

HONIGMAN

Case Study On The Successful Implementation Of The Lower Menominee River (Marinette, Wisconsin) Betterment Legacy Act Project

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Management of Contaminated Sediments

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Discussion Topics

Project History

1987: Raisin River designated a Great Lakes Area of Concern (AOC) with PCBs the primary chemical of concern



Project History

- 1997: Ford Implemented a Sediment Removal Action (SRA) Under a USEPA Consent Order
 - Approximately 20,000 cubic yards (CY) removed
- 1998-2012: USEPA and Michigan DEQ conducted Post-Remediation Monitoring
 - PCBs identified in areas not covered by the 1997 dredging, including areas located within the footprint of the SRA
- 2012: Great Lakes Legacy Act Agreement Signed
 - Executed between MDEQ and U.S. EPA (not Ford)
 - \$17.3M total cost (\$11.2M USEPA, \$6.1M MDEQ)
 - Agreement requires Ford to remediate contaminated sediments. GLNPO and MDEQ jointly implemented the remediation activities, with Ford providing cash and in-kind services to the MDEQ

- 2012: 109,000CY of sediments containing PCB concentrations up to 600 ppm were removed
 - **\$24,000,000 spent between 1997 and 2012**
- 2012-2013: Additional investigation to delineate lateral and vertical extent of PCBs/evaluate remedial options
- 2013-2015: Ford/Anchor presented technical case to USEPA/TSCA for current Final Remedy. Agency initially proposed a \$40M Final Remedy (complete removal).
- 3Q2015: Final Remedy Approved (removal and capping), with costs at \$15M (EPA contributing up to \$9M).

Discussion Topics

Project Participants

Ford

- Mannik & Smith
- Anchor QEA
- Severson Environmental Services
- Honigman

EPA

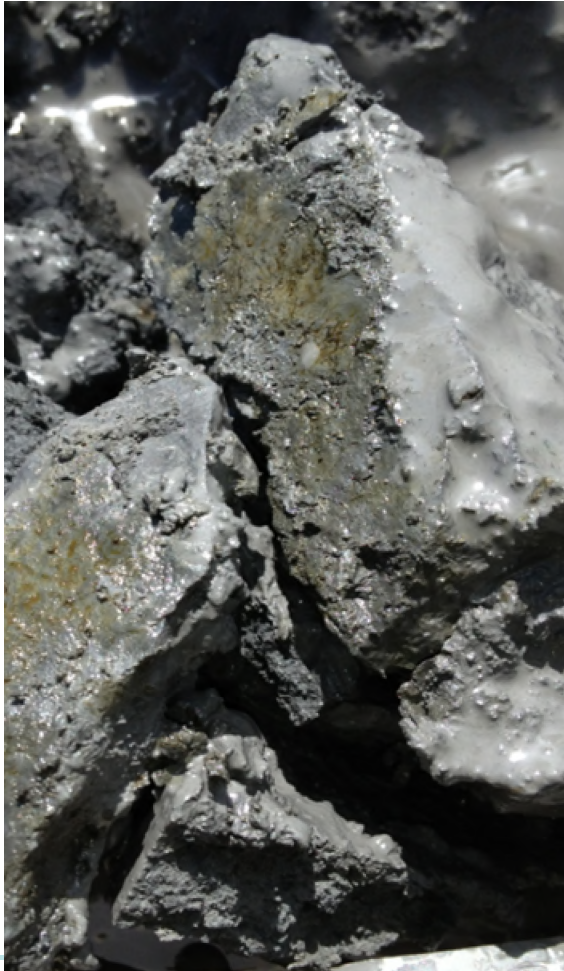
- Great Lakes National Program Office
- EPA/TSCA
- Environmental Restoration, LLC
- US Army Corps of Engineers

