at mouth of the river	Early 1920s
Lower Sheboygan River (channel upstream of 8th Street Bridge) added as a portion of Sheboygan Harbor for maintenance dredging	1954
404,000 cubic yards of sediment dredged by the U.S. Army Corps of Engineers (USACE) downstream of 8th Street Bridge	1956 through 1969
USACE disposes of dredged material from harbor in deep water disposal area in Lake Michigan	Prior to 1969
Tecumseh voluntarily excavates and replaces a dike constructed prior to issuance of PCB governing regulations with PCB contaminated soils	Late1970s
USACE sediment sampling indicates moderate to high levels of lead, zinc, PCBs, and chromium as well as moderate levels of arsenic	1979
Examination of sediment profile samples collected by the USACE shows presence of PCBs in surface of harbor sediments	December 1982
EPA places Sheboygan Harbor and River Site on the National Priorities List (NPL)	6/10/1986
EPA requests that Tecumseh conduct actions to remove about 5,000 cubic yards of contaminated sediments	1989 and 1990
Remedial Investigation completed	05/31/1990
Feasibility Study completed	01/11/1999
EPA issues Record of Decision (ROD)	5/12/2000
EPA enters into Consent Decree (CD) with Tecumseh for the Upper River, CD entered and effective	5/12/2004
Tecumseh transfers liability to PRS and funds insurance policy	May 2004
PRS starts Phase I of site cleanup at former Tecumseh Plant	September 2004
Upper River CD is amended to include PRS as responsible party	2006
PRS starts Phase II cleanup work by initiating dredging in Upper River	5/15/2006
PRS completes Phase II dredging in Upper River	October 2007
Final site inspection for Phase I and Phase II Remedial Action work	11/7/2007
EPA enters into administrative order on consent (AOC) with PRS for recharacterization and Remedial Design of Middle River, Lower River, and Inner Harbor; AOC becomes effective	02/6/2009
First Five-Year Review Report signed	09/01/2009
EPA issues Explanation of Significant Differences (ESD)	12/15/2010
EPA enters into CD with PRS for implementation of cleanup work in Middle River, Lower River, and Inner Harbor; CD entered and effective	8/15/2011
Pre-Final Inspection of Remedial Action	11/07/2012
Preliminary Close Out Report Signed	01/30/2013

B. BACKGROUND

Physical Characteristics

The Sheboygan Harbor and River site is located on the western shore of Lake Michigan approximately 55 miles north of Milwaukee, Wisconsin, in Sheboygan County (see Figure A-1). The site includes the lower 14 miles of the river from the Sheboygan Falls Dam downstream to, and including, the Inner Harbor. This segment of the river flows through Sheboygan Falls, Kohler, and Sheboygan before entering Lake Michigan. The Sheboygan River runs from west to east through east central Wisconsin, emptying into Lake Michigan.

EPA divided the river into three sections during the remedial investigations (RI) based on physical characteristics such as average depth, width, and level of polychlorinated biphenyl (PCB) sediment contamination. The Upper River extends from the Sheboygan Falls Dam downstream 4 miles to the Waelderhaus Dam in Kohler. The Middle River extends 7 miles from the Waelderhaus Dam to the former Chicago & Northwestern (C&NW) railroad bridge. The Lower River extends 3 miles from the C&NW railroad bridge to the Pennsylvania Avenue Bridge in downtown Sheboygan. The Inner Harbor includes the Sheboygan River from the Pennsylvania Avenue Bridge to the river's outlet to the Outer Harbor. The Outer Harbor is defined as the area formed by the two breakwalls.

The river is generally characterized by fast, rocky stretches in the upper reaches and slower, more sediment-laden stretches in the lower reaches. The width of the Upper River averages 120 feet and the depth ranges from 1 to 4 feet. The river widens as it approaches the harbor. Harbor water quality is a combination of near-shore lake water and water from the Sheboygan River.

Land and Resource Use

Land Uses

Land use along the Upper River is industrial, residential, and recreational in Sheboygan Falls. The Kohler Company owns land adjacent to the Middle River in the Village of Kohler. Land use in the Middle River consists of a horse farm, tree nursery, the company's historic River Bend property and the Black Wolf Run golf course. The 800-acre, Kohler-owned River Wildlife Area is on the south side of the river adjacent to the Upper and Middle River. The wildlife area is used as a private hunting and fishing club. Land use adjacent to the Lower River and Inner Harbor is recreational, commercial, and industrial with some residential areas. The City of Sheboygan's central business district is on the north bank of the river in the harbor area. The City has revitalized the harbor area. Offices, restaurants, marinas, parks, and a boardwalk are located within this area.

Surface Water / Groundwater Uses

There are no public beaches along the river or harbor. The Lower River and harbor are navigable, but the Upper and Middle River traffic is typically restricted to smaller craft (i.e. canoes and kayaks) which can be portaged around the dams in Kohler and Sheboygan Falls, as well as shallow areas. Public and recreational boat access is available at a number of locations within the city of Sheboygan in the Lower River and harbor. There is considerable seasonal fishing in the Middle River, Lower River and Inner Harbor. Fishing is more limited in the Upper River. According to Wisconsin Department of Natural Resources (WDNR) surveys, most fishing occurs during spring and fall salmon and trout runs. A fish consumption advisory is in effect for Sheboygan River and Lake Michigan fish.

The Sheboygan River is not used as a public water supply, but it drains into Lake Michigan which is used as a drinking water source by Sheboygan, Sheboygan Falls, and Kohler. The three cities regularly test the public water and it is safe to drink. Contaminated groundwater near the Tecumseh Products Company's (Tecumseh's) Sheboygan Falls Plant is not used as a drinking water source.

History of Contamination

The Sheboygan Harbor was constructed at the mouth of the Sheboygan River in the early 1920s. In 1954, the lower Sheboygan River, namely the channel upstream of the 8th Street Bridge, was added as a portion of the Sheboygan Harbor for USACE maintenance dredging. Between 1956 and 1969, a total of 404,000 cubic yards of sediment were dredged downstream of the 8th Street Bridge. Until implementation of the Superfund cleanup work, the channel above 8th Street had not been dredged since it was first dredged in 1956.

Prior to 1969, the USACE disposed of the dredged material from the harbor in an authorized deep water disposal area in Lake Michigan. After EPA and WDNR determined that the sediment was unsuitable for open-water disposal, no dredging occurred within the Sheboygan Harbor until implementation of the Superfund and Great Lakes National Program Office dredging projects. Sediment sampling done by the USACE in 1979 indicated moderate to high levels of lead, zinc, PCBs, and chromium and moderate levels of arsenic present in sediment at all locations sampled. The USACE routinely removed lake sand from a sandbar that forms at the outer entrance of the harbor, with the last dredging of the harbor mouth (until implementation of the projects mentioned above) occurring in the fall of 1991. In June 1979, the USACE collected 11 sediment cores from the harbor area ranging in depth from 1.5 to 9 feet. The USACE analyzed samples for lead, zinc, copper, chromium, and PCBs. The study revealed greater PCB and metal levels in the sediment of the Inner Harbor than in sediment from the Outer Harbor. In October 1979, the USACE collected a second round of samples consisting of 21 sediment cores. The USACE's analysis of these cores generally indicated an increase in PCB concentrations with the distance upstream from the harbor and with the depth of the sediment. The Sheboygan Harbor and River are both located within the Sheboygan River Area of Concern, so designated by the International Joint Commission on the Great Lakes due to impairment of the beneficial uses of the waterway.

Tecumseh, a manufacturer of refrigeration and air conditioning compressors and gasoline engines, was located adjacent to the Sheboygan River in Sheboygan Falls. Tecumseh is considered a potentially responsible party (PRP) because PCBs were found in sewer lines that lead to the river from the former Tecumseh facility and in hydraulic fluids used in Tecumseh's Die Cast Division manufacturing processes. The contamination level was high in the sediments immediately surrounding the former Tecumseh Plant, but decreased in concentration downstream. Tecumseh, prior to the issuance of regulations governing PCBs, used PCB-contaminated soils to construct a dike located along the river downstream of the Sheboygan Falls Dam. Tecumseh voluntarily excavated and replaced the dike following EPA's issuance of regulations governing PCBs in the late 1970s. Tecumseh undertook cleanup actions, but not before PCBs were released into the Sheboygan River.

Initial Response

EPA placed the Sheboygan Harbor and River site on the NPL in June 1986. In 1989 and 1990, EPA requested that Tecumseh conduct actions to remove about 5,000 cubic yards of contaminated sediment. This sediment was stored in two containment facilities at Tecumseh's Sheboygan Falls Plant. In addition, approximately 1,200 square yards of highly contaminated sediment were capped or "armored" in place to prevent contaminants in the sediment from entering the river. Information developed during these activities is described in a document called an Alternative Specific Remedial Investigation (ASRI) report.

Basis for Taking Action

Investigations performed by Tecumseh between 1987 and 1990 defined the nature and extent of contamination at the site and described the extent of the threat that contaminants pose to human health and the environment. Tecumseh obtained additional data in June 1999. The primary compounds of concern were determined to be PCBs and several heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). The PCB contamination was the primary driver of risk and, as a result, the cleanup, so the cleanup primarily focused on removing PCB-contaminated sediments and soils. However, metals, volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) were also detected at varying concentrations. Over the course of the investigations, Tecumseh, WDNR and the National Oceanic and Atmospheric Administration have all collected samples from the Sheboygan River.

Eight metals including cadmium, chromium, copper, lead, mercury, nickel and zinc were targeted as part of the RI. Generally, the metals occurred at relatively low concentrations in the upstream sediments and increased in the downstream sediments. Common natural elements such as aluminum, calcium, iron, magnesium, potassium and sodium were also present. Sampling detected five VOCs, including methylene chloride, acetone, chloroform, methyl ethyl ketone, and toluene, in the river sediments. VOCs were generally found in low concentrations in the river sediment. However, acetone was detected at levels up to 270 parts per billion (ppb), while toluene was detected at levels up to 740 ppb.

PAHs are commonly associated with petroleum products, waste oil, and coal tars. During the RI the total estimated PAH concentrations were at or below 2.0 parts per million (ppm) for nine of the ten river samples obtained. The tenth sample had a PAH concentration of 4 ppm. In 1998, PAH sampling conducted by the Wisconsin Public Service Corporation for a project managed by WDNR showed total PAH concentrations ranging from non-detect to 9,294 ppm near the former Campmarina Manufactured Gas Plant site in the Lower River, just upstream of the Pennsylvania Avenue Bridge. Additional investigations and remediation of PAH-contaminated sediments related to that effort were managed separately by EPA as part of a separate site, and the PAH-contaminated sediments were not addressed by EPA's May 2000 ROD for the Sheboygan Harbor and River site. No pesticides or dioxin/dibenzofurans were detected in the river sediments. Figure A-2 shows the potential exposure pathways for the site.

Upper River

PCB sampling results from the Upper River in 1989 and 1990 showed concentrations ranging from 1.4 to 4,500 ppm. Tecumseh removed PCB-contaminated sediment near its facility in 1990 and 1991. PCB sampling conducted in December 1997 from the same soft sediment areas sampled in 1989 and 1990 showed concentrations ranging from non-detect to 170 ppm. Soft sediment sampling in 1999 near Tecumseh's Sheboygan Falls Plant revealed PCB concentrations as high as 840 ppm. River bank sampling in 1999 near Tecumseh's Sheboygan Falls Plant revealed PCB concentrations as high as 1,100 ppm. PCB-contaminated sediment in this segment of the river migrated downstream due to the dynamic nature of this river reach.

Middle River

Information obtained from the Middle River during the RI showed PCB concentrations ranging from non-detect to 8.8 ppm. WDNR sediment-trap data showed PCB concentrations ranging from 1.4 to 3.0 ppm. WDNR obtained sediment trap data between 1990 and 1996. Samples obtained in 1997 by WDNR showed PCB concentrations ranging from 0.6 ppm to 37 ppm. Like the Upper River, sediment in the Middle River was considered likely to be disturbed due to the dynamic nature of this river reach.

Lower River

During the original site investigations, sampling in the Lower River showed PCB concentrations as high at 67 ppm in the Campmarina area just a couple of feet below the sediment surface. Contaminated sediments within the top two feet may be disturbed by high flow events and/or boating. WDNR sediment-trap data collected from 1994 to 1996 showed PCB concentrations ranging from 1.9 to 4.2 ppm in the Lower River.

Inner Harbor

RI sampling detected PCB concentrations as high as 220 ppm in the Inner Harbor; however these levels were detected in 1979 and remained many feet below the surface. PCB surface sampling results (from the top 6 inches of sediment) in 1987 ranged from 0.17 to 5.8 ppm. PCB surface sampling results in 1999 ranged from 0.38 to 5.3 ppm. As a general rule, PCB concentrations increased with depth between the 8th Street Bridge and the Inner Harbor mouth. This, however, was not the case for certain areas between the Pennsylvania Avenue and 8th Street Bridges.

Soil

Tecumseh collected soil samples from within the 10-year floodplain of the Sheboygan River during the investigation phase of the project. Floodplain samples collected in 1990 showed PCB concentrations ranging from non-detect to 71 ppm. In 1990 and 1992, Tecumseh took additional rounds of samples as part of the ASRI. PCB concentrations exceeded 50 ppm in two samples and 10 ppm in six samples. Sampling in Floodplain Area 11 showed a concentration of 220 ppm. Floodplain Area 11 was resampled in 1992 and showed PCB concentrations of 330 and 320 ppm. Due to disturbances of the floodplain caused by golf course construction by the land owner, PCB concentrations decreased in Floodplain Area 11 since the ASRI sampling.

Surface Water

PCB concentrations were detected in surface water prior to, during, and after implementation of the PCB removal action in 1989 and 1990.

Groundwater

PCB contamination was also present in groundwater at the former Tecumseh plant. Groundwater sampling conducted in September 1992 and May 1993 by Tecumseh indicated that PCBs were locally present in the groundwater at Tecumseh's former Sheboygan Falls Plant in concentrations that ranged from 0.10 micrograms per liter (µg/L) to 7.4 µg/L in unfiltered samples, and from below the detection limit (0.05 µg/L) to 0.98 µg/L in filtered samples. These concentrations were above the 0.03 µg/L WDNR enforcement standard (ES) for groundwater.

C. REMEDIAL ACTIONS

Remedy Selection

EPA issued a ROD for the site on May 12, 2000. The remedy outlined specific actions to address PCB-contaminated sediment, PCB-contaminated floodplain soil, and groundwater contamination. The major components of the selected remedy included:

- Upper River sediment characterization, removal of approximately 20,774 cubic yards of PCB-contaminated sediment to achieve a soft sediment surface weighted average concentration (SWAC) of 0.5 ppm in the Upper River, and fish and sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less.

- Middle River sediment characterization, removal of sediment if necessary to achieve a soft sediment SWAC of 0.5 ppm in the Middle River, and fish and sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less.

- Lower River sediment characterization, removal of sediment if necessary to achieve a soft sediment SWAC of 0.5 ppm In the Lower River, annual bathymetry surveys to identify areas susceptible to scour, and fish and sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less.

- Inner Harbor sediment characterization, removal of approximately 53,000 cubic yards of PCB-contaminated sediment to achieve a SWAC of 0.5 ppm in the Inner Harbor, annual bathymetry surveys to identify areas susceptible to scour, fish and sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less, and maintenance of the Outer Harbor breakwalls.

- Removal of floodplain soils containing PCB concentrations above 10 ppm.

- Investigation and mitigation of potential groundwater contamination and possible continuing sources at the former Tecumseh Plant in Sheboygan Falls.

- Placement of institutional controls (ICs) to limit access to Tecumseh's Sheboygan Falls plant groundwater as a drinking water source and reliance on existing WDNR waterfowl and fish consumption advisories to limit human exposure to contaminated waterfowl and fish.

The remedy consists of three primary Remedial Action Objectives (RAOs):

a. Protect human health and the environment from imminent and substantial endangerment due to PCBs attributed to the site. To achieve this remediation objective, PCB-contaminated soft sediment will be removed so that the entire river will reach an average PCB sediment concentration of 0.5 ppm or less over time. An average PCB sediment concentration of 0.5 ppm results in an excess human health carcinogenic risk of 1.0 x 10^{-4} or less over time through the consumption of PCB-contaminated fish.

   Based on site-specific biota-to-sediment accumulation factors, the corresponding PCB tissue levels for resident fish are:

SPORT FISH	**BOTTOM FEEDERS**
Small Mouth Bass - 0.31 ppm	Carp - 2.58 ppm
Walleye - 0.63 ppm	Catfish - 2.53 ppm
Trout - 0.09 ppm	

   For PCB contaminated floodplain areas, this remediation objective will be achieved by removing sufficient contaminated soil to reach an average PCB soil concentration of 10 ppm or less.

   With respect to PCB-contaminated groundwater or other potential sources near Tecumseh's Sheboygan Falls plant, the remediation objective will be to investigate and stop all additional PCB sources to the river system.

b. Mitigate potential PCB sources to the Sheboygan River/Harbor system and reduce PCB transport within the river system.

c. Remove and dispose of Confined Treatment Facility/Sediment Management Facility sediments and previously armored/capped PCB-contaminated soft sediment deposits.

On December 15, 2010, EPA issued an ESD to adjust the estimate of the volume of contaminated sediment to be removed from the river, the areas from which those sediments would be removed, and the estimated cost of the remedy. These adjustments were made following an evaluation of pre-design investigation data and development of the Lower River Remedial Design. The pre-design investigation data demonstrated that, compared to the estimates in the ROD, the more heavily-contaminated sediment was present in the upper soft sediment layers within the Lower River, and less contamination was present in the upper soft sediment layers in the Inner Harbor. The cost estimate was adjusted to reflect more current, accurate cost information for implementation of the remedy. The remedy difference described in the ESD are summarized in the tables below.

