



Cedar Creek Site – Operable Unit 2A: Lessons Learned During Implementation of an Environmental Dredging Project Located within a Historic Town



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Overview

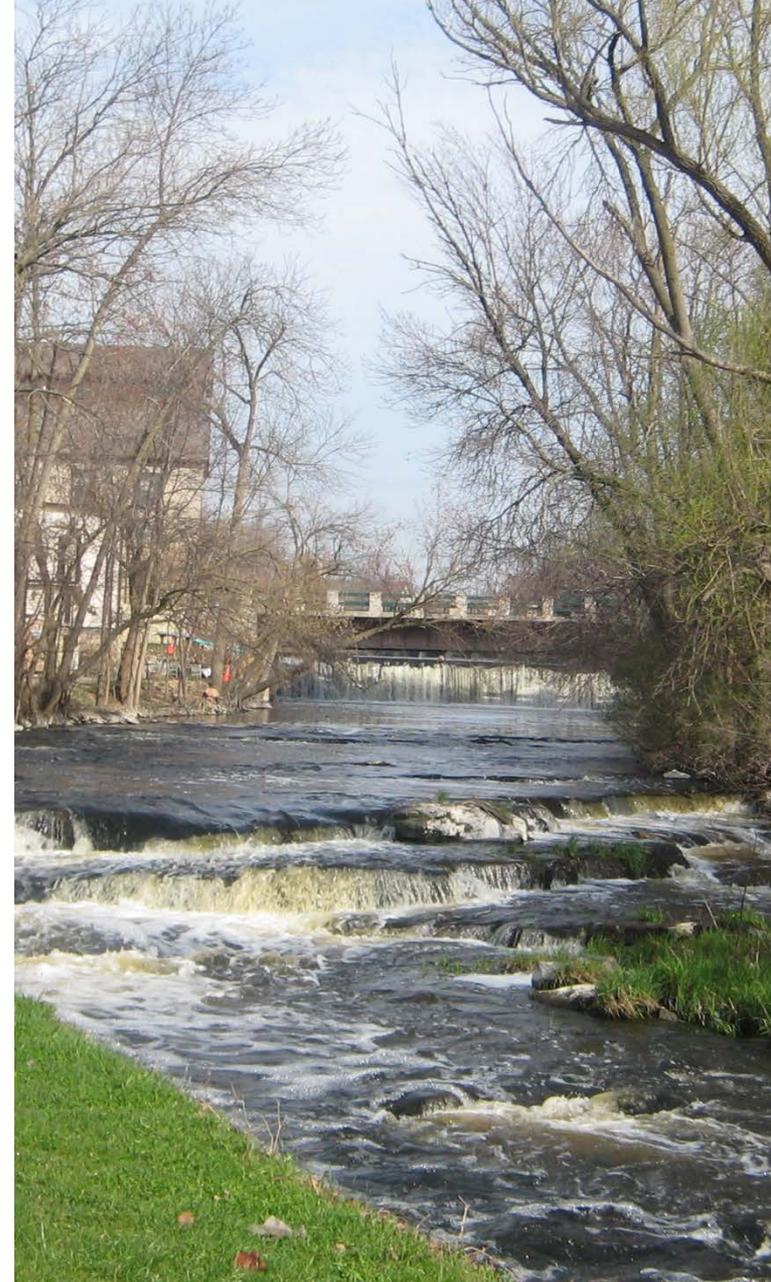
- 1 Site Background and Description
- 2 Design Elements
- 3 Dredging and Cover Placement Operations
- 4 Lessons Learned

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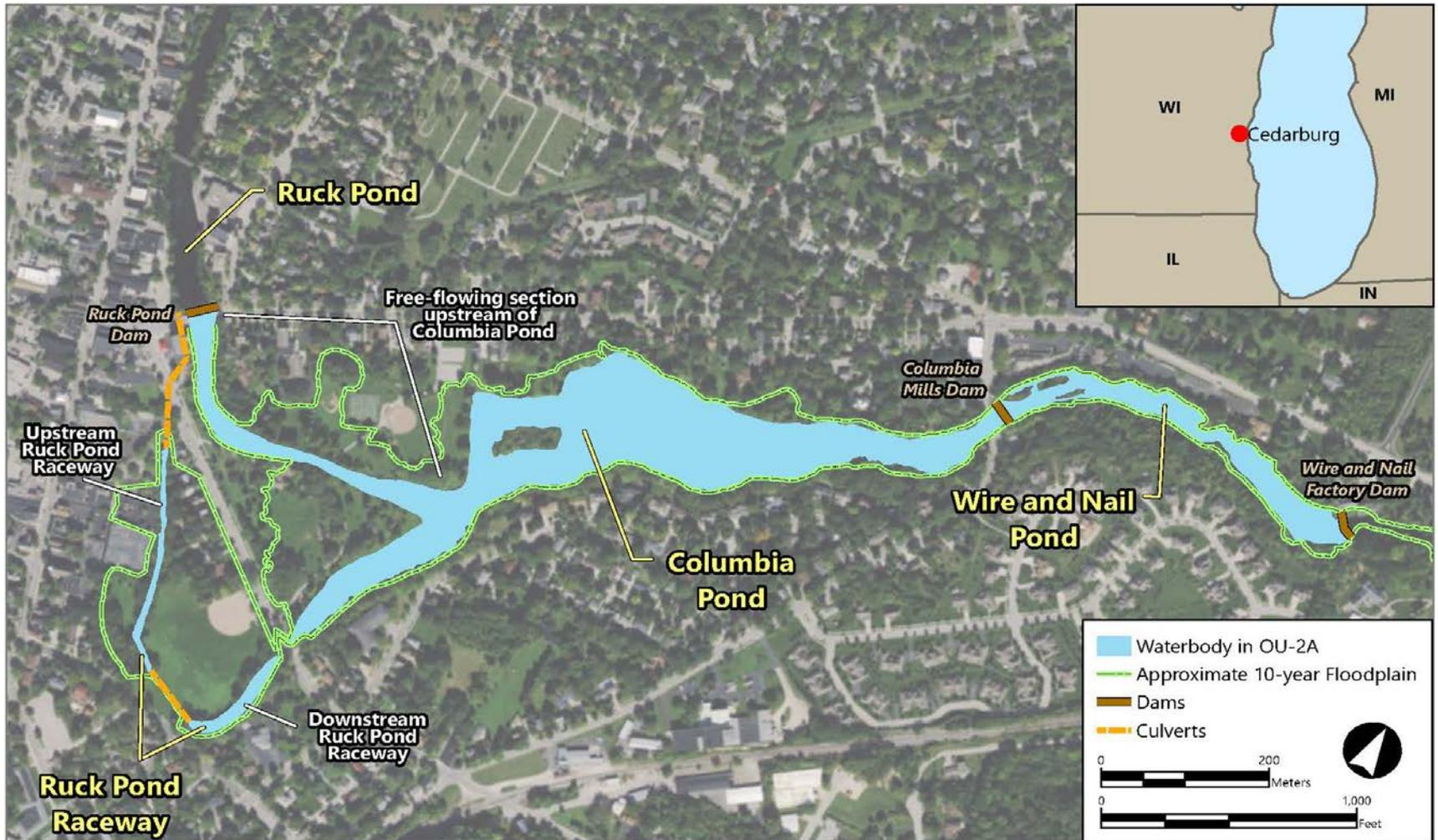
Site Background and Description