MDEQ

- Surface Water Quality Division



Project Challenges

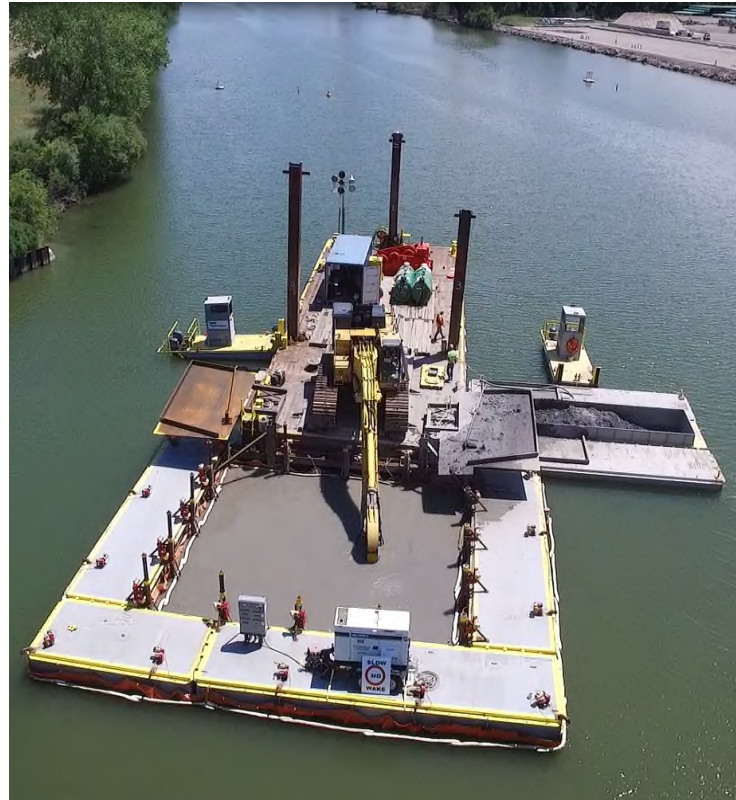


- Subsurface geology
- Extent/type of impacts
- Water depth
- Surface water quality
- Vessel traffic
- Adjacent projects
- Procurement and contracting

Discussion Topics

Site Operations

- Health and safety
- Sheetpile installation
- Turbidity controls
- Dredging
- Offloading
- Stabilization/dewatering
- Water treatment
- Loadout
- Transportation/disposal
- Capping
- Perimeter monitoring



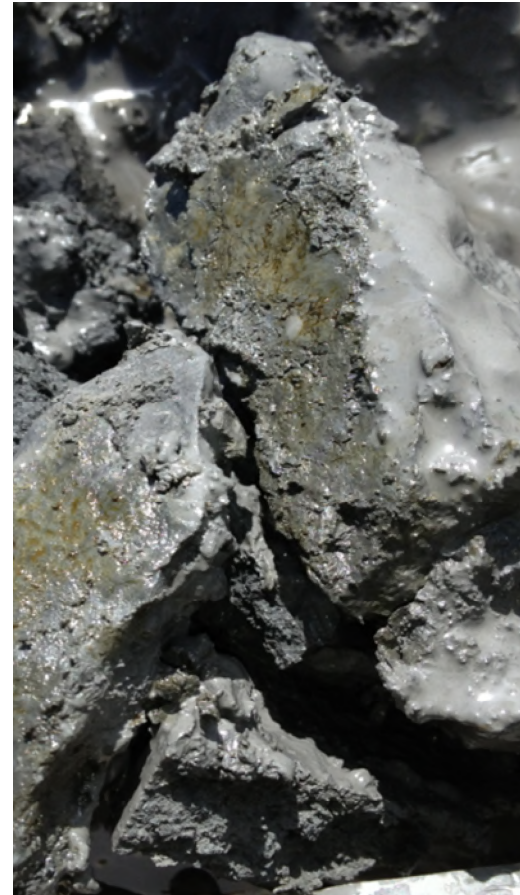
Setting/Remedial History Of Site

SITE LOCATION/SETTING

- River Raisin, Monroe County, Monroe, Michigan
- 1.45-acre Non-Aqueous Phase Liquid (NAPL) Area in the River Raisin adjacent to the former Ford Monroe Stamping Plant
- This work is the last remedial action to be completed as part of the larger River Raisin Area Of Concern

HISTORY OF SITE REMEDIAL ACTIONS

- 120,000 CY of sediments containing PCBs were removed from the AOC between 1997 and 2012
- NAPL-like substance observed during 2012 dredging/verification sampling
- Interim cover (sand) installed over the NAPL Area in 2012



Site Location



Final Remedy Timeline Of Events

Series of supplemental investigations completed in 2013-2014

- Surface water/groundwater temperature monitoring
- Seepage meter monitoring
- Porewater PCB sampling
- Installation of 45 borings and PCB soil sampling (207 soil samples)
- Geotechnical analysis and cross-hole seismic evaluation
- NAPL mobility