May 2000 ROD Capital Cost Estimate	**Capital Cost Estimate based on Lower River Remedial Design**
$ 12.1 million	$ 12.6 million
% Cost Difference = 4.1 %	

	May 200 ROD Contaminated Sediment Volume to be Removed	**Lower River Remedial Design Contaminated Sediment Volume to be Removed**
Lower River	None	16,158 cubic yards
Inner Harbor	53,000 cubic yards	34,390 cubic yards
Total Volume of Contaminated Sediment to be Removed from the Lower River and Inner Harbor		**50,548 cubic yards**
% Volume Difference of Contaminated Sediment to be Removed		**- 4.6 %**

Remedy Implementation

A CD between the United States and Tecumseh for the Upper River portion of the remedy was entered and became effective on May 12, 2004. Pursuant to the Upper River CD, Tecumseh's alleged liability was resolved for a portion of the site. Under the terms of the Upper River CD, Tecumseh was required to: 1) implement EPA's selected remedy for the cleanup of the Upper River section of the site; 2) pay at least $2.1 million toward EPA's past response costs; and 3) pay all Upper River future response costs incurred by the United States. On March 25, 2003, Tecumseh and PRS entered into a "Liability Transfer and Assumption Agreement" under which PRS assumed specified obligations and liabilities for remediation of the site and associated costs for which Tecumseh is responsible under the Upper River CD, which included the obligation to perform the Upper River work under the CD. PRS performed the remedial design/remedial action for the Upper River. Following completion of the remedial design, the remedial action for the Upper River was implemented in two phases from September 2004 to October 2007. The final site inspection of the Upper River Phase II remedial action was conducted on November 7, 2007.

EPA and WDNR determined that the following remedial action activities were completed according to the ROD and design specifications:

- Construction and installation of Groundwater Monitoring/ Interceptor Trench (GMIT);
- Excavation of source materials;
- Riverbank excavation;
- Removal of preferential pathways which included the removal of soil in a 10-foot radius from two outfall locations at the former Tecumseh plant that could pose a threat of continued PCB loadings to the river system;
- Installation of monitoring wells;
- Removal of 20,727 cubic yards of sediment which included 552.45 pounds of PCBs from the Upper River portion of the Sheboygan River from the Sheboygan Falls Dam down to Waelderhaus Dam; and
- Site restoration.

PRS entered into an AOC with EPA to perform recharacterization and remedial design activities for the Middle River, Lower River, and Inner Harbor. The AOC became effective on February 6, 2009.

Additional remedy implementation activities that occurred since the 2009 FYR are discussed in detail in the main body of the 2014 FYR to which this appendix is attached.

System Operation/Operation and Maintenance

After construction completion and verification that the Upper River Phase I and Phase II construction activities were completed, groundwater monitoring of the GMIT was initiated and a Post-Remediation Monitoring Plan (PMP) was developed by PRS. Fish tissue and soft sediment must also be monitored for PCB concentrations as part of the PMP, as required by the 2000 ROD. In 2008, PRS performed the initial baseline fish monitoring event for the Upper River as well as for the Middle River, Lower River, and Inner Harbor. The Upper River baseline fish monitoring event followed completion of the Upper River dredging work.

Additional monitoring events that have occurred since the 2009 FYR are discussed in detail in the main body of the 2014 FYR to which this appendix is attached.

Figure A1 - Sheboygan Harbor and River Superfund Site Location Map

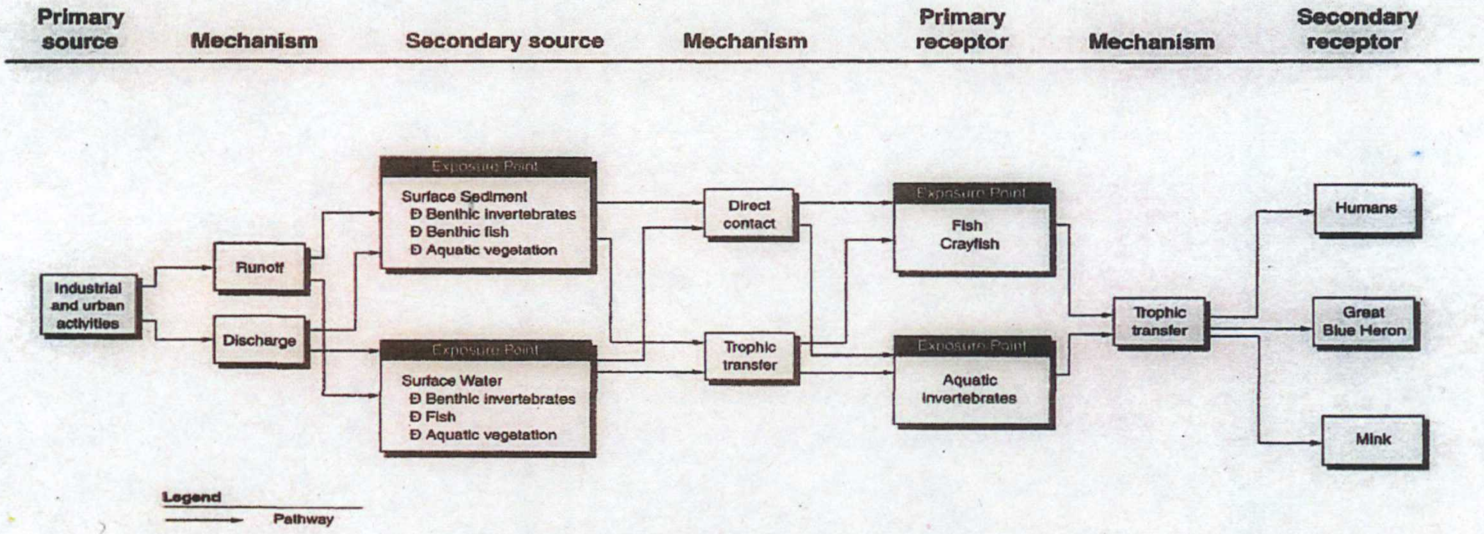


Figure A2 - Sheboygan Harbor and River Superfund Site Potential Exposure pathways

APPENDIX B

ADDITIONAL TABLES

(not included in main body of FYR)

Table B1

Summary of 2007 Post-Dredge Sediment Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep01-1	909.0	0.017	15.5
Dep02-1	2,331.0	0.017	39.6
Dep03-1	337.0	0.017	5.7
Dep04-1	224.0	0.017	3.8
Dep05-1	2,694.0	0.017	45.8
Dep05-2	2,731.0	0.017	46.4
Dep05-3	1,001.0	0.017	17.0
Dep06-1	2,745.0	0.017	46.7
Dep06-2	2,679.0	0.017	45.5
Dep06-3	2,464.0	0.017	41.9
Dep07-1	2,715.0	0.017	46.2
Dep07-2	816.0	0.017	13.9
Dep08-1	185.0	0.017	3.1
Dep09-1	2,724.0	1.155	3,146.8
Dep09-2	2,704.0	0.874	2,362.2
Dep09-3	2,692.0	0.680	1,830.6
Dep09-4	2,667.0	0.391	1,043.2
Dep09-5	2,690.0	0.206	555.4
Dep09-6	2,695.0	0.672	1,811.4
Dep09-7	2,577.0	0.705	1,816.3
Dep09-8	1,455.0	0.318	462.9
Dep10-1	314.0	0.017	5.3
Dep11-1	147.0	0.017	2.5
Dep12-1	29.0	0.017	0.5
Dep13-1	2,581.8	0.017	43.9
Dep13-2	2,582.8	0.017	43.9
Dep13-3	3,181.0	0.017	54.1
Dep13-4	2,931.7	0.017	49.8
Dep13-5	25.0	0.017	0.4
Dep14-1	2,687.0	0.017	45.7
Dep14-2	2,680.0	0.017	45.6
Dep14-3	2,709.0	0.017	46.1
Dep14-4	2,716.0	0.017	46.2
Dep14-5	2,656.0	0.416	1,106.0
Dep14-6	2,673.0	0.017	45.4
Dep14-7	2,688.0	0.017	45.7
Dep14-8	2,678.0	0.017	45.5
Dep14-9	2,668.0	0.017	45.4
Dep14-10	1,804.0	0.017	30.7
Dep15-1	647.0	0.017	11.0
Dep16-1	2,738.0	1.744	4,774.3
Dep16-2	2,668.0	1.833	4,891.6
Dep16-3	2,700.0	0.727	1,962.8
Dep16-4	2,724.0	0.255	694.9
Dep16-5	2,683.0	0.269	721.7
Dep16-6	127.0	0.370	47.0

Table B1

Summary of 2007 Post-Dredge Sediment Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep17-1	2,725.0	0.017	46.3
Dep17-2	673.0	0.017	11.4
Dep18-1	2,669.0	0.017	45.4
Dep18-2	2,703.0	0.017	46.0
Dep18-3	2,744.0	0.017	46.6
Dep18-4	2,691.0	0.017	45.7
Dep18-5	2,678.0	0.017	45.5
Dep18-6	2,723.0	0.017	46.3
Dep18-7	2,692.0	0.017	45.8
Dep18-8	2,686.0	0.017	45.7
Dep18-9	2,722.0	0.017	46.3
Dep18-10	2,069.0	0.017	35.2
Dep19-1	892.0	0.254	226.6
Dep20A-1	2,639.0	0.326	859.4
Dep20A-2	2,712.0	0.101	273.0
Dep20A-3	2,711.0	0.573	1,552.3
Dep20A-4	2,728.0	0.048	130.3
Dep20A-5	1,090.0	0.098	106.5
Dep20A-6	2,660.0	0.055	147.5
Dep20A-7	2,748.0	0.412	1,131.5
Dep20A-8	2,736.0	0.584	1,598.7
Dep20A-9	2,684.0	0.545	1,461.9
Dep20A-10	2,641.0	0.206	543.1
Dep20A-11	2,680.0	0.323	866.7
Dep20A-12	2,704.0	0.108	292.8
Dep20A-13	2,703.0	0.184	496.1
Dep20C-14	2,708.0	0.545	1,475.0
Dep20C-15	2,684.0	0.478	1,283.0
Dep20C-16	2,695.0	0.522	1,406.5
Dep20C-17	2,731.0	0.293	799.3
Dep20C-18	2,681.0	0.288	772.3
Dep20C-19	2,692.0	0.352	946.5
Dep20C-20	2,720.0	0.178	484.2
Dep20C-21	2,720.0	0.051	139.6
Dep20C-22	2,604.0	0.398	1,035.1
Dep20C-23	2,677.0	0.438	1,173.4
Dep20C-24	2,693.0	2.673	7,198.7
Dep20C-25	2,636.0	7.207	18,998.4
Dep20C-26	2,695.0	1.312	3,537.1
Dep20C-27	2,702.0	1.343	3,627.6
Dep20C-28	2,708.0	2.621	7,098.4
Dep20C-29	2,692.0	1.067	2,873.6
Dep20B-30	2,656.0	4.768	12,664.5
Dep20B-31	2,743.0	2.978	8,168.4
Dep20B-32	2,682.0	3.413	9,153.3
Dep20B-33	2,640.0	13.890	36,669.8

Table B1

Summary of 2007 Post-Dredge Sediment Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep20B-34	2,635.0	4.205	11,079.8
Dep20B-35	2,821.0	2.109	5,949.5
Dep20B-36	2,681.0	1.684	4,513.6
Dep20B-37	2,738.0	2.563	7,017.2
Dep20B-38	2,628.0	9.746	25,611.9
Dep20B-39	2,682.0	1.009	2,706.9
Dep20B-40	2,708.0	7.009	18,979.0
Dep20B-41	2,644.0	1.097	2,900.7
Dep20B-42	2,764.0	2.082	5,755.4
Dep20B-43	2,726.0	1.338	3,648.2
Dep20B-44	2,726.0	8.153	22,223.9
Dep20B-45	2,638.0	11.009	29,040.4
Dep20B-46	534.0	1.800	961.2
Dep20B-47	827.0	0.530	438.5
Dep20B-48	664.0	1.918	1,273.5
Dep20B-49	2,697.0	1.443	3,892.8
Dep21-1	2,619.0	1.300	3,404.7
Dep21-2	1,130.0	2.200	2,486.0
Dep22-1	728.0	0.600	436.8
Dep23-1	2,636.0	2.100	5,535.6
Dep23-2	2,705.0	1.200	3,246.0
Dep23-3	2,735.0	1.000	2,735.0
Dep23-4	1,347.0	3.200	4,310.4
Dep24-1	2,680.0	3.100	8,308.0
Dep24-2	1,417.0	2.100	2,975.7
Dep25-1	80.0	2.700	216.0
Dep26A-1	2,687.0	2.182	5,863.0
Dep26A-2	2,720.0	3.678	10,004.2
Dep26A-3	2,706.0	4.507	12,195.9
Dep26A-4	2,714.0	3.500	9,499.0
Dep26A-5	2,708.0	12.351	33,446.5
Dep26A-6	2,673.0	10.739	28,705.3
Dep26A-7	2,786.0	19.130	53,296.2
Dep26A-8	2,691.0	11.475	30,879.2
Dep26A-9	2,670.0	3.285	8,771.0
Dep26A-10	2,729.0	0.287	783.2
Dep26A-11	2,740.0	12.454	34,124.0
Dep26A-12	2,609.0	6.509	16,982.0
Dep26B-13	2,693.0	15.339	41,307.9
Dep26B-14	2,746.0	18.760	51,515.0
Dep26B-15	1,373.0	9.337	12,819.7
Dep27-1	2,619.0	2.000	5,238.0
Dep27-2	2,685.0	0.900	2,416.5
Dep27-3	2,712.0	0.900	2,440.8
Dep27-4	2,657.0	1.100	2,922.7
Dep27-5	2,743.0	0.900	2,468.7

Table B1

Summary of 2007 Post-Dredge Sediment Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep27-6	2,709.0	0.600	1,625.4
Dep27-7	1,678.0	17.100	28,693.8
Dep28-1	135.0	0.300	40.5
Dep29-1	2,672.0	2.100	5,611.2
Dep29-2	652.0	1.100	717.2
Dep30-1	1,790.0	0.400	716.0
Dep31-1	2,747.0	2.000	5,494.0
Dep31-2	2,640.0	1.100	2,904.0
Dep31-3	2,722.0	0.300	816.6
Dep31-4	2,681.0	1.500	4,021.5
Dep31-5	95.0	1.200	114.0
Dep32-1	2,879.0	0.700	2,015.3
Dep32-2	2,701.0	0.500	1,350.5
Dep32-3	2,667.0	0.800	2,133.6
Dep32-4	2,659.0	0.700	1,861.3
Dep32-5	2,720.0	0.800	2,176.0
Dep32-6	2,773.0	0.400	1,109.2
Dep32-7	2,675.0	0.800	2,140.0
Dep32-8	2,702.0	1.700	4,593.4
Dep32-9	2,694.0	0.900	2,424.6
Dep32-10	2,731.0	0.800	2,184.8
Dep32-11	2,722.0	0.600	1,633.2
Dep32-12	2,717.0	0.700	1,901.9
Dep32-13	2,701.0	0.800	2,160.8
Dep32-14	2,658.0	0.600	1,594.8
Dep32-15	2,696.0	0.600	1,617.6
Dep32-16	2,693.0	0.800	2,154.4
Dep32-17	2,668.0	0.500	1,334.0
Dep32-18	2,699.0	0.400	1,079.6
Dep32-19	789.0	0.200	157.8
Dep33A-1	2,703.0	0.100	270.3
Dep33A-2	2,644.0	1.200	3,172.8
Dep33A-3	2,690.0	0.400	1,076.0
Dep33A-4	2,665.0	0.200	533.0
Dep33A-5	2,786.0	0.500	1,393.0
Dep33A-6	2,702.0	0.500	1,351.0
Dep33A-7	2,657.0	0.600	1,594.2
Dep33A-8	2,708.0	0.300	812.4
Dep33A-9	2,806.0	1.400	3,928.4
Dep33A-10	2,723.0	1.500	4,084.5
Dep33A-11	2,711.0	0.700	1,897.7
Dep33A-12	2,728.0	1.000	2,728.0
Dep33A-13	2,694.0	1.600	4,310.4
Dep33A-14	2,717.0	1.400	3,803.8
Dep33C-15	2,627.0	3.700	9,719.9
Dep33C-16	2,694.0	11.700	31,519.8

Table B1

Summary of 2007 Post-Dredge Sediment Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Design or Re-calculated Surface Area	Post-Dredge Average PCB Concentration	RMU Contribution to SWAC
	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep33C-17	2,652.0	6.400	16,972.8
Dep33C-18	2,744.0	7.000	19,208.0
Dep33C-19	2,708.0	3.400	9,207.2
Dep33C-20	2,654.0	2.400	6,369.6
Dep33B-21	2,751.0	1.800	4,951.8
Dep33B-22	2,740.0	1.600	4,384.0
Dep33B-23	2,676.0	1.300	3,478.8
Dep33B-24	2,676.0	1.000	2,676.0
Dep33B-25	2,740.0	0.700	1,918.0
Dep33B-26	2,676.0	0.900	2,408.4
Dep33B-27	2,714.0	0.700	1,899.8
Dep33B-28	2,590.0	0.700	1,813.0
AA1-1	2,800.0	0.017	47.6
AA2-1	1,500.0	0.017	25.5
AA3-1	360.0	0.017	6.1
AA4-1	1,200.0	0.017	20.4
AA5A-1	2,625.0	0.017	44.6
AA7-1	400.0	0.017	6.8
AA8-1	1,000.0	0.017	17.0
AA10-1	2,000.0	0.017	34.0
AA11-1	1,050.0	0.017	17.9
	MEDIAN	0.600	
TOTAL	478,362.2		937,307.8
ESTIMATED SWAC = SUM(C)/SUM(A)			1.96

Note:

1. Per the Verification Sampling Plan (Section 3.1.3 of Appendix E of the *Upper River Phase II Sediment Removal Design*) submitted and approved, if hardpan or consolidated material is determined, a value equal to the detection limit (0.017 ppm) will be assigned to this location and used in the SWAC calculation. The value of 0.017 ppm represents the Test America detection limit.