Final Remedy Timeline Of Events

- **July 2013 – July 2014: Ford/USEPA discuss and review Alternatives Analyses over multiple iterations**
 - Option 1: Complete Removal (30' of glacial till through 55' of water)
 - Option 2: Excavation and Capping Hybrid
 - Included cap modeling and breakthrough analysis
 - Included extremes such as maximum prop wash and 100-year rain/flood events
 - Included input from Port of Monroe to assume future operations
 - Option 3: Excavation and Capping Hybrid (additional excavation volume vs Option 2)
- **February 2015: Ford presents proposed Final Remedy (Option 2) to the USEPA Technical Review Committee**
- **May 2015: EPA approves the Final Remedy**
- **2016: Final Remedy implementation**

2-Year approval process! Not typical of sediment projects.

**REMEDY WAS A JOINT EFFORT BETWEEN FORD AND THE EPA (GLNPO).
IMPLEMENTATION COSTS WERE SHARED 50/50 UP TO A TOTAL OF \$9 MILLION.**

Final Remedy Design

28,100 CY of sediment removal (29,465 CY actual removal)

Upper Shelf (Yellow shading on Slide 9)

- 8.2-foot removal and residual cover layer placement (sand)

Transition Area and Navigation Channel (Blue shading on Slide 9)

- 10-foot removal and engineered cap placement
- Some NAPL-impacted sediment will remain under the cap

Cap installed in Transition and Navigation Area and consists of both isolation and armor layers

Isolation layer

- 36-inch layer consisting of sand amended with sorptive material (i.e., Organoclay at 3% by weight)

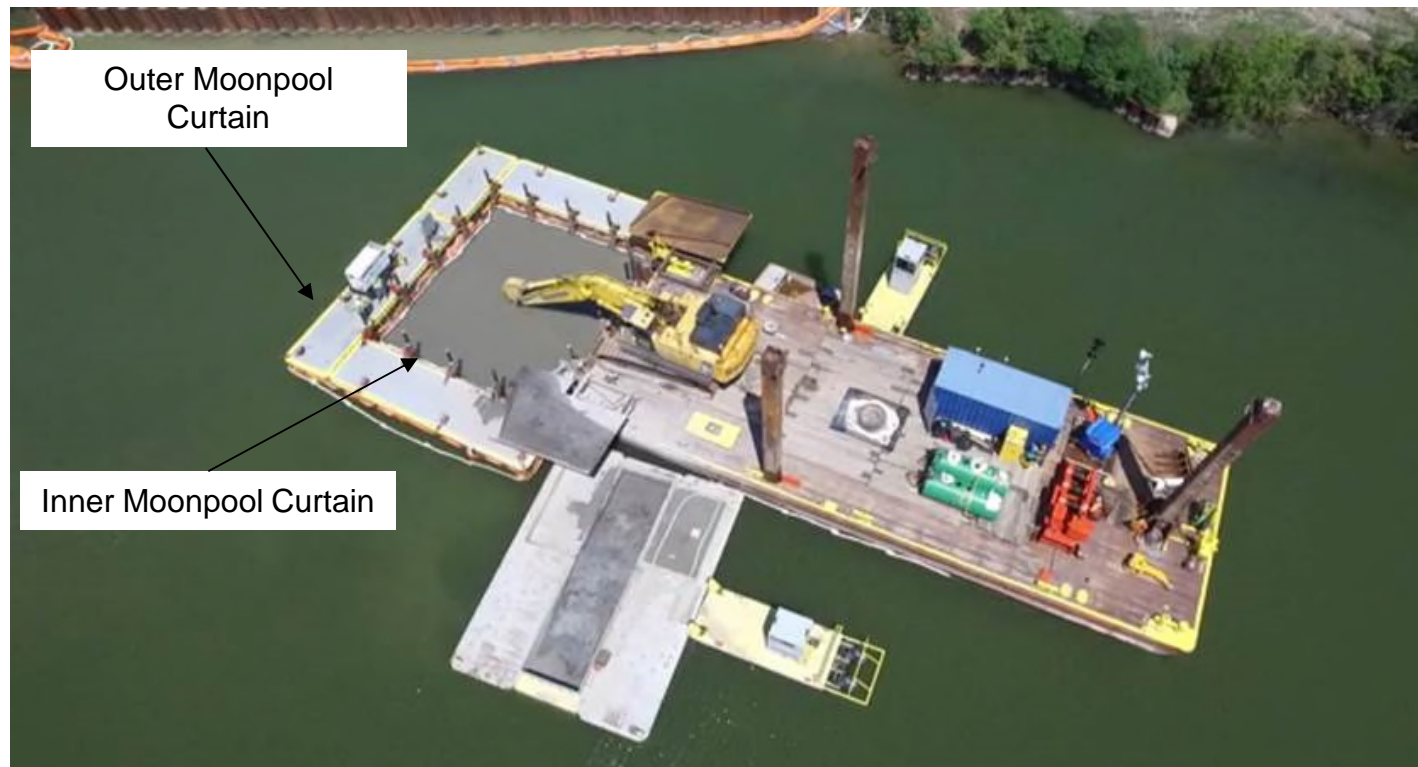
- 12-inch filter layer consisting of 21AA stone

- 36-inch armor stone layer consisting of 36-48 inch diameter rock



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Final Remedy (Dredging)



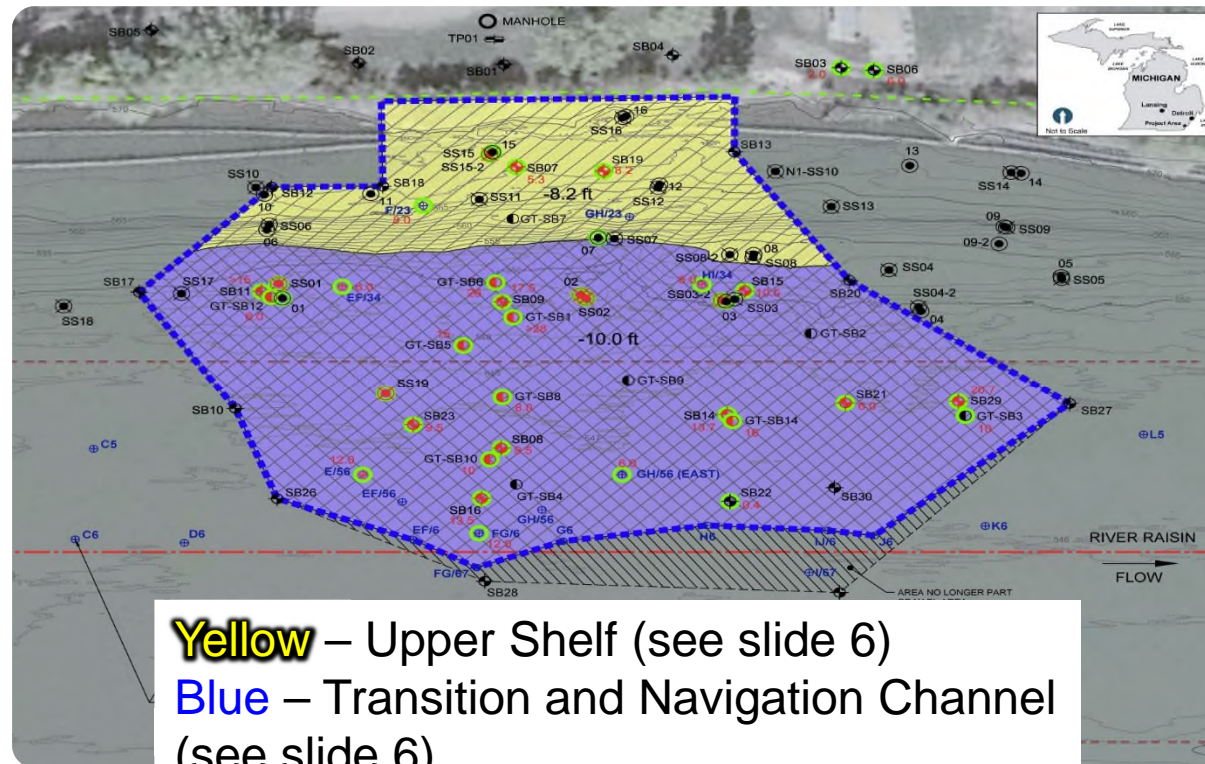
<https://www.youtube.com/watch?v=N28Arvufgxl#action=share>

Youtube search: 2016 Sediment Remediation at Raisin River

Final Remedy (Dredge Material Stabilization)