Table B2

Summary of 2012 Phase 1 Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Surface Area	PCB Concentration	RMU Contribution to SWAC
	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep01-1	909.0	3.130	2,845.2
Dep02-1	2,331.0	0.040	93.2
Dep03-1	337.0	3.380	1,139.1
Dep04-1	224.0	1.740	389.8
Dep05-1	2,694.0	3.890	10,479.7
Dep05-2	2,731.0	0.910	2,485.2
Dep05-3	1,001.0	2.210	2,212.2
Dep06-1	2,745.0	0.324	889.4
Dep06-2	2,679.0	0.654	1,752.1
Dep06-3	2,464.0	5.140	12,665.0
Dep07-1	2,715.0	2.050	5,565.8
Dep07-2	816.0	2.420	1,974.7
Dep08-1	185.0	1.020	188.7
Dep09-1	2,724.0	0.317	863.5
Dep09-2	2,704.0	1.580	4,272.3
Dep09-3	2,692.0	0.827	2,226.3
Dep09-4	2,667.0	0.600	1,600.2
Dep09-5	2,690.0	2.300	6,187.0
Dep09-6	2,695.0	0.993	2,676.1
Dep09-7	2,577.0	1.820	4,690.1
Dep09-8	1,455.0	0.786	1,143.6
Dep10-1	314.0	0.769	241.5
Dep11-1	147.0	0.024	3.5
Dep12-1	29.0	0.024	0.7
Dep13-1	2,581.8	1.040	2,685.0
Dep13-2	2,582.8	0.423	1,092.5
Dep13-3	3,181.0	0.649	2,064.5
Dep13-4	2,931.7	1.910	5,599.5
Dep13-5	25.0	0.728	18.2
Dep14-1	2,687.0	0.176	472.9
Dep14-2	2,680.0	0.221	592.3
Dep14-3	2,709.0	0.453	1,227.2
Dep14-4	2,716.0	0.374	1,015.8
Dep14-5	2,656.0	0.196	520.6
Dep14-6	2,673.0	0.289	772.5
Dep14-7	2,688.0	0.434	1,166.6
Dep14-8	2,678.0	0.830	2,222.7
Dep14-9	2,668.0	0.506	1,350.0
Dep14-10	1,804.0	0.636	1,147.3
Dep15-1	647.0	0.380	245.9
Dep16-1	2,738.0	0.353	966.5
Dep16-2	2,668.0	0.459	1,224.6
Dep16-3	2,700.0	0.216	583.2
Dep16-4	2,724.0	0.272	740.9
Dep16-5	2,683.0	0.672	1,803.0
Dep16-6	127.0	0.424	53.8
Dep17-1	2,725.0	0.408	1,111.8
Dep17-2	673.0	0.548	368.8

Table B2

Summary of 2012 Phase 1 Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Surface Area	PCB Concentration	RMU Contribution to SWAC
	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep18-1	2,669.0	0.489	1,305.1
Dep18-2	2,703.0	0.662	1,789.4
Dep18-3	2,744.0	1.360	3,731.8
Dep18-4	2,691.0	1.120	3,013.9
Dep18-5	2,678.0	0.737	1,973.7
Dep18-6	2,723.0	1.590	4,329.6
Dep18-7	2,692.0	0.633	1,704.0
Dep18-8	2,686.0	0.767	2,060.2
Dep18-9	2,722.0	0.751	2,044.2
Dep18-10	2,069.0	0.499	1,032.4
Dep19-1	892.0	0.779	694.9
Dep20A-1	2,639.0	0.265	699.3
Dep20A-2	2,712.0	0.336	911.2
Dep20A-3	2,711.0	0.628	1,702.5
Dep20A-4	2,728.0	0.393	1,072.1
Dep20A-5	1,090.0	0.544	593.0
Dep20A-6	2,660.0	0.659	1,752.9
Dep20A-7	2,748.0	0.553	1,519.6
Dep20A-8	2,736.0	0.459	1,255.8
Dep20A-9	2,684.0	0.842	2,259.9
Dep20A-10	2,641.0	0.525	1,386.5
Dep20A-11	2,680.0	0.341	913.9
Dep20A-12	2,704.0	0.256	692.2
Dep20A-13	2,703.0	0.579	1,565.0
Dep20C-14	2,708.0	0.279	755.5
Dep20C-15	2,684.0	0.384	1,030.7
Dep20C-16	2,695.0	0.525	1,414.9
Dep20C-17	2,731.0	0.294	802.9
Dep20C-18	2,681.0	0.318	852.6
Dep20C-19	2,692.0	0.516	1,389.1
Dep20C-20	2,720.0	1.440	3,916.8
Dep20C-21	2,720.0	0.525	1,428.0
Dep20C-22	2,604.0	0.870	2,265.5
Dep20C-23	2,677.0	2.190	5,862.6
Dep20C-24	2,693.0	0.392	1,055.7
Dep20C-25	2,636.0	0.261	688.0
Dep20C-26	2,695.0	0.411	1,107.6
Dep20C-27	2,702.0	0.334	902.5
Dep20C-28	2,708.0	0.445	1,205.1
Dep20C-29	2,692.0	0.476	1,281.4
Dep20B-30	2,656.0	0.432	1,147.4
Dep20B-31	2,743.0	0.377	1,034.1
Dep20B-32	2,682.0	0.474	1,271.3
Dep20B-33	2,640.0	0.635	1,676.4
Dep20B-34	2,635.0	0.703	1,852.4
Dep20B-35	2,821.0	1.600	4,513.6
Dep20B-36	2,681.0	0.446	1,195.7
Dep20B-37	2,738.0	2.000	5,476.0

Table B2

Summary of 2012 Phase 1 Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Surface Area (sq. ft.)	PCB Concentration (mg/Kg)	RMU Contribution to SWAC (sq.ft*mg/Kg)
Dep20B-38	2,628.0	0.998	2,622.7
Dep20B-39	2,682.0	0.575	1,542.2
Dep20B-40	2,708.0	0.578	1,565.2
Dep20B-41	2,644.0	0.635	1,678.9
Dep20B-42	2,764.0	0.682	1,885.0
Dep20B-43	2,726.0	0.290	790.5
Dep20B-44	2,726.0	0.845	2,303.5
Dep20B-45	2,638.0	1.880	4,959.4
Dep20B-46	534.0	0.313	167.1
Dep20B-47	827.0	0.522	431.7
Dep20B-48	664.0	0.707	469.4
Dep20B-49	2,697.0	1.150	3,101.6
Dep21-1	2,619.0	1.030	2,697.6
Dep21-2	1,130.0	0.417	471.2
Dep22-1	728.0	0.765	556.9
Dep23-1	2,636.0	1.140	3,005.0
Dep23-2	2,705.0	0.580	1,568.9
Dep23-3	2,735.0	1.080	2,953.8
Dep23-4	1,347.0	0.805	1,084.3
Dep24-1	2,680.0	0.478	1,281.0
Dep24-2	1,417.0	0.694	983.4
Dep25-1	80.0	2.480	198.4
Dep26A-1	2,687.0	0.586	1,574.6
Dep26A-2	2,720.0	0.626	1,702.7
Dep26A-3	2,706.0	1.300	3,517.8
Dep26A-4	2,714.0	1.220	3,311.1
Dep26A-5	2,708.0	0.328	888.2
Dep26A-6	2,673.0	0.643	1,718.7
Dep26A-7	2,786.0	0.807	2,248.3
Dep26A-8	2,691.0	1.160	3,121.6
Dep26A-9	2,670.0	0.422	1,126.7
Dep26A-10	2,729.0	0.225	614.0
Dep26A-11	2,740.0	3.200	8,768.0
Dep26A-12	2,609.0	0.518	1,351.5
Dep26B-13	2,693.0	0.491	1,322.3
Dep26B-14	2,746.0	0.544	1,493.8
Dep26B-15	1,373.0	0.676	928.1
Dep27-1	2,619.0	1.340	3,509.5
Dep27-2	2,685.0	1.100	2,953.5
Dep27-3	2,712.0	0.933	2,530.3
Dep27-4	2,657.0	0.407	1,081.4
Dep27-5	2,743.0	0.873	2,394.6
Dep27-6	2,709.0	0.146	395.5
Dep27-7	1,678.0	0.610	1,023.6
Dep28-1	135.0	0.576	77.8
Dep29-1	2,672.0	0.748	1,998.7
Dep29-2	652.0	0.425	277.1
Dep30-1	1,790.0	0.129	230.9

Table B2

Summary of 2012 Phase 1 Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Surface Area (sq. ft.)	PCB Concentration (mg/Kg)	RMU Contribution to SWAC (sq.ft*mg/Kg)
Dep31-1	2,747.0	0.473	1,299.3
Dep31-2	2,640.0	0.854	2,254.6
Dep31-3	2,722.0	0.943	2,566.8
Dep31-4	2,681.0	0.735	1,970.5
Dep31-5	95.0	0.826	78.5
Dep32-1	2,879.0	0.769	2,214.0
Dep32-2	2,701.0	0.835	2,255.3
Dep32-3	2,667.0	0.836	2,229.6
Dep32-4	2,659.0	0.671	1,784.2
Dep32-5	2,720.0	0.559	1,520.5
Dep32-6	2,773.0	0.494	1,369.9
Dep32-7	2,675.0	0.424	1,134.2
Dep32-8	2,702.0	0.883	2,385.9
Dep32-9	2,694.0	0.717	1,931.6
Dep32-10	2,731.0	0.649	1,772.4
Dep32-11	2,722.0	0.378	1,028.9
Dep32-12	2,717.0	0.723	1,964.4
Dep32-13	2,701.0	0.486	1,312.7
Dep32-14	2,658.0	0.594	1,578.9
Dep32-15	2,696.0	0.370	997.5
Dep32-16	2,693.0	0.516	1,389.6
Dep32-17	2,668.0	0.636	1,696.8
Dep32-18	2,699.0	0.186	502.0
Dep32-19	789.0	0.440	347.2
Dep33A-1	2,703.0	0.330	892.0
Dep33A-2	2,644.0	0.332	877.8
Dep33A-3	2,690.0	0.923	2,482.9
Dep33A-4	2,665.0	0.341	908.8
Dep33A-5	2,786.0	0.626	1,744.0
Dep33A-6	2,702.0	1.260	3,404.5
Dep33A-7	2,657.0	0.732	1,944.9
Dep33A-8	2,708.0	1.400	3,791.2
Dep33A-9	2,806.0	2.110	5,920.7
Dep33A-10	2,723.0	0.791	2,153.9
Dep33A-11	2,711.0	0.539	1,461.2
Dep33A-12	2,728.0	0.480	1,309.4
Dep33A-13	2,694.0	0.774	2,085.2
Dep33A-14	2,717.0	0.940	2,554.0
Dep33C-15	2,627.0	0.474	1,245.2
Dep33C-16	2,694.0	0.396	1,066.8
Dep33C-17	2,652.0	0.502	1,331.3
Dep33C-18	2,744.0	0.341	935.7
Dep33C-19	2,708.0	0.771	2,087.9
Dep33C-20	2,654.0	0.469	1,244.7
Dep33B-21	2,751.0	0.429	1,180.2
Dep33B-22	2,740.0	0.618	1,693.3
Dep33B-23	2,676.0	0.889	2,379.0
Dep33B-24	2,676.0	0.597	1,597.6

Table B2

Summary of 2012 Phase 1 Results and SWAC Calculation for Upper River

	A	B	C = A*B
Identifier	Surface Area	PCB Concentration	RMU Contribution to SWAC
	(sq. ft.)	(mg/Kg)	(sq.ft*mg/Kg)
Dep33B-25	2,740.0	0.577	1,581.0
Dep33B-26	2,676.0	0.873	2,336.1
Dep33B-27	2,714.0	0.319	865.8
Dep33B-28	2,590.0	0.235	608.7
AA1-1	2,800.0	0.478	1,338.4
AA2-1	1,500.0	3.640	5,460.0
AA3-1	360.0	1.540	554.4
AA4-1	1,200.0	3.110	3,732.0
AA5A-1	2,625.0	0.516	1,354.5
AA7-1	400.0	2.870	1,148.0
AA8-1	1,000.0	0.710	710.0
AA10-1	2,000.0	0.741	1,482.0
AA11-1	1,050.0	0.885	929.3
	MEDIAN	0.626	
TOTAL	478,362.2		372,215.8
ESTIMATED SWAC = SUM(C)/SUM(A)			0.78

Note:

1. Per the 2008 *Post-Remediation Monitoring Plan* submitted and approved, if hardpan or consolidated material is determined, a value equal to the detection limit (0.024 ppm) will be assigned to this location and used in the SWAC calculation. The value of 0.024 ppm represents the Pace Analytical detection limit.

Table B3

Year-by-Year Fish Tissue Samples Statistical Comparison

Year by Year Statistical Comparision

UR1 - AC	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean	25.88	6.04	13.89	17.86	28.46	37.02
Minimum	1.63	0.65	5.27	1.87	4.55	8.27
Maximum	73.13	15.70	34.70	58.90	52.20	100.00
Standard Deviation	21.45	5.38	8.74	17.53	15.78	24.62
Coefficient of Variation	0.83	0.89	0.63	0.98	0.55	0.67
Upper 95% UCL	35.28	8.83	8.83	30.85	36.64	51.44
UR1 - AWS	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	12.42	10.94	16.23	4.71	10.63	10.68
Minimum	5.74	0.25	3.92	1.67	2.67	2.21
Maximum	20.60	25.30	45.90	16.50	25.20	37.20
Standard Deviation	5.00	8.26	10.90	3.92	6.81	9.61
Coefficient of Variation	0.40	0.76	0.67	0.83	0.64	0.90
Upper 95% UCL	15.77	16.48	16.48	6.73	14.16	16.33
UR1 - JWS	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	6.01	3.10	9.87	2.32		
Minimum	1.99	1.52	3.94	0.44		
Maximum	9.71	5.81	16.60	5.36		
Standard Deviation	2.85	1.65	4.27	1.71		
Coefficient of Variation	0.47	0.53	0.43	0.74		
Upper 95% UCL	7.92	4.48	4.48	3.53		
UR1 - SB	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	12.96	5.75	4.74	3.22	5.80	7.06
Minimum	4.09	1.28	0.52	0.69	2.52	0.14
Maximum	22.20	11.50	7.26	4.77	8.69	21.50
Standard Deviation	7.28	3.51	2.03	1.50	2.17	6.70
Coefficient of Variation	0.56	0.61	0.43	0.47	0.37	0.95
Upper 95% UCL	17.83	8.10	8.10	4.00	6.93	10.53
UR1 - RB	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	6.94	2.85	2.85	3.66	3.07	4.03
Minimum	1.22	0.90	0.30	0.41	1.18	0.15
Maximum	16.80	4.80	5.94	12.00	5.94	15.70
Standard Deviation	5.01	1.32	1.97	2.94	1.87	4.79
Coefficient of Variation	0.72	0.46	0.69	5.66	0.61	1.19
Upper 95% UCL	10.30	3.76	3.76	5.66	4.33	9.04
UR2 - AC	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	14.72	16.83	7.03	8.84	21.29	19.22
Minimum	1.02	5.04	0.29	2.44	4.65	1.05
Maximum	47.70	37.50	32.90	19.70	36.90	39.00
Standard Deviation	15.04	9.49	11.15	5.68	10.83	12.00
Coefficient of Variation	1.02	0.56	1.59	0.64	0.51	0.62
Upper 95% UCL	24.89	20.99	20.99	12.64	28.55	25.78
UR2 - AWS	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	8.92	11.58	5.11	4.31	3.71	6.87
Minimum	3.95	2.27	2.82	2.36	1.32	3.66
Maximum	16.60	25.00	11.00	7.69	8.31	12.40
Standard Deviation	4.19	7.69	2.57	1.64	2.50	2.28
Coefficient of Variation	0.47	0.66	0.50	0.38	0.67	0.33
Upper 95% UCL	11.72	16.73	16.73	5.16	5.35	8.05
UR2 - JWS	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	6.82	2.75	1.97	1.50		
Minimum	3.73	0.71	0.46	0.87		
Maximum	11.50	5.09	3.51	2.41		
Standard Deviation	2.96	1.24	0.94	0.53		
Coefficient of Variation	0.43	0.45	0.48	0.35		
Upper 95% UCL	8.80	3.58	3.58	1.80		
UR2 - SB	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	14.52	3.52	4.32	2.28	2.69	2.93
Minimum	3.12	0.54	1.68	0.70	1.25	0.96
Maximum	33.50	9.20	7.72	4.11	9.72	5.80
Standard Deviation	11.11	3.22	1.92	1.17	2.30	1.60
Coefficient of Variation	0.77	0.91	0.44	0.51	0.85	0.54
Upper 95% UCL	21.96	5.68	5.68	2.89	3.80	3.76
UR2 - RB	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	4.27	6.70	1.63	2.20	1.18	2.28
Minimum	0.74	0.96	0.53	0.46	0.35	0.78
Maximum	8.72	14.00	3.10	4.80	2.25	9.96
Standard Deviation	2.94	4.91	0.94	1.21	0.68	2.49
Coefficient of Variation	0.69	0.73	0.57	0.55	0.57	1.09
Upper 95% UCL	6.23	9.99	9.99	2.82	1.54	3.55
See Notes on Page 3						