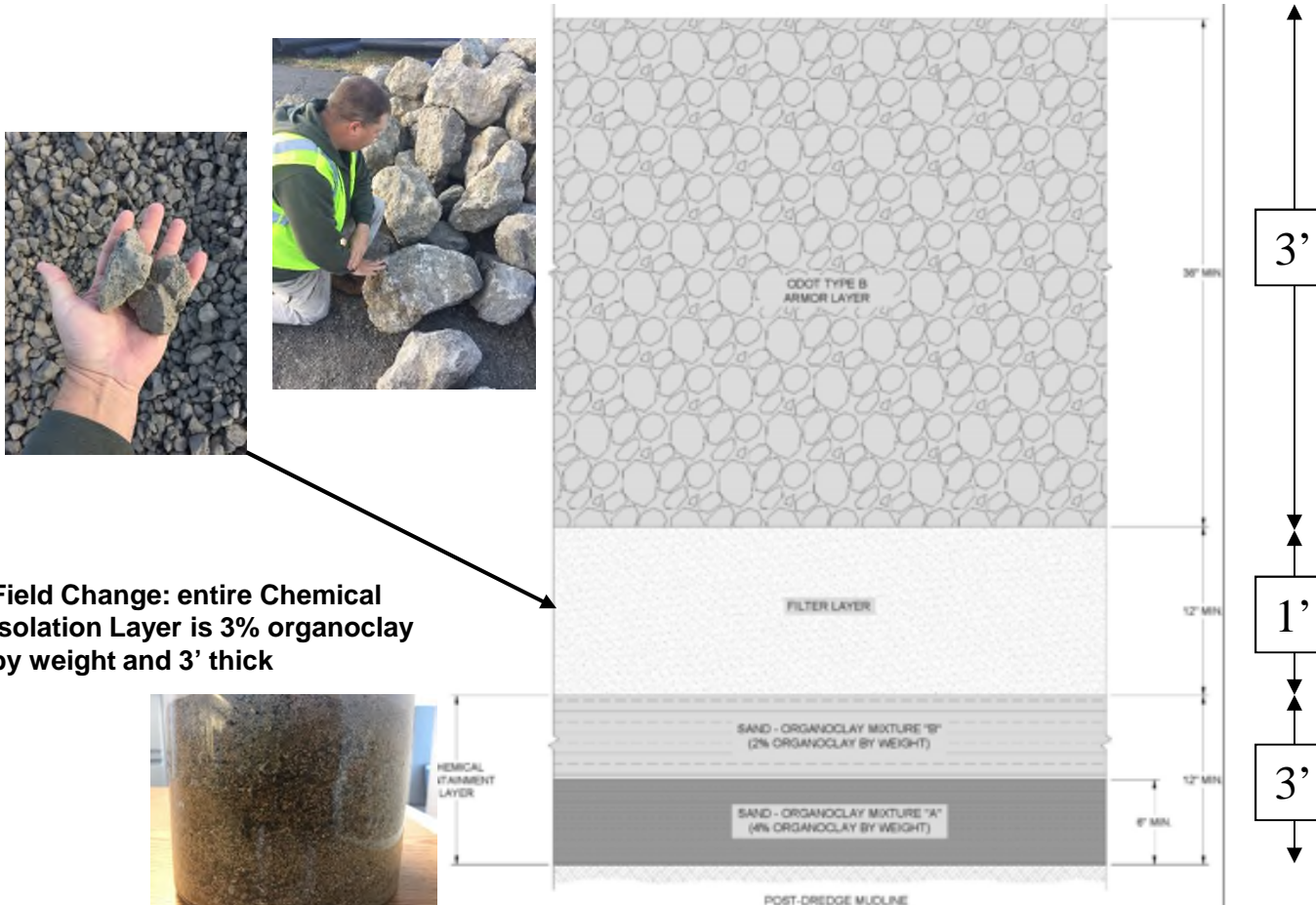


Final Remedy Layout (Actual)

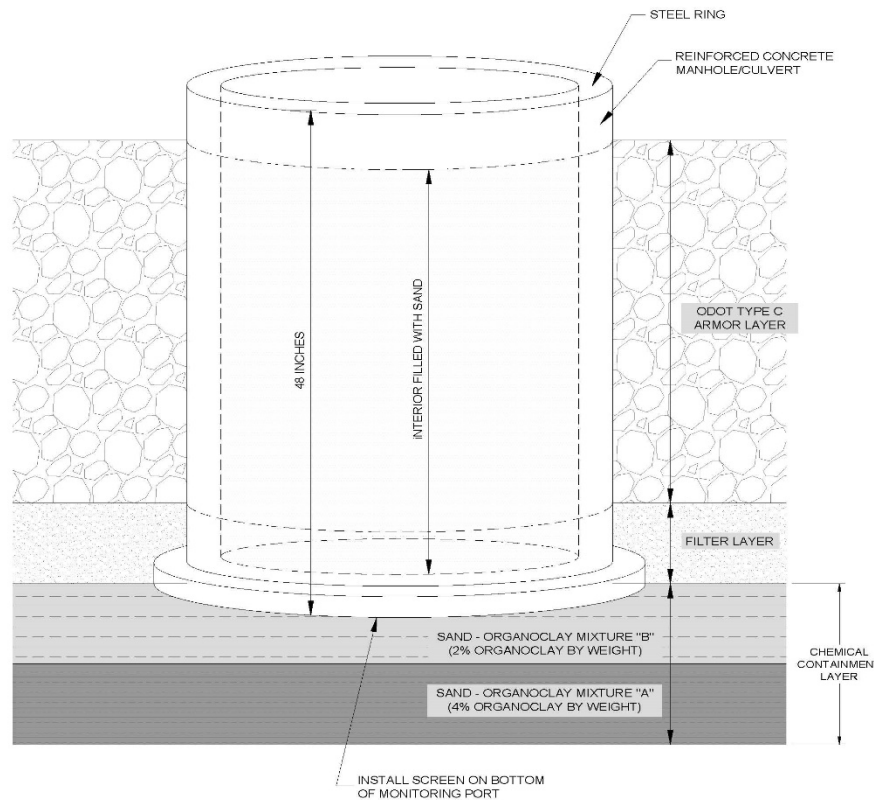


Yellow – Upper Shelf (see slide 6)
Blue – Transition and Navigation Channel
(see slide 6)
Red Lines – USACE Navigation Channel

Final Remedy (Capping)



Final Remedy (Monitoring)



- Total of 4 sampling ports installed
- Physical and chemical monitoring to be completed
- Monitoring required in Years 1, 2, 3, 6, and 9 post-cap placement
- After 9 years, the plan will be reviewed for potential revision

* Figure is from Design document and not representative of Chemical Isolation Layer installed

Key Takeaways

EPA agreed to keep project in the GLNPO program which allowed cost share to be implemented

Remedy includes leaving PCB concentrations in the glacial till at concentrations greater than 10,000ppm (under a 7' thick cap)

Remedy is a capping remedy first and foremost, but dredging was required to complete the cap. Completion of dredging on time greatly impacted cap schedule

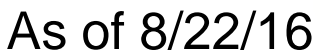
Communication with the Port of Monroe was key to cap installation success

Port provided a 2-week “in-water” window with no large vessel traffic to allow cap installation