Table B3

Year-by-Year Fish Tissue Samples Statistical Comparison

MR1 - AC	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean	4.44		25.81	17.01	14.19	15.54
Minimum	1.28		3.35	7.80	0.61	8.49
Maximum	22.80		123.00	25.00	24.90	22.90
Standard Deviation	7.43		39.96	5.76	7.27	5.24
Coefficient of Variation	1.67		1.55	0.34	0.51	0.34
Upper 95% UCL	15.89		8.83	20.87	19.06	19.04
MR1 - AWS	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	8.77		4.16	3.31	2.14	1.78
Minimum	3.24		0.47	0.42	0.68	0.63
Maximum	19.90		8.11	5.94	4.41	4.87
Standard Deviation	5.86		2.44	1.73	1.22	1.39
Coefficient of Variation	0.67		0.59	0.52	0.57	0.78
Upper 95% UCL	13.07		16.48	4.47	2.95	3.01
MR1 - JWS	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean			2.87	1.12	2.13	
Minimum			1.63	0.63	1.27	
Maximum			3.63	1.84	3.92	
Standard Deviation			0.65	0.39	0.96	
Coefficient of Variation			0.23	0.34	0.45	
Upper 95% UCL			4.48	1.39	2.92	
MR1 - CC	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean						12.75
Minimum						5.41
Maximum						18.70
Standard Deviation						4.39
Coefficient of Variation						0.34
Upper 95% UCL						15.69
MR1 - SB	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	8.75		3.78	3.29	4.02	2.35
Minimum	4.20		0.69	0.19	1.05	0.35
Maximum	18.20		9.71	8.25	7.44	4.51
Standard Deviation	4.94		2.78	2.52	2.21	1.57
Coefficient of Variation	0.56		0.73	0.77	0.55	0.67
Upper 95% UCL	12.07		8.10	4.98	5.50	3.41
MR1- RB	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	2.79		1.26	1.73	1.73	1.36
Minimum	2.79		0.92	0.41	1.15	0.97
Maximum	2.79		1.69	2.83	2.76	2.07
Standard Deviation	NA		0.24	0.83	0.55	0.35
Coefficient of Variation	NA		0.19	0.48	0.32	0.26
Upper 95% UCL	NA		3.76	2.29	2.10	1.60
MR1- W	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	2.79					10.53
Minimum	2.79					4.38
Maximum	2.79					21.10
Standard Deviation	NA					9.20
Coefficient of Variation	NA					0.87
Upper 95% UCL	NA					16.90
MR2 - AC	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	1.27		5.88	9.83	19.21	15.58
Minimum	1.27		2.42	1.83	6.13	2.09
Maximum	1.27		11.70	20.50	37.00	45.30
Standard Deviation	NA		3.31	6.67	11.72	15.46
Coefficient of Variation	NA		0.56	0.68	0.61	0.99
Upper 95% UCL	NA		20.99	14.29	27.05	25.94
MR2 - AWS	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	3.96		2.77	2.21	3.21	0.73
Minimum	0.93		1.56	0.70	1.58	0.18
Maximum	6.98		4.08	5.91	4.61	1.31
Standard Deviation	2.01		1.08	1.76	1.22	0.39
Coefficient of Variation	0.51		0.39	0.80	0.38	0.54
Upper 95% UCL	5.31		16.73	3.39	4.02	0.99
MR2 - JWS	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	1.37		2.31	0.95	2.95	1.49
Minimum	0.98		1.19	0.03	1.41	1.15
Maximum	2.03		3.50	1.28	4.01	1.90
Standard Deviation	0.39		0.88	0.42	0.87	0.37
Coefficient of Variation	0.28		0.38	0.44	0.30	0.25
Upper 95% UCL	1.66		2.91	1.12	3.53	1.87
MR2 - SB	**2008 (mg/Kg)**	**2009 (mg/Kg)**	**2010 (mg/Kg)**	**2011 (mg/Kg)**	**2012 (mg/Kg)**	**2013 (mg/Kg)**
Mean	4.30		2.38	1.34	2.74	1.61
Minimum	2.64		0.89	0.85	1.92	1.03
Maximum	7.65		5.64	2.60	3.89	2.48
Standard Deviation	1.61		1.50	0.58	0.63	0.49
Coefficient of Variation	0.37		0.63	0.44	0.23	0.31
Upper 95% UCL	5.38		5.68	1.75	3.17	1.94

See Notes on Page 3

Table B3

Year-by-Year Fish Tissue Samples Statistical Comparison

Year by Year Statistical Comparision

MR2 - RB	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean	2.49		1.11	1.71	1.59	0.92
Minimum	1.42		0.43	0.41	1.15	0.45
Maximum	3.70		2.34	3.16	2.07	1.25
Standard Deviation	0.79		0.60	0.84	0.38	0.23
Coefficient of Variation	0.32		0.54	0.49	0.24	0.26
Upper 95% UCL	3.02		9.99	2.27	1.85	1.07

LR - AC	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean						17.22
Minimum						2.17
Maximum						48.90
Standard Deviation						14.92
Coefficient of Variation						0.87
Upper 95% UCL						27.21

LR - AWS	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean						1.08
Minimum						0.61
Maximum						1.76
Standard Deviation						0.39
Coefficient of Variation						0.36
Upper 95% UCL						1.35

LR - SB	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean						1.34
Minimum						0.43
Maximum						2.52
Standard Deviation						0.75
Coefficient of Variation						0.56
Upper 95% UCL						1.84

LR - RB	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean						1.30
Minimum						0.53
Maximum						1.84
Standard Deviation						0.42
Coefficient of Variation						0.32
Upper 95% UCL						1.56

IH - AC	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean						15.77
Minimum						9.96
Maximum						24.70
Standard Deviation						4.92
Coefficient of Variation						0.31
Upper 95% UCL						19.38

IH - AWS	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean						0.91
Minimum						0.34
Maximum						2.03
Standard Deviation						0.66
Coefficient of Variation						0.73
Upper 95% UCL						1.52

IH - SB	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean						1.60
Minimum						0.20
Maximum						2.91
Standard Deviation						0.99
Coefficient of Variation						0.62
Upper 95% UCL						2.22

IH - RB	2008 (mg/Kg)	2009 (mg/Kg)	2010 (mg/Kg)	2011 (mg/Kg)	2012 (mg/Kg)	2013 (mg/Kg)
Mean						2.24
Minimum						1.30
Maximum						3.94
Standard Deviation						1.16
Coefficient of Variation						0.52
Upper 95% UCL						2.72

UR1 – Upper River from former Tecumseh Site to Riverbend Dam
UR2 – Upper River from Riverbend Dam to Waelderhaus Dam
MR1 - Middle River from Waelderhaus Dam to Kohler Landfill
MR2 - Middle River from Kohler Landfill to C&NW Railroad Bridge
LR - Lower River from C&NW Railroad Bridge to Pennsylvania Avenue Bridge
IH - Inner Harbor from Pennsylvania Avenue Bridge to Sheboygan River outlet
AC - Adult carp
AWS - Adult white sucker
JWS - Juvenile white sucker
SB - Smallmouth bass
RB - Rock Bass
CC - Channel Catfish
W - Walleye
Data not presented where no fish were collected

Table B4

Summary of PCB Sample Concentrations in Groundwater Years 2004 – 2013

Sheboygan River and Harbor Superfund Site

Date Well	NR 140 Criteria	11/17/2004	5/27/2005	12/13/2005	7/10/2006	11/20/2006	5/31/2007	10/23/2007	5/14/2008	10/15/2008
MW9	0.03	🟨 0.47	🟨 0.47	🟨 0.49	🟨 0.49	🟨 0.48	🟨 0.49	🟨 0.47	🟨 0.49	🟨 0.24
MW10		🟨 0.47	🟨 0.48	🟨 0.5	🟥	1.1	🟨 0.49	0.98	0.72	0.5
MW12		1.5	🟨 0.47	🟨 0.5	🟨 0.47	0.57	0.46	0.44	0.83	🟨 0.23
MW13		1.5	🟨 0.48	🟨 0.48	2.1	1.1	0.82	1.5	1.6	1.9
MW16		🟨 0.49	🟨 0.48	🟨 0.5	🟨 0.47	🟨 0.49	0.4	🟨 0.47	🟨 0.49	🟨 0.24
MW17		🟨 0.48	🟨 0.48	🟨 0.48	🟨 0.46	🟨 0.48	🟨 0.51	🟨 0.47	🟨 0.5	🟨 0.24

Results in µg/L

🟨 Not detected at listed reporting limit

🟥 Sample not collected

Date Well	NR 140 Criteria	5/14/2009	10/22/2009	5/14/2010	10/29/2010	6/29/2011	11/29/2011	6/28/2012	11/7/2012	6/4/2013
MW9	0.03	🟨 0.24	🟨 0.23	🟨 0.29	🟨 0.29	🟨 0.29	🟨 0.31	🟨 0.29	🟨 0.31	🟨 0.25
MW10		0.44	0.47	0.39	0.85	0.44	0.67	0.38	0.57	0.55
MW12		0.49	🟨 0.23	0.33	0.88	0.34	🟨 0.31	0.8	🟨 0.31	🟨 0.25
MW13		1.6	1.0	2.0	1.1	1.7	1.5	0.82	0.54	0.44
MW16		🟨 0.23	🟨 0.23	🟨 0.29	🟨 0.29	🟨 0.29	🟨 0.31	🟨 <0.29	🟨 0.31	🟨 0.27
MW17		🟨 0.23	🟨 0.23	🟨 0.3	🟨 0.29	🟨 0.29	🟨 0.31	🟨 <0.29	🟨 0.31	🟨 0.26

Results in µg/L

🟨 Not detected at listed reporting limit

🟥 Sample not collected

Table B5

Floodplain 3 PCB Concentration Sample Results

Sheboygan River and Harbor Superfund Site

		SAMPLE LOCATION								
	DEPTH BELOW GROUND SURFACE	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	MEAN CONCENTRATION
Surface	0.0-0.5	17.45	17.00	26.98	0.56	0.07	0.12	2.90	0.45	8.20
	0.5-1.5		8.30							
Frost Line	1.5-2.5	11.00								7.77
	2.5-3.5	0.60								
	3.5-4.5									
	4.5-5.5									

NOTES:
1. PCB Concentrations are measured in units of mg/Kg
2. Non-detect results are shown in italics and represent 1/2 the detection limit.

Sample ID	Results	Units
FP3-S1-N.EAST, 8/7/12	11.80	mg/kg
FP3-S1-N.WEST, 8/7/12	6.28	mg/kg
FP3-S1-S.EAST, 8/7/12	27.20	mg/kg
FP3-S1-S.WEST, 8/7/12	24.50	mg/kg
FP3-S3-EAST, 8/7/12	23.00	mg/kg
FP3-S3-NORTH, 8/7/12	6.32	mg/kg
FP3-S3-SOUTH, 8/7/12	40.90	mg/kg
FP3-S3-WEST, 8/7/12	37.70	mg/kg

Table B6

Floodplain 4 PCB Concentration Sample Results

Sheboygan River and Harbor Superfund Site

		SAMPLE LOCATIONS																																		
	DEPTH BELOW GROUND SURFACE	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	FP9	FP10	FP11	FP12	FP13	FP14	FP15	FP16	FP17	FP18	FP19	FP20	FP21	FP22	FP23	FP24	FP25	FP26	FP27	FP28	FP29	FP30	FP31	FP32	FP33	FP34	MEAN CONC
Surface	0.0-0.5	0.42	0.25	3.50	5.70	3.90	16.00	19.94	23.00	9.50	0.40	0.05	3.00	0.43	3.50	2.00	10.70	2.20	2.50	18.00	1.20	0.79	0.83	0.73	2.10	5.50	0.54	1.10	1.30	7.00	1.30	1.10	4.10	2.30	4.50	4.61
	0.5-1.5						11.00		1.40								1.90			1.60																
Frost Line	1.5-2.5						0.92	2.00	0.25								0.20			0.20																3.76
	2.5-3.5						0.26	0.76	0.16								0.13			0.31																
	3.5-4.5						0.02	1.20	0.04								0.16			0.17																
	4.5-5.5							1.00									0.09																			

NOTES:
1. PCB Concentrations are measured in units of mg/Kg
2. Non-detect results are shown in italics and represent 1/2 the detection limit.

Sample ID	Results	Units
FP4-S7-EAST, 8/7/12	29.80	mg/kg
FP4-S7-NORTH, 8/7/12	4.15	mg/kg
FP4-S7-SOUTH, 8/7/12	13.20	mg/kg
FP4-S7-WEST, 8/7/12	32.60	mg/kg

Table B7

Floodplain 6 PCB Concentration Sample Results

Sheboygan River and Harbor Superfund Site

		SAMPLE LOCATION																		
	DEPTH BELOW GROUND SURFACE	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	FP9	FP10	FP11	FP12	FP13	FP14	FP15	FP16	FP17	FP18	MEAN CONCENTRATION
Surface	0.0-0.5	0.82	0.26	25.00	23.00	20.00	12.00	1.80	2.60	7.90	22.00	35.00	3.58	43.80	26.85	0.94	5.00	0.87	0.17	9.31
	0.5-1.5			5.40	2.60	1.60					5.60	1.90				0.27	2.30	0.15	0.03	
Frost Line	1.5-2.5			2.00						10.00	0.83	0.42	0.16	4.10	9.90	0.02		0.05		6.79
	2.5-3.5									5.40		0.23	0.13	3.80	3.30	0.03		*0.01*		
	3.5-4.5													0.97	2.20					
	4.5-5.5													1.20						

NOTES:

1. PCB Concentrations are measured in units of mg/Kg
2. Non-detect results are shown in italics and represent 1/2 the detection limit.

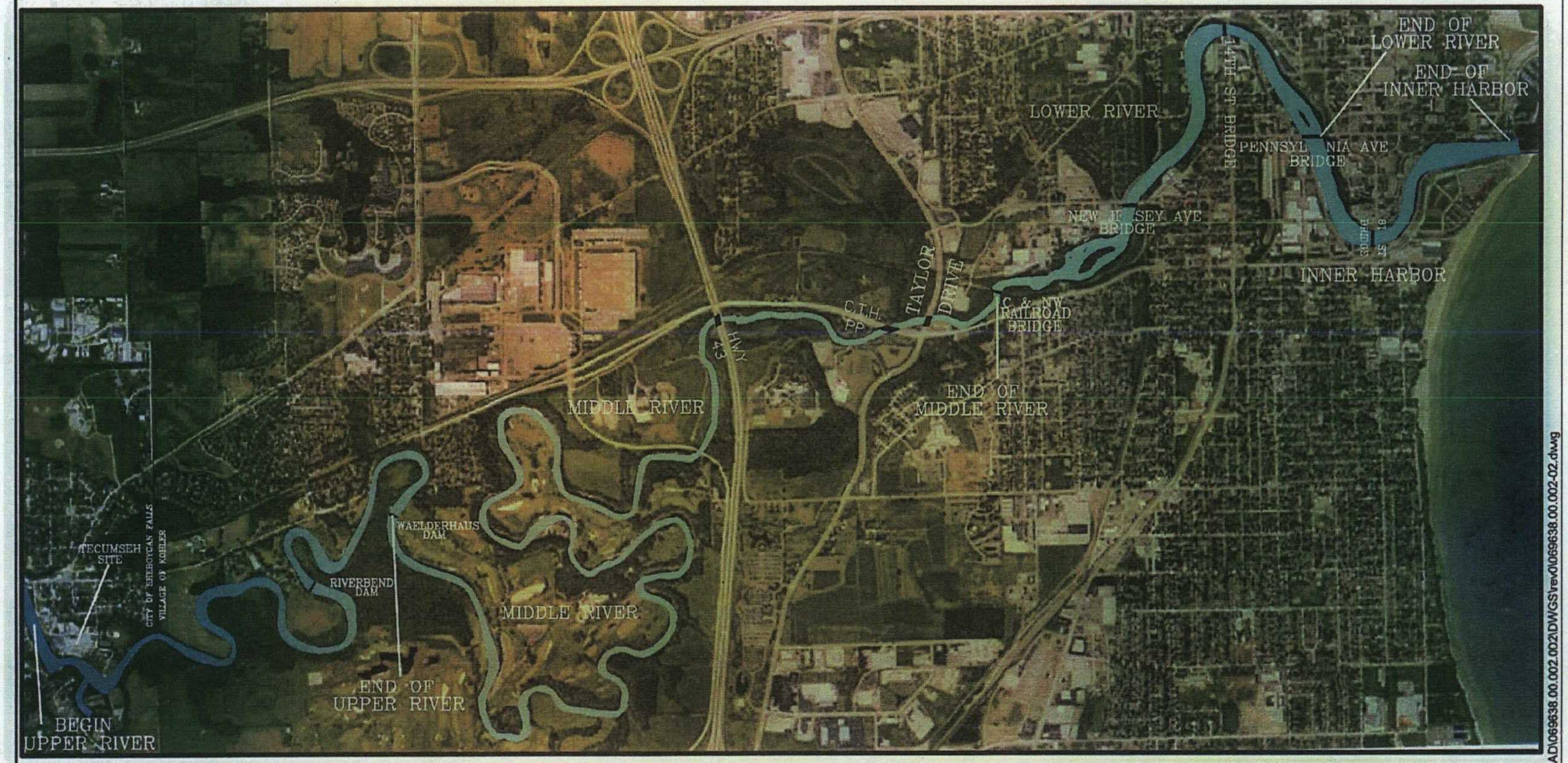
🟨 3. Sample locations removed (5-feet by 5-feet by 1.5 feet)

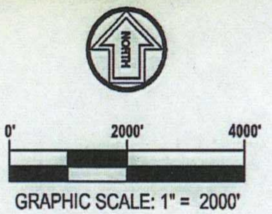
Sample ID	Results	Units
FP6-S12-COMP, 9/25/12	3.58	mg/kg
FP6-S13-N.EAST, 10/9/12	48.1	mg/kg
FP6-S13-N.WEST, 10/9/12	20.2	mg/kg
FP6-S13-S.EAST, 9/25/12	38.1	mg/kg
FP6-S13-S.WEST, 9/25/12	68.8	mg/kg
FP6-S14-EAST, 9/25/12	30.2	mg/kg
FP6-S14-NORTH, 9/25/12	39.2	mg/kg
FP6-S14-SOUTH, 9/25/12	15.3	mg/kg
FP6-S14-WEST, 9/25/12	22.7	mg/kg
FP6-S9-EAST, 9/25/12	13.8	mg/kg
FP6-S9-NORTH, 9/25/12	7.46	mg/kg
FP6-S9-SOUTH, 9/25/12	5.14	mg/kg
FP6-S9-WEST, 9/25/12	5.21	mg/kg

🟦 Sidewall unable to be further excavated due to tree impedence.

APPENDIX C

FIGURES





NOTE:
DRAWING INFORMATION PROVIDED BY POLLUTION RISK SERVICES.

Apr 25, 2014 - 2:50pm - jblake
\\Smefile\work In progress\069638.00\CAD\069638.00.002.002\DWGS\rev0\069638.00.002-02.dwg

Figure 1 – Sheboygan Harbor and River Superfund Site Map/ River Reaches

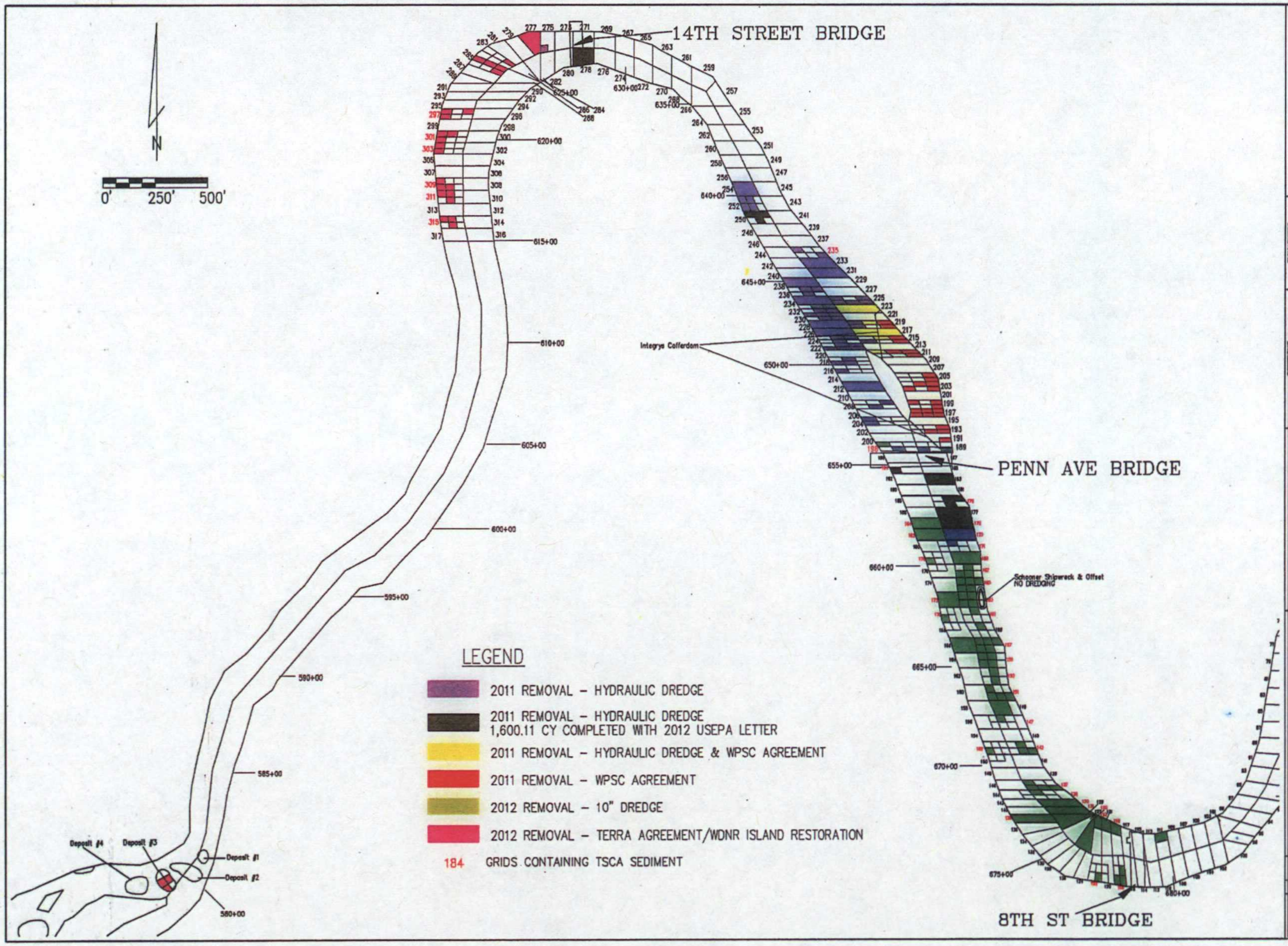


Figure 2 - Sheboygan Harbor and River Superfund Site Dredging Removal Locations

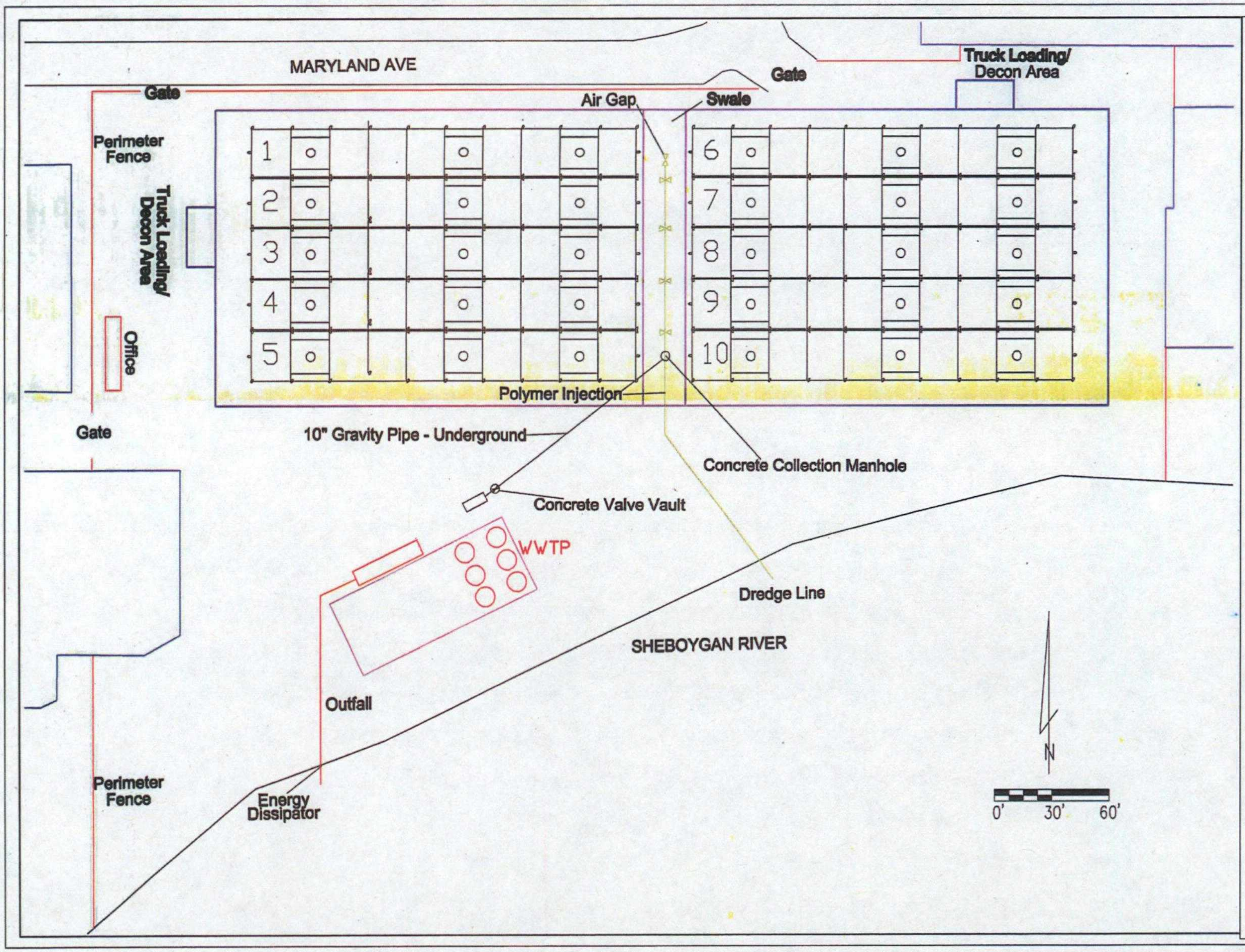
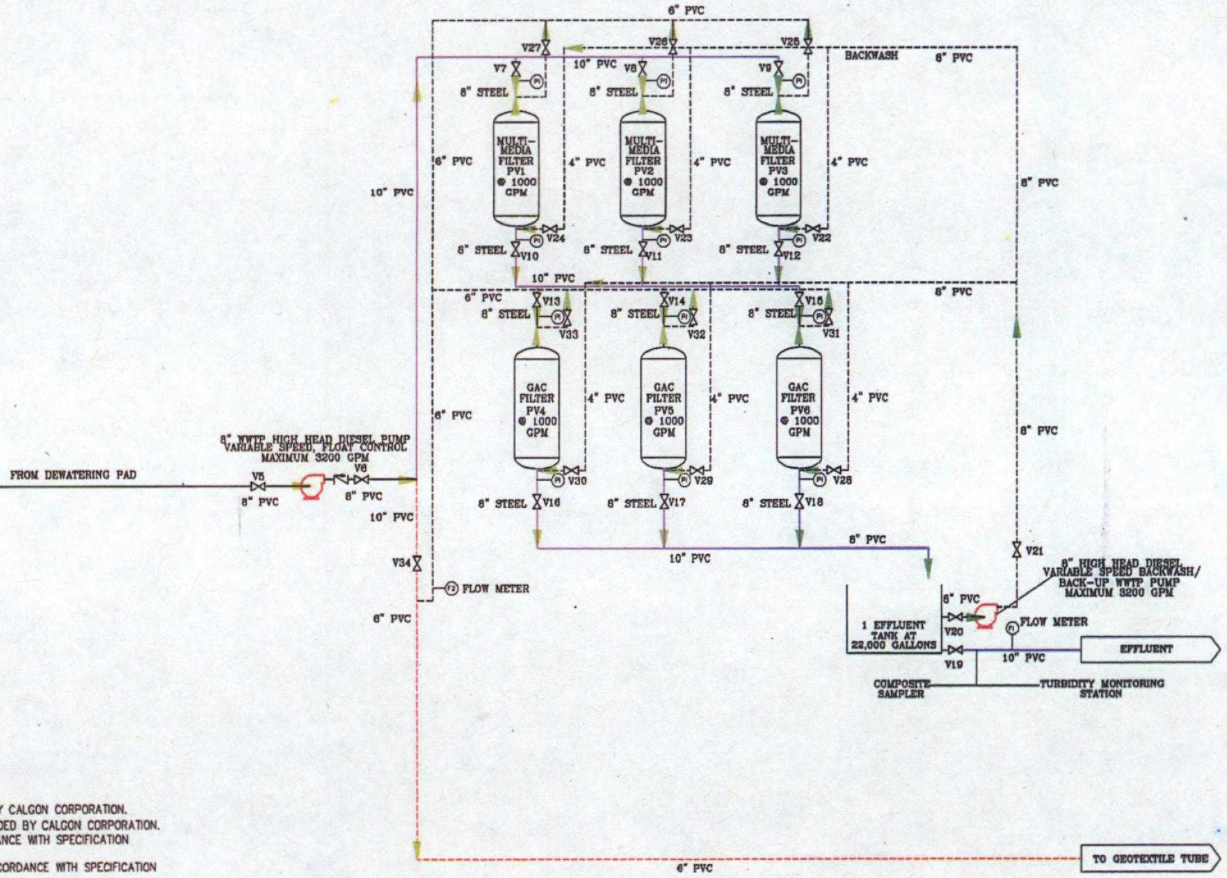


Figure 3 - Sheboygan Harbor and River Superfund Site Dewatering System Layout

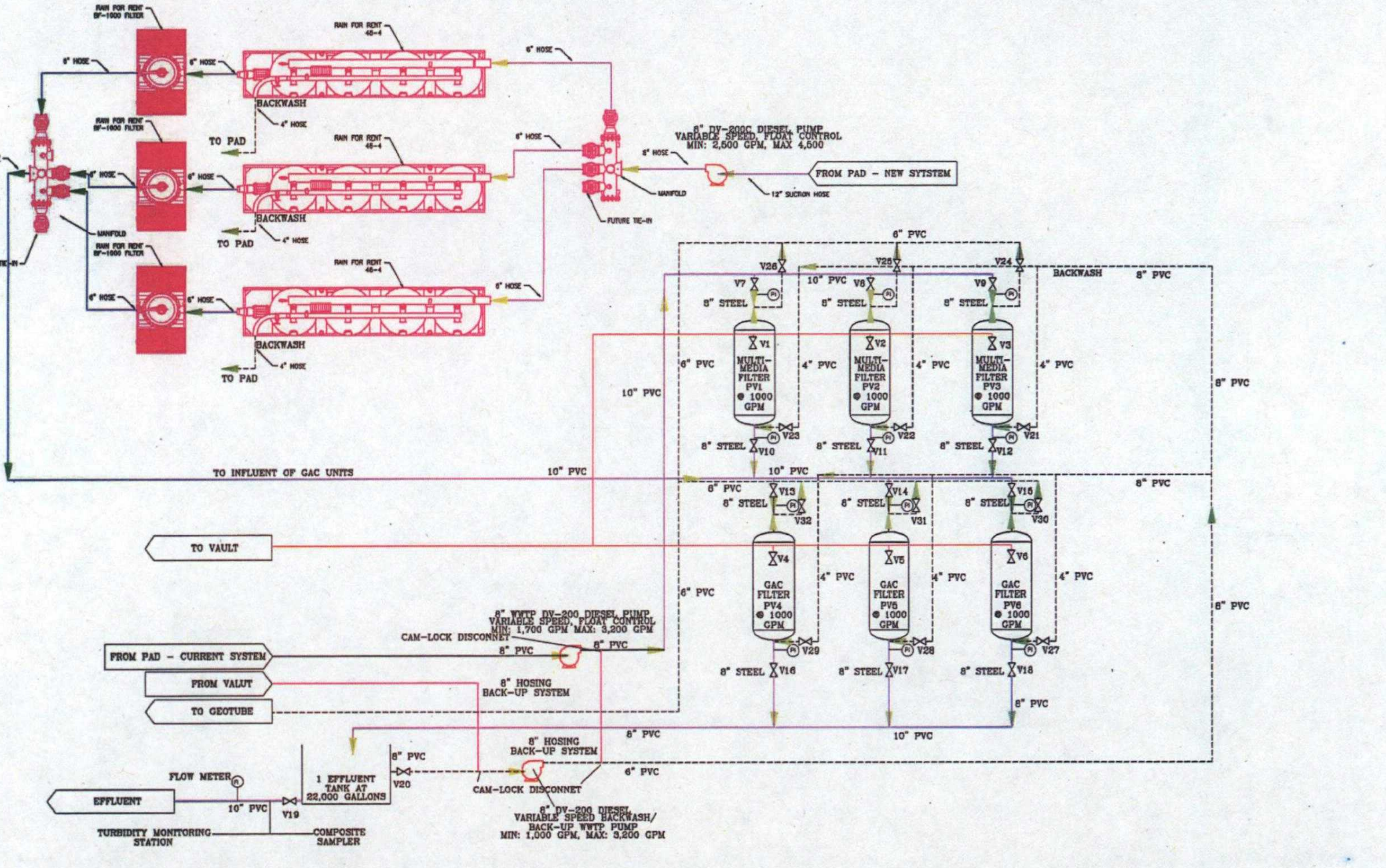


NOTES
1. MULTI-MEDIA AND GAC FILTERS PROVIDED BY CALGON CORPORATION.
2. FILTER PIPING WILL BE 8" STEEL AND PROVIDED BY CALGON CORPORATION.
3. ALL OTHER PIPING WILL BE PVC IN ACCORDANCE WITH SPECIFICATION #02089 IN SIZES NOTED ON DRAWING.
4. OUTFALL WILL BE LINED WITH RIPRAP IN ACCORDANCE WITH SPECIFICATION #02271 FOR EROSION CONTROL.

LEGEND

V#A Operational valve shut off location
— Operational Flow
- - - Backwash Flow
- - - By-pass Flow (Contingency)

Figure 4 - Sheboygan Harbor and River Superfund Site 2010 Waste Water Treatment Plant

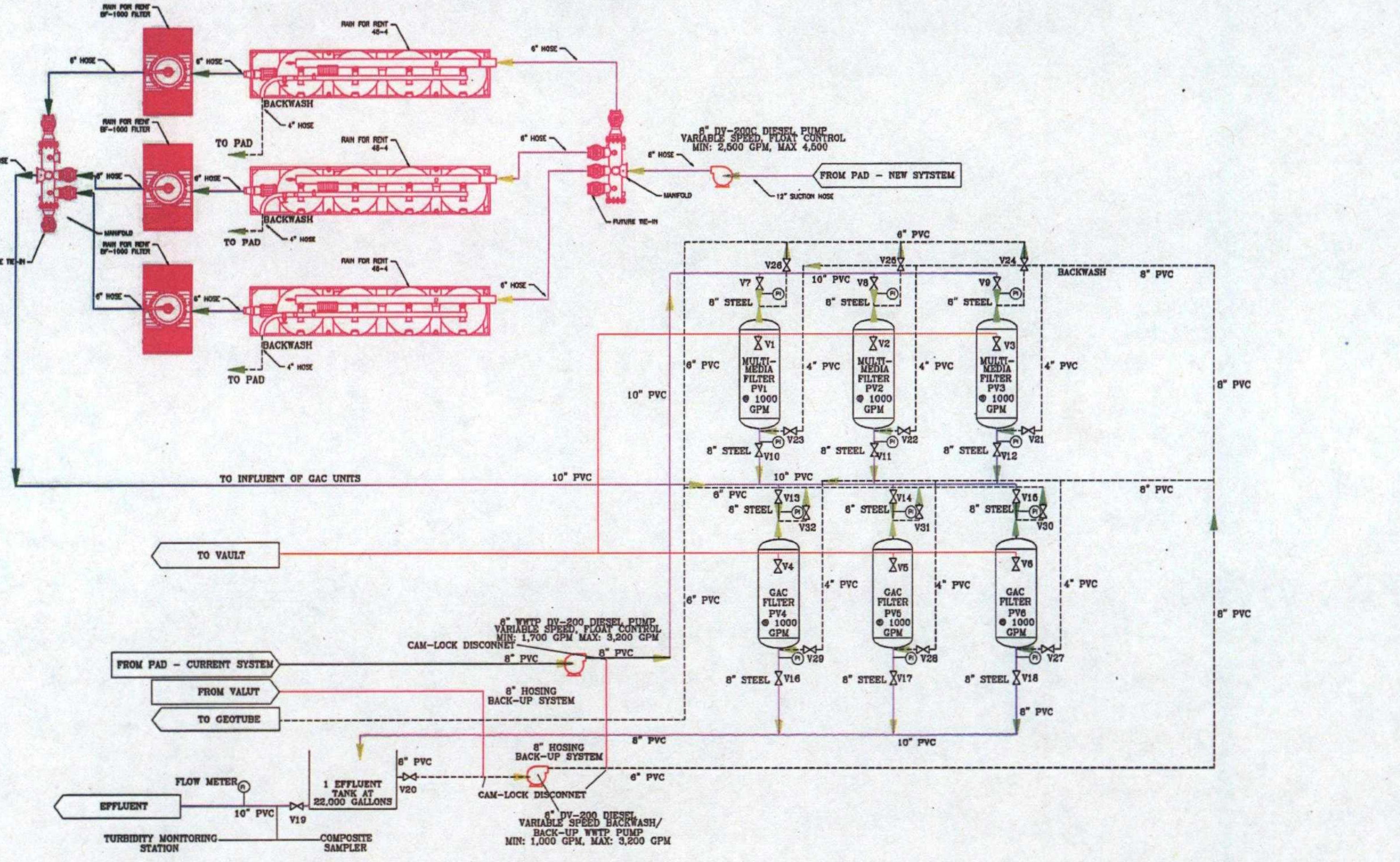


NOTES
1. MULTI-MEDIA AND GAC FILTERS PROVIDED BY CALGON CORPORATION.
2. FILTER PIPING WILL BE 8" STEEL AND PROVIDED BY CALGON CORPORATION.
3. ALL OTHER PIPING WILL BE PVC IN ACCORDANCE WITH SPECIFICATION #02089 IN SIZES NOTED ON DRAWING.
4. OUTFALL WILL BE LINED WITH RIPRAP IN ACCORDANCE WITH SPECIFICATION #02271 FOR EROSION CONTROL.
5. WWTP PROCESS WILL BE INSTALLED WITH SECONDARY CONTAINMENT.