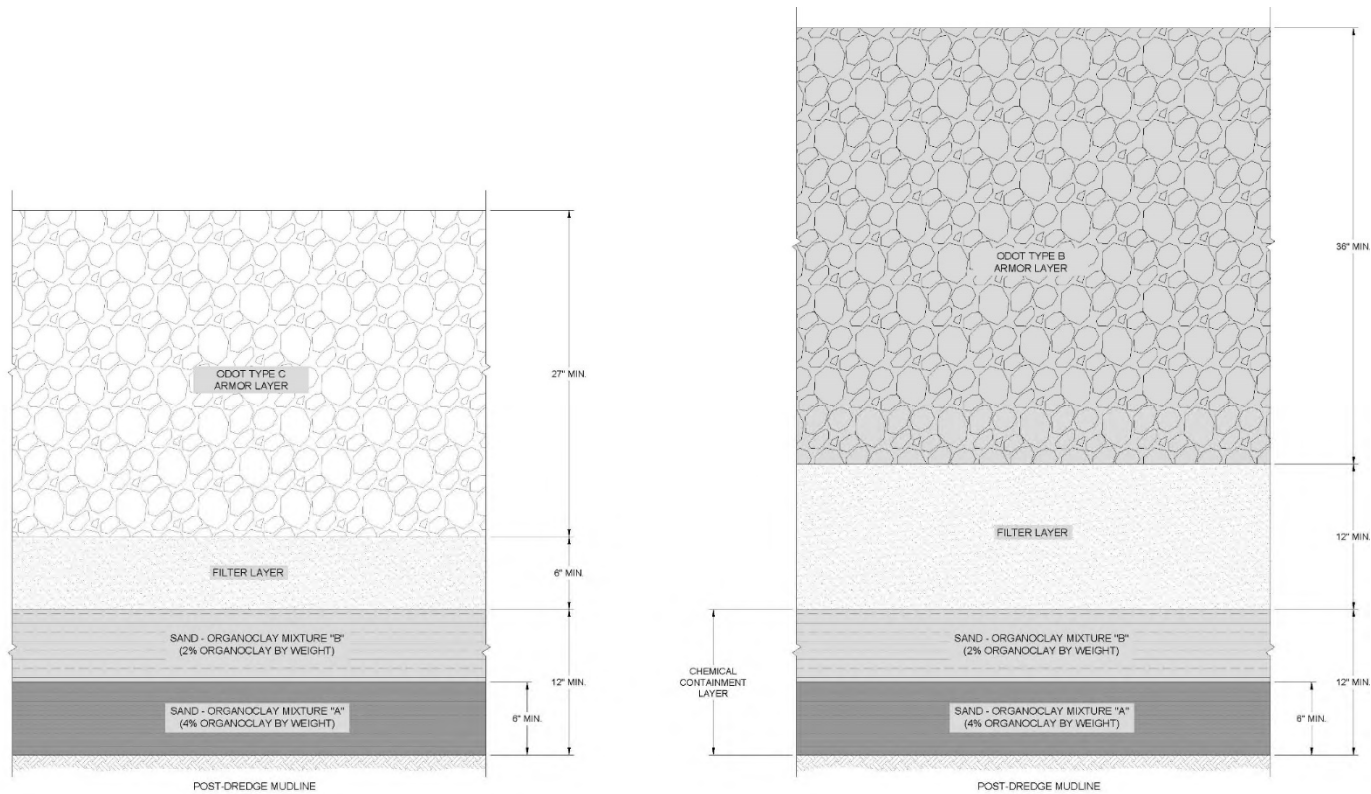
Port provided laydown area for cap materials and chemical isolation layer mixing

FORD IS RESPONSIBLE FOR CAP INSPECTION AND MONITORING.

Dredging



Capping



Project Details

Mobilization Date: June 1, 2016

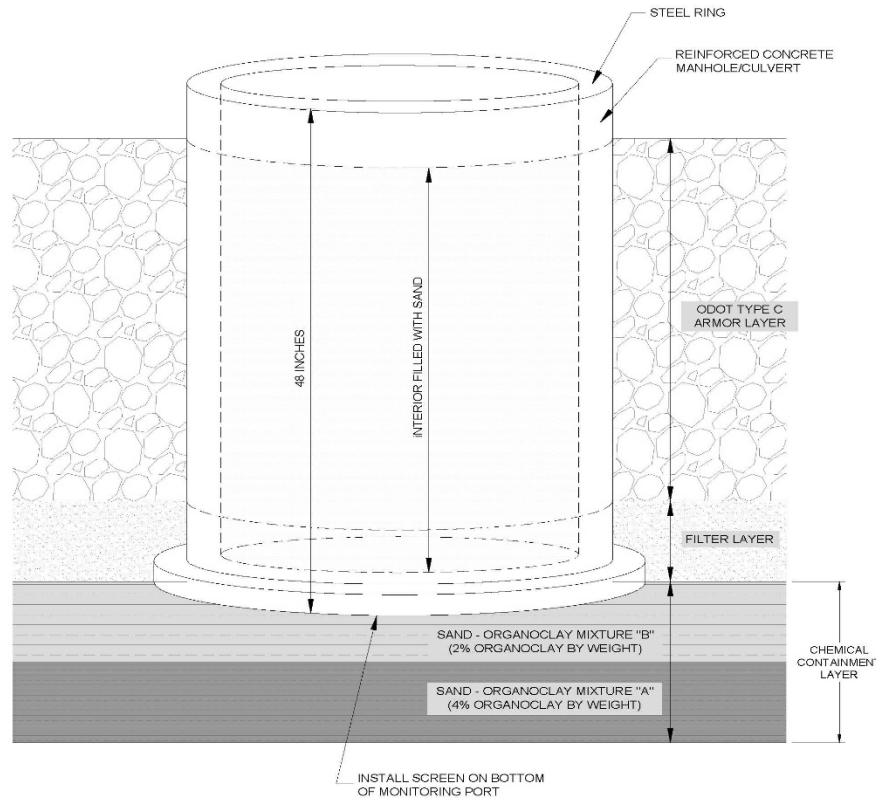
Substantial Completion Date: December 19, 2016