LEGEND

V#A	Operational valve shut off location
———	Operational Flow
- - - - -	Backwash Flow
———	Pressue Relief Vent Line

Figure 5 - Sheboygan Harbor and River Superfund Site 2011 Waste Water Treatment Plant

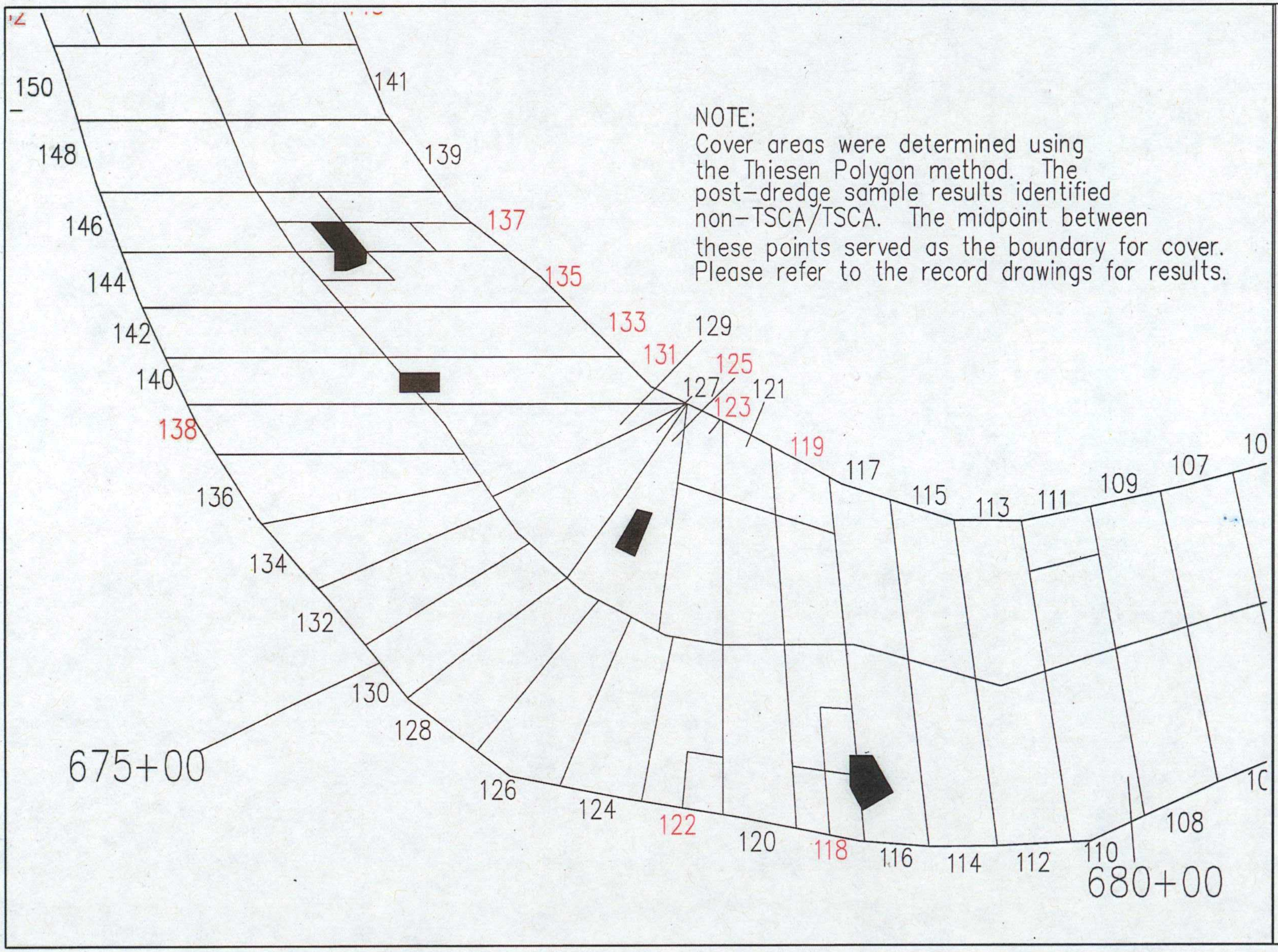


NOTES
1. MULTI-MEDIA AND GAC FILTERS PROVIDED BY CALGON CORPORATION.
2. FILTER PIPING WILL BE 8" STEEL AND PROVIDED BY CALGON CORPORATION.
3. ALL OTHER PIPING WILL BE PVC IN ACCORDANCE WITH SPECIFICATION #02089 IN SIZES NOTED ON DRAWING.
4. OUTFALL WILL BE LINED WITH RIPRAP IN ACCORDANCE WITH SPECIFICATION #02271 FOR EROSION CONTROL.
5. WWTP PROCESS WILL BE INSTALLED WITH SECONDARY CONTAINMENT.

LEGEND

V#A	Operational valve shut off location
───	Operational Flow
-----	Backwash Flow
───	Pressue Relief Vent Line

Figure 6 - Sheboygan Harbor and River Superfund Site 2012 Final waste Water Treatment Plant



NOTE:
Cover areas were determined using the Thiesen Polygon method. The post-dredge sample results identified non-TSCA/TSCA. The midpoint between these points served as the boundary for cover. Please refer to the record drawings for results.

Figure 7 - Sheboygan Harbor and River Superfund Site Sand Cover Locations

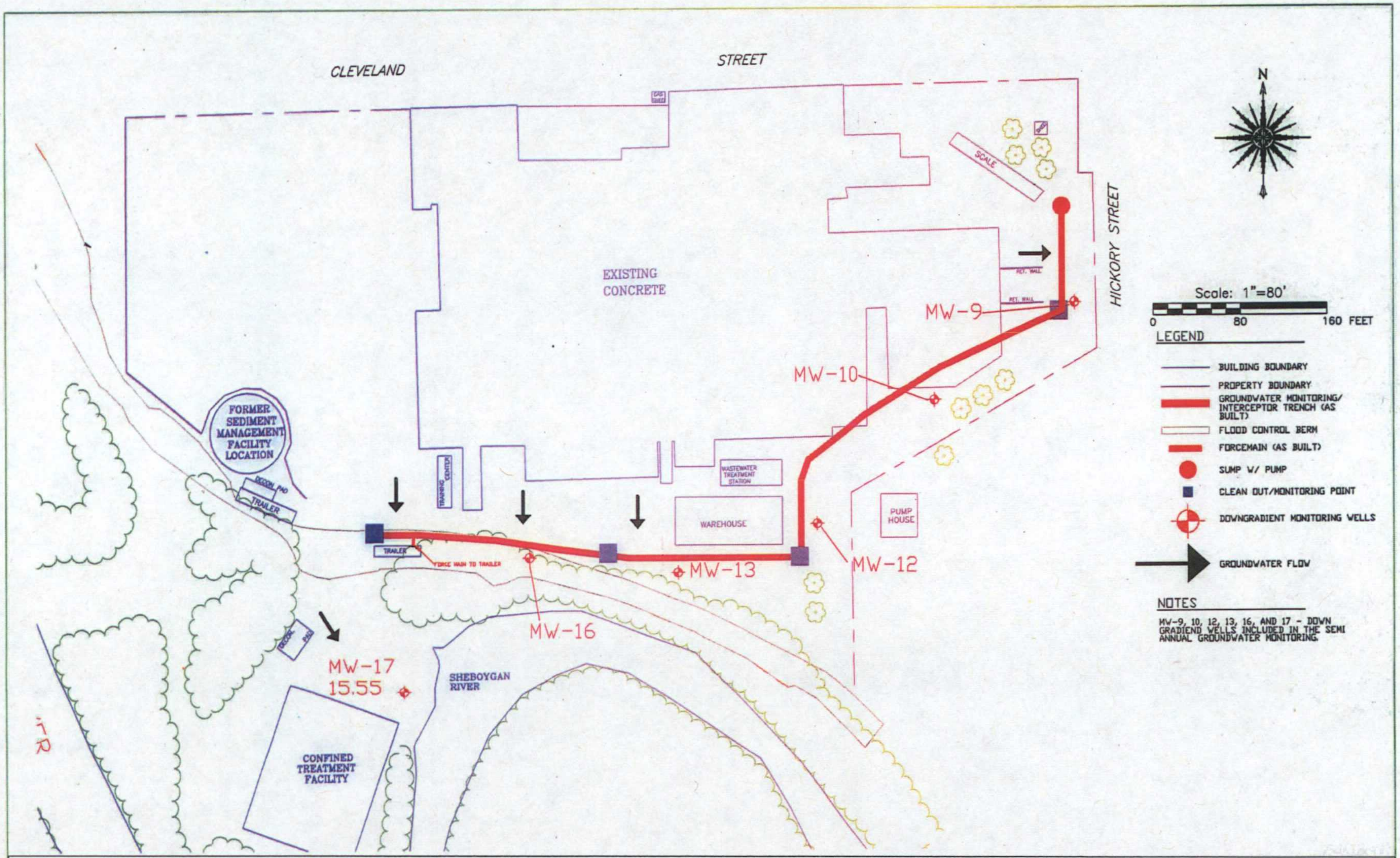


Figure 8 - Sheboygan Harbor and River Superfund Site Groundwater Interception Trench and Monitoring Wells

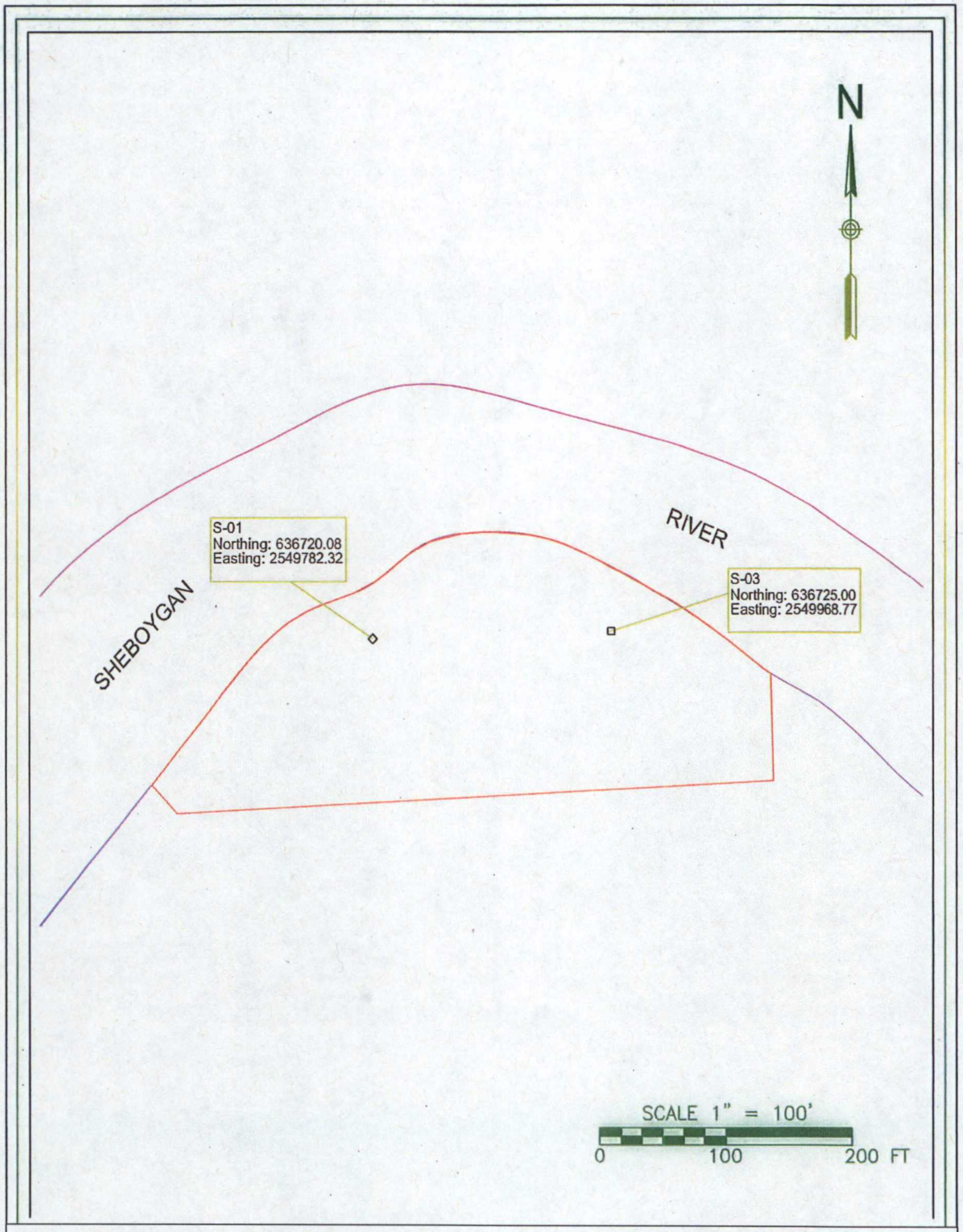


Figure 9 - Sheboygan Harbor and River Superfund Site Floodplain 3 Removal Locations

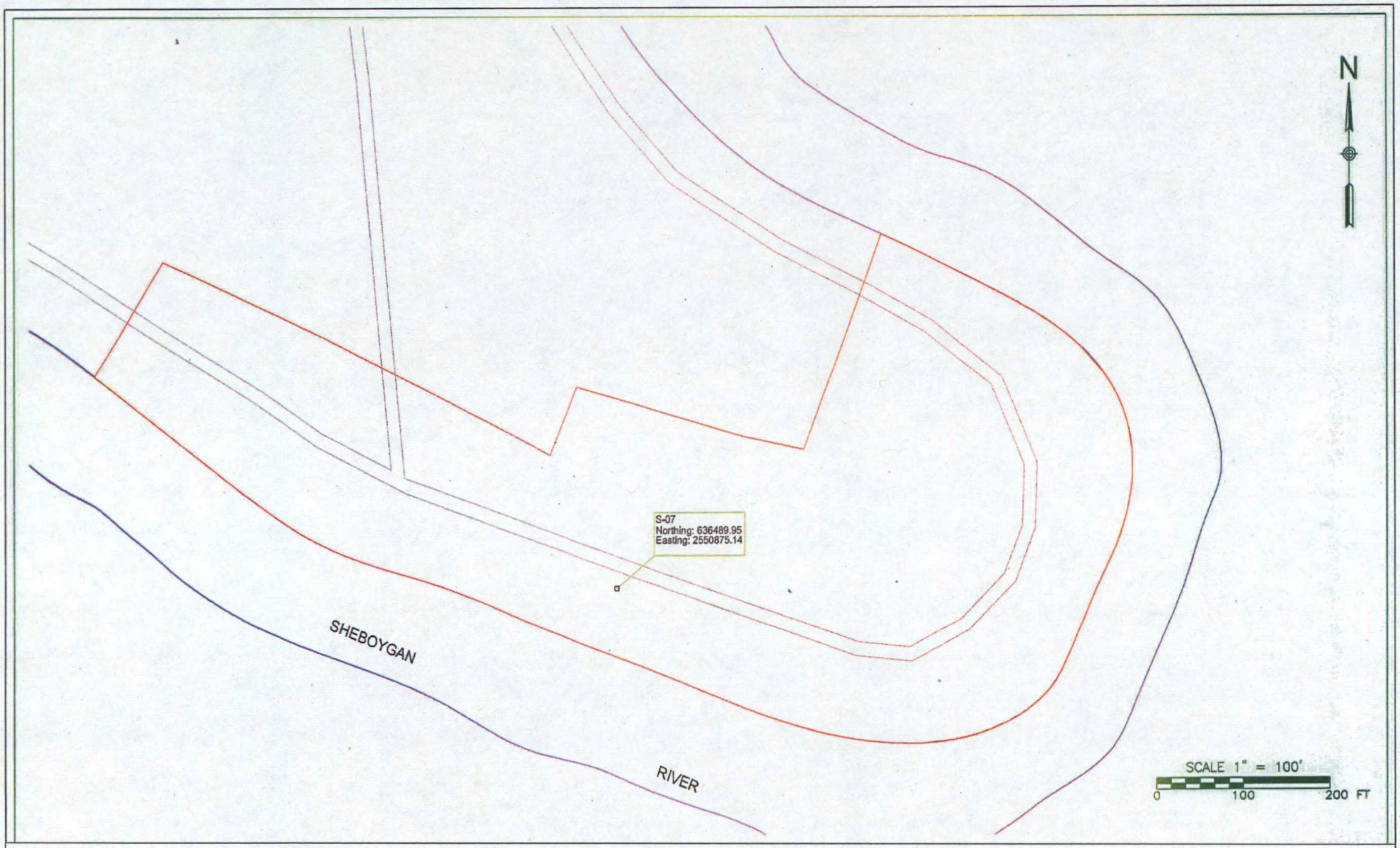


Figure 10 - Sheboygan Harbor and River Superfund Site Floodplain 4 Removal Locations

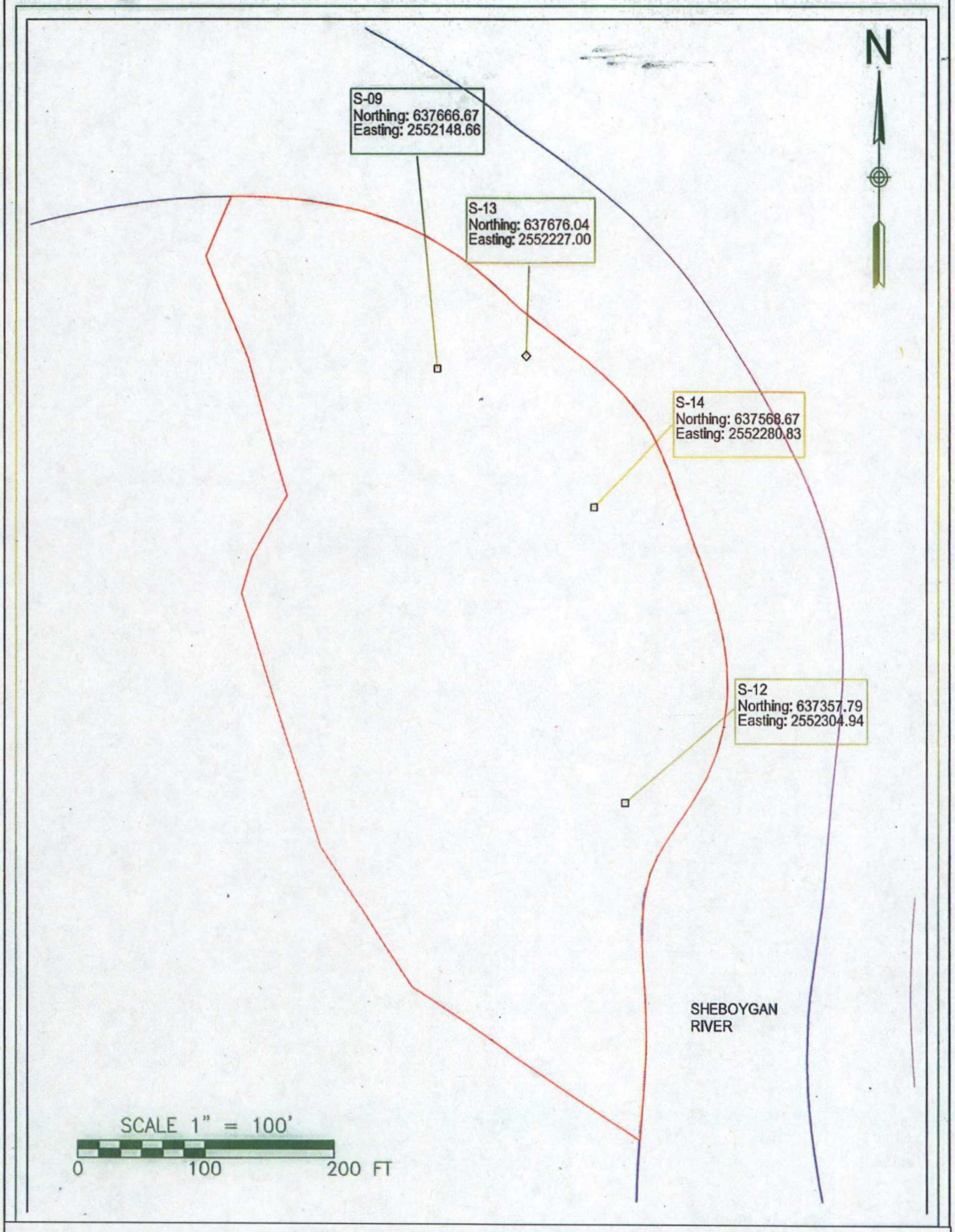
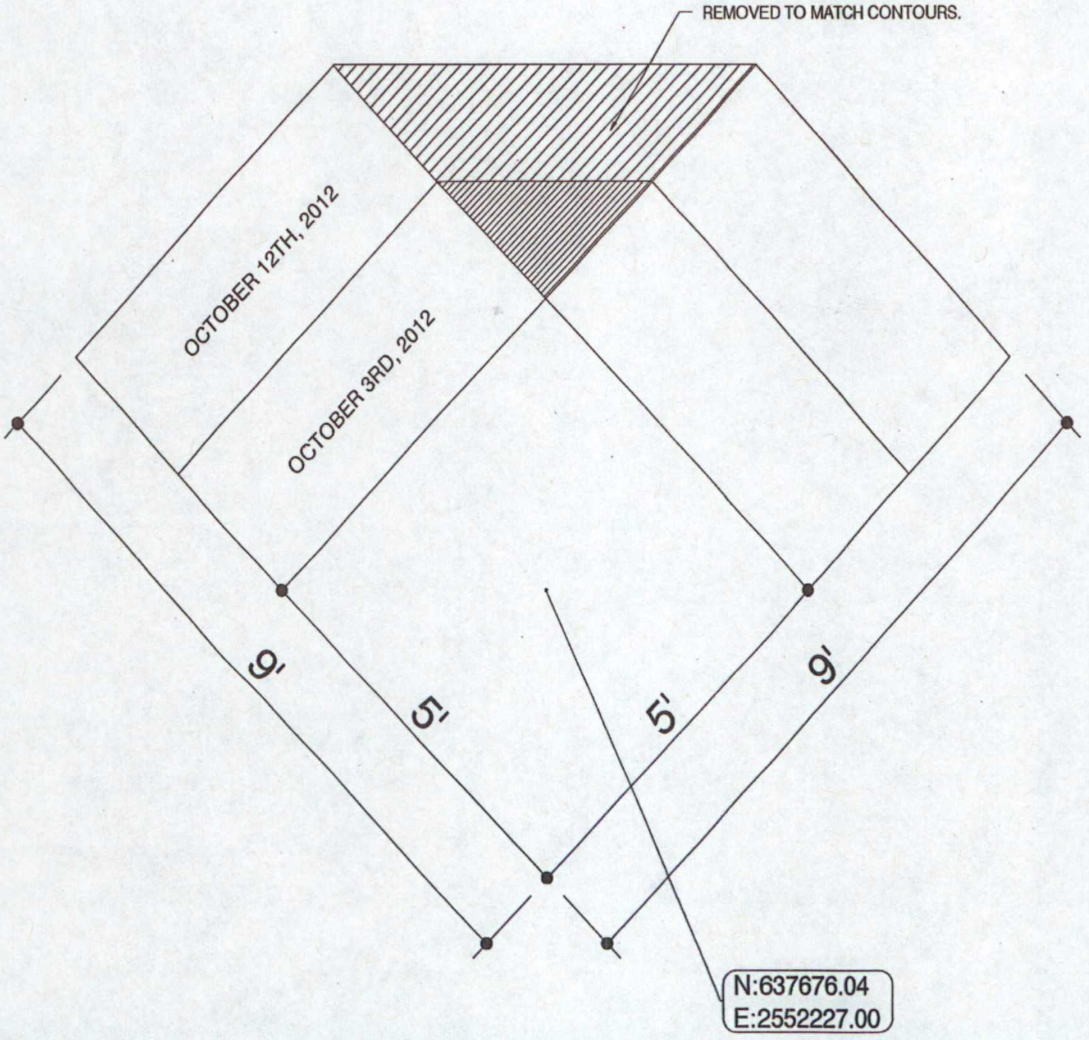


Figure 11 - Sheboygan Harbor and River Superfund Site Floodplain 6 Removal Locations

Figure 12 - Sheboygan Harbor and River Superfund Site Hot Spot Soil Removal Location in Floodplain 6



SOIL REMOVAL
INITIAL EXCAVATION: SEPTEMBER 24TH 2012
SECOND EXCAVATION: OCTOBER 3RD, 2012
THIRD EXCAVATION: OCTOBER 12TH, 2012

APPENDIX D

NEWSPAPER AD

Lakeland College selected for international program

Sheboygan Press Media

Lakeland College is one of 16 U.S. colleges and universities selected by the Institute of International Education for the 2013-2014 Brazil initiative of its International Academic Partnership Program.

Lakeland will participate in a year-long program comprised of training activities designed to assist in implementing and sustaining partnerships with counterparts in Brazil. The program includes a week-long study tour to Brazil in spring 2014 to learn about the Brazilian higher education system and meet with potential partner campuses.

A 10-member steering committee at Lakeland has adopted the following as Lakeland's expected outcomes:

» Create university partnerships in Brazil for both short-term and long-term study abroad options for Lakeland students.

» Recruit more Brazilian students to attend Lakeland and therefore educate U.S. students about Brazil and its culture.

» Connect what is happening in Brazil with Lakeland's faculty expertise. Krista Feinberg, associate professor of history, is teaching a course this spring on the history of modern Brazil, and Lakeland's biology faculty are interested in tropical biology in Brazil.

» Help achieve the college's goal to internationalize the campus, and have a strategic plan related to Brazil.

"For decades, Lakeland has made a strong commitment to international education," Lakeland interim president Dan Eck said in a news release. "Creating a strong presence in Brazil complements our existing international programs and presents new study abroad opportunities for our students."

This semester, Lakeland has 75 international students from 13 countries enrolled at its main campus in Sheboygan County.

Since 1990, Lakeland has operated a two-year campus in Tokyo, Japan, and Lakeland has sister school relationships with the following institutions: Koje College and Ansan University in Korea; East China Institute of Technology and Shanghai Finance University in China; Universität Kassel and (beginning next year) the Erfurt University of Applied Sciences in Germany; Universidad Reformada in Colombia; and The University of Luxembourg in Luxembourg.

The other participating U.S. campuses in the Brazil Initiative are: Dartmouth College, Farleigh Dickinson University, The City of New York's Lehman College, Medaille College, Rice University, Stetson University, Troy University, University of Arizona, University of Michigan-Dearborn, University of Missouri, University of Nebraska-Lincoln, University of Wisconsin-Stout, University of Wisconsin- Whitewater, Wayne State University and Western New Mexico University.

The Institute of International Education's Center for International Partnerships in Higher Education will guide the campus representatives through a strategic planning process in the current academic year geared toward establishing partnerships with institutions in Brazil. This group also will have the opportunity to benefit from the experiences of previous delegations of high-level officials who represented 14 U.S. higher education institutions in 2013 and 18 additional institutions in 2012.

"Higher education stands to play a vital role in Brazil" IIE's president and CEO Allan E. Goodman said in a news release. "And educational partnerships between the US and Brazil will help build Brazil's intellectual capital while fostering key institutional partnerships between the two nations."

These partnership programs offer timely resources for campuses in both countries to explore areas of academic cooperation, including exchanging students and scholars and collaborating on research projects and degree programs.

Over the past few years, both the U.S. Department of State and the government of Brazil have emphasized the importance of educational collaboration. Continued cooperation between the two countries is evidenced by the expansion of the Fulbright and Brazil Scientific Mobility programs, the addition of English, a new language immersion program in Brazil, and the ongoing alliance in the US-Brazil Joint Action Plan on Racial Equality.

COLLEGE NOTES

LTC adding locations for medical terminology classes

To help meet the demand for future health care workforce needs, Lakeshore Technical College will be adding seven locations for its medical terminology class.

LTC currently holds the classes at the Cleveland campus. Classes also will be held at LTC Manitowoc and LTC Sheboygan as well as at the LTC Educations Centers at Cedar Grove-Belgium High School, Plymouth High School, Kiel High School, Mishicot High School and Two Rivers High School.

Classes will be offered on Mondays from 5:30 to 8:30 p.m. beginning Jan. 20.

High school and adult learners are welcome to participate, and credits earned apply to LTC health programs, as well as transfer to numerous four-year colleges and universities.

"Most students pursuing a degree in the medical field will need to take this class in order to complete their degree," LTC dean of health and human services Jim Lemerond said in a news release. "We want to be as flexible as possible and give the students more options to take this class so they can get a good start on completing their degree."

The class is an introductory course and will focus on the component parts of medical terms, including prefixes, suffixes and word roots. Students also will explore the Greek and Latin origins of medical terms and commonly used abbreviations. The class provides a foundation for anyone interested in the medical field, including health occupations that do not require patient-care duties such as health care information technology or records administration.

For more information or to register, visit www.gotoltc.edu/GetStarted or call 888-468-6582, ext 1366.

Lakeland offers scholarship for area students

Lakeland College will be awarding one $5,000 Community Scholarship for graduating seniors from the Sheboygan area this spring.

Students eligible for the scholarship must live in Sheboygan or one of the surrounding communities, must be a new applicant at Lakeland and be admissible according to Lakeland admissions standards and have applied for the scholarship by Dec. 31. All applicants will be notified by Feb. 15 on the status of their application.

The scholarship is for students attending college full time at Lakeland's main campus in Sheboygan County.

The community scholarship is administered by the Lakeland College Council of Ambassadors. The college has assembled a team of alumni ambassadors in several communities in Wisconsin to help spread the word about this scholarship opportunity.

Winners will be awarded $2,500 for their freshman year and $2,500 for their sophomore year at Lakeland.

For more information, or to apply for the scholarship online, visit lakeland.edu/scholarship.

UW-Sheboygan offers Winterim 2014 classes

The University of Wisconsin-Sheboygan is offering a variety of classes during the Winterim 2014 session, which runs Jan. 2-23.

Classes are being offered in the areas of art, chemistry, computer applications, math, political science and religion. Courses are offered during mornings, afternoons and evenings. Tuition for Winterim classes is reduced.

Registration for Winterim 2014 is open now and will continue through Jan. 2. Tuition payments are due by Jan. 2.

For more information on courses or to register, contact the UW-Sheboygan student affairs office at 920-459-6633, email uwshb@uwc.edu or visit www.sheboygan.uwc.edu.

New students should apply at https://apply.wisconsin.edu/.

LTC closing for holiday break

Lakeshore Technical College campuses in Cleveland, Manitowoc and Sheboygan will be closed for the holidays Dec. 24 through Jan. 1.

Current and prospective students will not have access to LTC on-campus services. The college will re-open Jan. 2.

LTC information is available for prospective students at www.gotoltc.edu and for current students at the LTC web portal "My LTC."

Compiled by Kali Thiel of Sheboygan Press Media. She can be reached at 920-453-5134 or kthiel@sheboyganpress.com.

Letters

Continued from Page C3

bad! So I won't play on my mom's ps3. Thanks for the ps3 I play it every day. Thanks for the rylanders I love thier powers. Merry Christmas

Your friend
Treyvon, age 8

Dear Santa,

My name is Chua Zong. I'm eight year's old. I'm a girl. I've been a good girl because at school I'm being safe, respectful, responsible and I help my mom wash dishes, also I been helping my dad wash his car. Santa you come on Christmas eve. You are a very nice man. Your just mostly like us. I love the things you g me last year I use the hello kitty blanket every winter. I would like a winter boot because it will keep my feet warm and I can go in snow. And I also what a new hokey stick so I can practice hokey. My class and me are also doing hokey in gym. P.s. say hello to Rudolph and the others for me.

Love:
Chua Zong, age 8

Dear Santa,

I am Rachel. I am seven years old. I really want a cat because I would take care of and play with it. I also want a dog because it would be good and I would teach it tricks. I also want new snow boots because I don't want a cold.

Your friend,
Rachel, age 7

Dar Santa,

My name is Aydean. I ma 7 years old I clean my room I am raising my hand at school. I cleen the kichin. How is Rudolph god or bad. Thank you for the toys from last year. I need sum Velcro shoes so Miss R do not tie my shoes I want a computer to help me read

Luv
Aydean, age 7

Dear Santa,

I am Syrus and I clean up my room all the time and help my mom and dad all the time and take the dog out!

I want a phone so I can call my mom wen I'm in trouble.

Love, Syrus

Dear Santa,

My name is Samantha and I'm 7 yaers old. I started to cleaning when I was five How is Rudolph Santa? Thanks Santa for the awesame bike you gave me. I rode it all the time and every day. I want some bots four the snow and to keep my feet worm. I want some snow pants to keep me worm. I want a scarf. So it can keep my neck worm.

You friend,
Samantha. age 7

Dear Santa,

My name is Evan I'm a boy I'm 7 yers old I Like vd you Gams. I want sleping dogs and a rele skat bord and a skat bord vd you game and a Kamra and phon. Case I'm vary good decus I do my chores when I'm told.

your friend
Evan, age 7

Dear Santa,

My name is Jazmyne.y I'm 8 years old! Santa I help my mom. My sister Darina is mean to me! Visit is good. I'm varey extremely good coase I put dishis away. Sometimes I clean my room! I lisin to my mom. how have you been santa! Are the elves werking hard for my perosins. Is Rudolph doing good? Santa I rill like the things you gave me! I love skooter you gave me. I yoost to ride it. I rilly would like a phone for christmas. I allway lisin to my mom. I can call my mom if I get lost. I can call my mom if she dose not know where I'am! I can call Isaiah. I can call Treyvon. I can call Alysha. I can call Evan. I can call Rachel. I can call Chua Zong. I can call Sammie. I can call Aydrean. I can call Rylee. I can call Ryan. I can call Ambrosia. I can call Adriana Rose. I can call Jonathan A.

Jazmyne.y, age 8

GANNETT ILLUSTRATION

EPA Begins Review
of Sheboygan River and Harbor Superfund Site
Sheboygan, Wisconsin

The U.S. Environmental Protection Agency is conducting a five-year review of the 14-mile-long Sheboygan River and Harbor Superfund site that runs from Sheboygan Falls to the mouth of the river at Lake Michigan. The Superfund law requires regular checkups of sites that have been cleaned up or where cleanup has been ongoing for at least five years – with waste managed on-site – to make sure the cleanup continues to protect people and the environment. This is the second five-year review.