Dredge Volume: 29,465 cy

Cap and residual cover built as designed with the exception of 3% minimum organoclay across the 12 inch isolation layer rather than 2% in top 6 inches and 4% in bottom 6 inches.

Modeling shows more protective and change made to accommodate capping window provided by Port of Monroe.

Cap Monitoring



- Total of 3 sampling ports to be installed
- Physical and chemical monitoring to be completed
- Monitoring required in Years 1, 2, 3, 6, and 9 post-cap placement
- After 9 years, the plan will be reviewed for potential revision

St. Louis River Interlake Duluth Tar (SLRIDT) Site

- Site impacted with PAHs
- GLLA project – “betterment” to ROD remedy
 - Use Activated Carbon Mat in CAD cap
 - Protect bioactive zone from COCs during cap consolidation
 - Barrier to root penetration
 - Cap thinner, resulting in better habitat
- Cost-share 50% GLLA/50% XIK Corp.
- Total Project Cost < \$3M

River Raisin GLLA Project



River Raisin

- Site impacted with PCBs
- GLLA Project
 - RD/RA – Dredging
 - Site recontaminated following a 1995 remedial action
- State of Michigan and Ford are non-federal sponsors
- MDEQ
 - Cash contributions
- Ford
 - In-kind service: Removal of inert historical navigational²⁵

Dredging Details – Base Project

- 109,000 Cubic Yard of Total Dredging
 - 3,000 CY of TSCA (>50 ppm PCBs)
 - 106,000 CY of non-TSCA (<50 ppm PCBs)
- TSCA Dredging
 - Mechanical Dredge with Silt Curtains
 - Processing at Ford Property
 - Disposal at EQ's Wayne County Landfill
- Non-TSCA Dredging
 - Hydraulic Dredge with Pipeline
 - Disposal at Sterling State Park CDF

Innovative In-Kind Example – Creating CDF Disposal Capacity

- Use of CDF required EPA and MDEQ to remove an equal volume (106,000 CY), for disposal elsewhere
 - Preserved capacity at CDF for future maintenance of the navigation channel
- Extensive chemical testing identified 112,000 CY of material identified as “inert” by MDEQ
- Material to be excavated, dewatered, and stockpiled on Ford property for future use at the site

Supplemental Project – 2012-2015

- During confirmatory sampling of the final DMU, PCB NAPL was discovered above TSCA levels
- Extensive new sampling focused on a 1.2 acre area in Fall 2012, Spring 2013 & Summer of 2014
- The NAPL area was delineated vertically and horizontally
- NAPL located in stiff glacial till/weathered bedrock – dredging challenges expected
- Construction anticipated in Fall 2015
- Partners: GLNPO, MDEQ and Ford

Spirit Lake



Spirit Lake

- Site impacted with PAHs
- GLLA Project – RI/FS
 - No Further Action ROD for sediment
 - Expected accumulation of clean sediment in a few areas not occurring at rate anticipated
 - Initial Phase - speed was critical – needed to sample on ice!
- Cost-share RI/FS with Industrial non-federal sponsor
- Remedy Selection about to occur
- Classic Legacy Act Example – accelerated sediment remediation; bonus of accelerating upland work
- Strong partnership between GLNPO, MPCA and the non-federal partners

Value of GLLA

- GLNPO is a great partner
 - Expertise
 - Creative problem-solving
 - Stakeholder assistance
 - Focus on results, not process
 - Efficiency
 - Earlier site remediation
 - Funding



Many Other Successful Projects

- Ashtabula, Ohio
- Tannery Bay – Sault Ste. Marie, Michigan
- Ottawa River, Toledo, Ohio
- Black Lagoon, Michigan
- Ruddiman Creek, Michigan
- Lower Rouge River, Michigan
- Kinnickinnic River, Wisconsin
- Grand Calumet, Indiana
- Buffalo River, New York

Questions ?

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