The cleanup involved dredging PCB-contaminated sediment from the former Tecumseh Products plant in Sheboygan Falls to the mouth of the river as well as removing contaminated soil from certain areas of the floodplain along Kohler property.

More information is available at the Mead Public Library, 710 N. Eighth St., Sheboygan, and at www.epa.gov/region5/sites/sheboygan. The review should be completed by May 2014.

The five-year review is an opportunity for you to tell EPA about site conditions and any concerns you have. Contact:

Susan Pastor
Community Involvement Coordinator
312-353-1325
pastor.susan@epa.gov

Pablo Valentin
Remedial Project Manager
312-353-2886
valentin.pablo@epa.gov

You may call EPA toll-free at 800-621-8431, 8:30 a.m. – 4:30 p.m., weekdays.

WNAXLP

WOLF'S
CYCLING & FITNESS
Recumbent Bikes
457-0664
S. 12th & Broadway, Sheboygan
Store Hours: Mon.-Fri. 9-6 Sat. 9-5

Dance to
Don Peachy
Sun. Dec. 29
MILLHOME
Kiel 1-5pm
For Mighty Good Time!

a Magical, Musical MADCAP!
Jan. 24 - Feb. 2
CINDERELLA
TICKETS: www.tyasheboygan.org

APPENDIX E

SITE INSPECTION CHECKLIST

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION

Site name: Sheboygan Harbor and River	**Date of inspection:** 06/03/14
Location and Region: Sheboygan, WI R5	**EPA ID:** WID980996367
Agency, office, or company leading the five-year review: EPA	**Weather/temperature:** Sunny 68°F

Remedy Includes: (Check all that apply)

Landfill cover/containment

[✓ Access controls]

[✓ Institutional controls]

Groundwater pump and treatment

Surface water collection and treatment

Other Ground water monitoring, Interceptor trench, Sediment Dredging, Fish tissue monitoring.

Monitored natural attenuation

Groundwater containment

Vertical barrier walls

Attachments: Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Keith Egan / Project Manager / 06/02/14
   Name Title Date
   Interviewed at site at office [✓ by phone] Phone no. 513-310-8818
   Problems, suggestions; Report attached
   None to report

2. **O&M staff** N/A
   Name Title Date
   Interviewed at site at office by phone Phone no. ______
   Problems, suggestions; Report attached ______

Inspection Attendees:
Vic Pappas, WDNR
Tom Wentland, WDNR
Ken Aukerman, SME
Pablo Valentin, EPA

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency WDNR
Contact Thomas Wentland Project Manager 06/03/14 920-892-6638
Name Title Date Phone no.
Problems; suggestions; Report attached
No issues

Agency NA
Contact
Name Title Date Phone no.
Problems; suggestions; Report attached

Agency
Contact
Name Title Date Phone no.
Problems; suggestions; Report attached

Agency
Contact
Name Title Date Phone no.
Problems; suggestions; Report attached

4. **Other interviews** (optional) Report attached.

N/A

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - O&M manual — Readily available [✓ Up to date] N/A
   - As-built drawings — Readily available Up to date N/A
   - Maintenance logs — Readily available Up to date N/A
   - Remarks

2. **Site-Specific Health and Safety Plan** — Readily available [✓ Up to date] N/A
   - Contingency plan/emergency response plan — Readily available Up to date N/A
   - Remarks

3. **O&M and OSHA Training Records** — Readily available [✓ Up to date] N/A
   - Remarks

4. **Permits and Service Agreements**
   - Air discharge permit — Readily available [✓ Up to date] N/A
   - Effluent discharge — Readily available Up to date N/A
   - Waste disposal, POTW — Readily available Up to date N/A
   - Other permits — Readily available Up to date N/A
   - Remarks

5. **Gas Generation Records** — Readily available Up to date [✓ N/A]
   - Remarks

6. **Settlement Monument Records** — Readily available Up to date [✓ N/A]
   - Remarks

7. **Groundwater Monitoring Records** — Readily available [✓ Up to date] N/A
   - Remarks

8. **Leachate Extraction Records** — Readily available Up to date [✓ N/A]
   - Remarks

9. **Discharge Compliance Records**
   - Air — Readily available Up to date [✓ N/A]
   - Water (effluent) — Readily available [✓ Up to date] N/A
   - Remarks

10. **Daily Access/Security Logs** — Readily available Up to date N/A
    - Remarks People have been tresspassing the location of the former dewatering facility at Maryland Avenue and Dumping construction Debris.

IV. O&M COSTS

1. **O&M Organization**

State in-house Contractor for State
PRP in-house [✓ Contractor for PRP]
Federal Facility in-house Contractor for Federal Facility
Other Soil Material Engineers, Inc. (SME)

2. **O&M Cost Records** N/A

Readily available Up to date
Funding mechanism/agreement in place
Original O&M cost estimate__________ Breakdown attached

Total annual cost by year for review period if available

From______ (Date) To______ (Date) ________ (Total cost) Breakdown attached
From______ (Date) To______ (Date) ________ (Total cost) Breakdown attached
From______ (Date) To______ (Date) ________ (Total cost) Breakdown attached
From______ (Date) To______ (Date) ________ (Total cost) Breakdown attached
From______ (Date) To______ (Date) ________ (Total cost) Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS [✓ Applicable] N/A

A. Fencing

1. [✓ **Fencing damaged**] Location shown on site map Gates secured N/A

Remarks SME will repair fence at former Tecumseh Plant.

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map N/A

Remarks Fish advisory signs and GLNPO signs along river shoreline

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented Yes No [✓ N/A]
Site conditions imply ICs not being fully enforced Yes No [✓ N/A]

Type of monitoring (*e.g.*, self-reporting, drive by) Currently evaluating ICs
Frequency
Responsible party/agency
Contact Keith Egan (Name) Project Manager (Title) 06/03/14 (Date) 513-319-8318 (Phone no.)

Reporting is up-to-date Yes No ~~N/A~~
Reports are verified by the lead agency Yes No ~~N/A~~

Specific requirements in deed or decision documents have been met Yes No ~~N/A~~
Violations have been reported Yes No ~~N/A~~
Other problems or suggestions: Report attached

2. **Adequacy** ICs are adequate ICs are inadequate ~~N/A~~
Remarks

D. General

1. **Vandalism/trespassing** Location shown on site map No ~~vandalism evident~~
Remarks

2. **Land use changes on site** ~~N/A~~
Remarks

3. **Land use changes off site** ~~N/A~~
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads Applicable N/A

1. **Roads damaged** Location shown on site map Roads adequate ~~N/A~~
Remarks

B. Other Site Conditions

Remarks N/A

VII. LANDFILL COVERS Applicable [✓ N/A]

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
Areal extent________ Depth________
Remarks________

2. **Cracks** Location shown on site map Cracking not evident
Lengths________ Widths________ Depths________
Remarks________

3. **Erosion** Location shown on site map Erosion not evident
Areal extent________ Depth________
Remarks________

4. **Holes** Location shown on site map Holes not evident
Areal extent________ Depth________
Remarks________

5. **Vegetative Cover** Grass Cover properly established No signs of stress
Trees/Shrubs (indicate size and locations on a diagram)
Remarks________

6. **Alternative Cover (armored rock, concrete, etc.)** N/A
Remarks________

7. **Bulges** Location shown on site map Bulges not evident
Areal extent________ Height________
Remarks________

8. **Wet Areas/Water Damage** Wet areas/water damage not evident
Wet areas Location shown on site map Areal extent______
[✓ Ponding] Location shown on site map Areal extent______
Seeps Location shown on site map Areal extent______
Soft subgrade Location shown on site map Areal extent______
Remarks Ponding of water was observed at the sump of the former Tecumseh Plant.

9. **Slope Instability** Slides Location shown on site map No evidence of slope instability
Areal extent______
N/A
Remarks______

B. Benches Applicable [✓ N/A]
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** Location shown on site map N/A or okay
Remarks______

2. **Bench Breached** Location shown on site map N/A or okay
Remarks______

3. **Bench Overtopped** Location shown on site map N/A or okay
Remarks______

C. Letdown Channels Applicable [✓ N/A]
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** Location shown on site map No evidence of settlement
Areal extent______ Depth______
Remarks______

2. **Material Degradation** Location shown on site map No evidence of degradation
Material type______ Areal extent______
Remarks______

3. **Erosion** Location shown on site map No evidence of erosion
Areal extent______ Depth______
Remarks______

4. **Undercutting** Location shown on site map No evidence of undercutting
Areal extent____________ Depth__________
Remarks____
____

5. **Obstructions** Type__________________ No obstructions
Location shown on site map Areal extent____________
Size__________
Remarks____
____

6. **Excessive Vegetative Growth** Type__________________
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent____________
Remarks____
____

D. Cover Penetrations Applicable ~~N/A~~

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
N/A
Remarks____
____

2. **Gas Monitoring Probes**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks____
____

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks____
____

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks____
____

5. **Settlement Monuments** Located Routinely surveyed N/A
Remarks____
____

E. Gas Collection and Treatment Applicable [✓ N/A]

1. **Gas Treatment Facilities**
   Flaring Thermal destruction Collection for reuse
   Good condition Needs Maintenance
   Remarks____
   ____

2. **Gas Collection Wells, Manifolds and Piping**
   Good condition Needs Maintenance
   Remarks____
   ____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   Good condition Needs Maintenance N/A
   Remarks____
   ____

F. Cover Drainage Layer Applicable [✓ N/A]

1. **Outlet Pipes Inspected** Functioning N/A
   Remarks____
   ____

2. **Outlet Rock Inspected** Functioning N/A
   Remarks____
   ____

G. Detention/Sedimentation Ponds Applicable N/A

1. **Siltation** Areal extent____________ Depth__________ N/A
   Siltation not evident
   Remarks____
   ____

2. **Erosion** Areal extent____________ Depth__________
   Erosion not evident
   Remarks____
   ____

3. **Outlet Works** Functioning N/A
   Remarks____
   ____

4. **Dam** Functioning N/A
   Remarks____
   ____

H. Retaining Walls Applicable [✓ N/A]

1. **Deformations** Location shown on site map Deformation not evident
Horizontal displacement____________ Vertical displacement____________
Rotational displacement____________
Remarks____

2. **Degradation** Location shown on site map Degradation not evident
Remarks____

I. Perimeter Ditches/Off-Site Discharge Applicable [✓ N/A]

1. **Siltation** Location shown on site map Siltation not evident
Areal extent____________ Depth____________
Remarks____

2. **Vegetative Growth** Location shown on site map N/A
Vegetation does not impede flow
Areal extent____________ Type____________
Remarks____

3. **Erosion** Location shown on site map Erosion not evident
Areal extent____________ Depth____________
Remarks____

4. **Discharge Structure** Functioning N/A
Remarks____

VIII. VERTICAL BARRIER WALLS Applicable [✓ N/A]

1. **Settlement** Location shown on site map Settlement not evident
Areal extent____________ Depth____________
Remarks____

2. **Performance Monitoring**Type of monitoring____________________
Performance not monitored
Frequency____________________ Evidence of breaching
Head differential____________________
Remarks____

IX. GROUNDWATER/SURFACE WATER REMEDIES [✓ Applicable] N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
Good condition All required wells properly operating Needs Maintenance N/A
Remarks Monitoring wells and Ground Water Interception trench sump in good condition.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
[✓ Good condition] Needs Maintenance
Remarks

3. **Spare Parts and Equipment**
Readily available Good condition Requires upgrade Needs to be provided
Remarks The equipment used for waste Water treatment at Maryland still at the location, needs to be removed.

B. Surface Water Collection Structures, Pumps, and Pipelines [✓ Applicable] N/A

1. **Collection Structures, Pumps, and Electrical**
Good condition Needs Maintenance N/A
Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
Good condition Needs Maintenance
Remarks Swale at Maryland avenue needs re-vegetation and ck of grading.

3. **Spare Parts and Equipment**
Readily available Good condition Requires upgrade Needs to be provided
Remarks N/A

C. Treatment System Applicable N/A

1. **Treatment Train** (Check components that apply)
Metals removal [✓ Oil/water separation] Bioremediation
Air stripping [✓ Carbon adsorbers]
Filters Need to be removed
Additive (*e.g.*, chelation agent, flocculent)__________
Others__________
Good condition Needs Maintenance
Sampling ports properly marked and functional
Sampling/maintenance log displayed and up to date
Equipment properly identified
Quantity of groundwater treated annually__________
Quantity of surface water treated annually__________
Remarks__________

2. **Electrical Enclosures and Panels** (properly rated and functional)
[✓ N/A] Good condition Needs Maintenance
Remarks__________

3. **Tanks, Vaults, Storage Vessels**
N/A Good condition [✓ Proper secondary containment] Needs Maintenance
Remarks Need to be removed from Maryland Avenue facility.

4. **Discharge Structure and Appurtenances**
[✓ N/A] Good condition Needs Maintenance
Remarks__________

5. **Treatment Building(s)**
[✓ N/A] Good condition (esp. roof and doorways) Needs repair
Chemicals and equipment properly stored
Remarks__________

6. **Monitoring Wells** (pump and treatment remedy)
[✓ Properly secured/locked] [✓ Functioning] [✓ Routinely sampled] [✓ Good condition]
[✓ All required wells located] Needs Maintenance N/A
Remarks__________

D. Monitoring Data

1. Monitoring Data
[✓ Is routinely submitted on time] Is of acceptable quality

2. Monitoring data suggests:
[✓ Groundwater plume is effectively contained] Contaminant concentrations are declining

D. Monitored Natural Attenuation N/A

1. **Monitoring Wells** (natural attenuation remedy)

Properly secured/locked Functioning Routinely sampled Good condition
All required wells located Needs Maintenance N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Drainage trench at former Maryland Dewatering facility will be graded according to City Plans.

construction Debris needs to be removed

Maryland dewatering pad was removed without informing EPA.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

NO issues

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

N/A

Additional Observations - dredge lines need to be removed from the former Tecumseh facility. The fence at the former Tecumseh Plant needs repair.

Construction debris at former Maryland dewatering facility needs to be removed as well as the equipment associated with the waste water treatment plant

Floodplain excavation areas looked adequate in terms of re-vegetation

Four five gallon pails containing dirt from sweeping the former dewatering Pad at the former Tecumseh Plant need disposal.

APPENDIX F

PHOTOGRAPHS DOCUMENTING SITE CONDITIONS

Dewatering pad at Former Tecumseh Plant

Monitoring Well MW-16

Water ponding at sump in the Former Tecumseh plant dewatering pad

Damaged fence in north east corner of the former Tecumseh Plant Location

bird cage placed by Fish and Wildlife at location of former Tecumseh plant

Oil separators at building in former Tecumseh plant

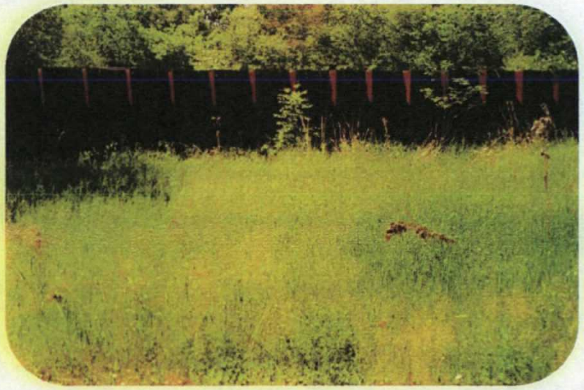
Sump pump for groundwater interception trench and monitoring wells MW-9 and MW-10

Maryland Avenue former dewatering pad

Water ponding at dewatering pad at former Tecumseh plant

Deredge lines piled up at former Tecumseh plant location

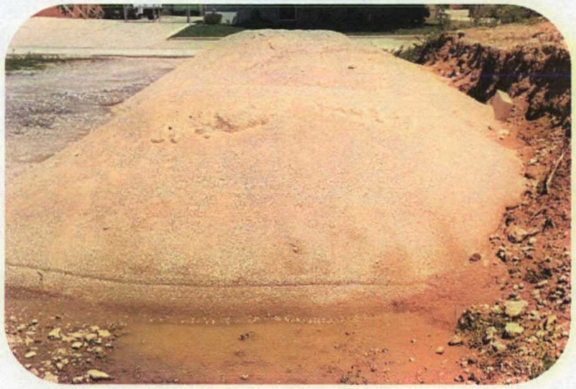
Rip rap placed at river shoreline at former Tecumseh plant location after excavation of armored areas



Remaining metal from sediment confined disposal facility at former Tecumseh plant

Drainage ditch construction at Maryland avenue dewatering pad

Construction debris at Maryland avenue dewatering pad

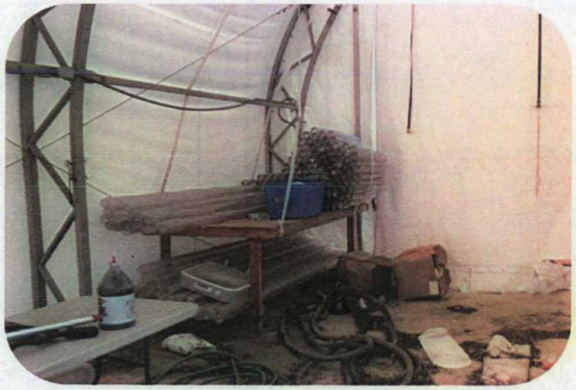


Sand at Maryland avenues dewatering pad

Area of habitat restoration at Wildwood island looking from Maryland avenue dewatering pad

Drainage ditch grading in progress at Maryland avenue dewatering pad

Waste water Treatment plant at Maryland avenue dewatering pad



Interior of temporarey building containing waste water treatment plant equipment

Rip rap at discharge outfall for waste water treatment plant at Maryland avenue dewatering pad

Excavation area in floodplain 4

Excavation area floodplain 4

Excavation area floodplain 4

our five gallon containers holding dirt swept from the former Tecumseh plant dewatering pad

Excavation area in floodplain 6

Excavation area floodplain 6

Excavation area in floodplain 3

Excavation area in floodplain 3