Site Background

- Part of Cedar Creek Superfund Alternative Site
 - Approximately 1.3-mile stretch of creek and floodplains
 - Located in Cedarburg, Wisconsin
- Polychlorinated biphenyls (PCBs) entered Cedar Creek through stormwater connections
- Project implemented as a Non-Time Critical Removal Action (NTCRA)



Cedar Creek Site – Operable Unit 2A



Site Description

- Ruck Pond Raceway
 - 2,200-foot diversion channel
 - Both culverted sections and open channel
- Columbia Pond
 - 15-acre shallow impoundment
 - Controlled by Columbia Mills Dam
- Wire and Nail Pond
 - 2-acre narrow impoundment
 - Controlled by Wire and Nail Factory Dam



Open Channel of Ruck Pond Raceway



Island in Columbia Pond



Aerial View of Wire and Nail Pond near Wire and Nail Factory Dam

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Design Elements

Design Requirements

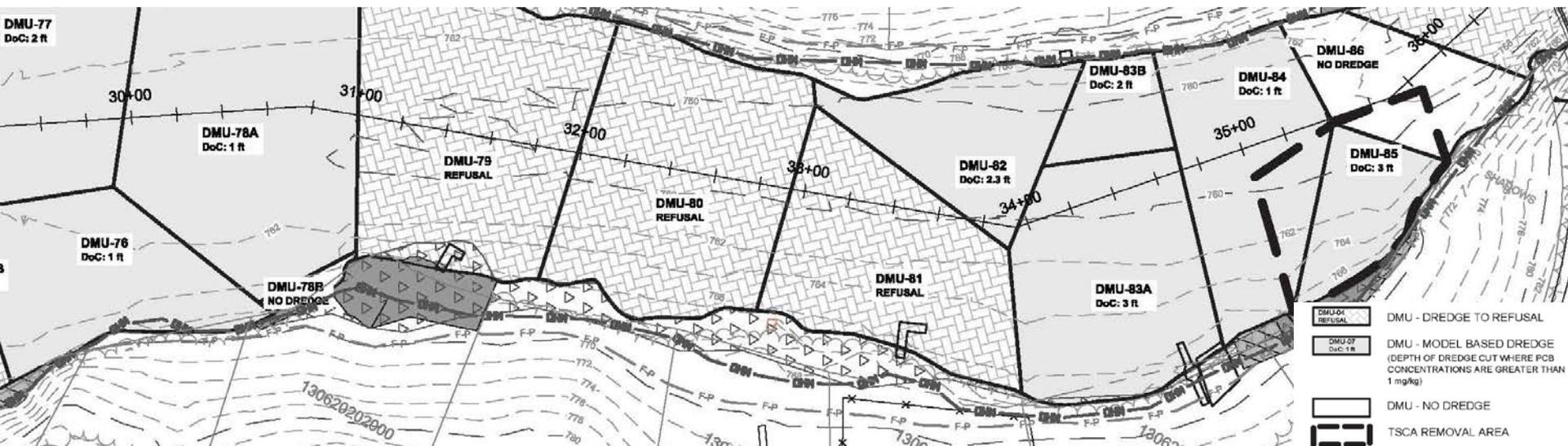
- USEPA and Mercury Marine entered into Settlement Agreement to perform a NTCRA

Media	Removal Criteria
Soil	<ul style="list-style-type: none">• 1 mg/kg PCBs
Sediment	<ul style="list-style-type: none">• 2.5 mg/kg PCBs• 98% mass removal• Short-term surface-weighted average concentration (SWAC) goal of 0.5 mg/kg PCBs• Long-term SWAC goal of 0.25 mg/kg PCBs

- Mercury Marine elected to lower sediment removal action level used in design to 1 mg/kg

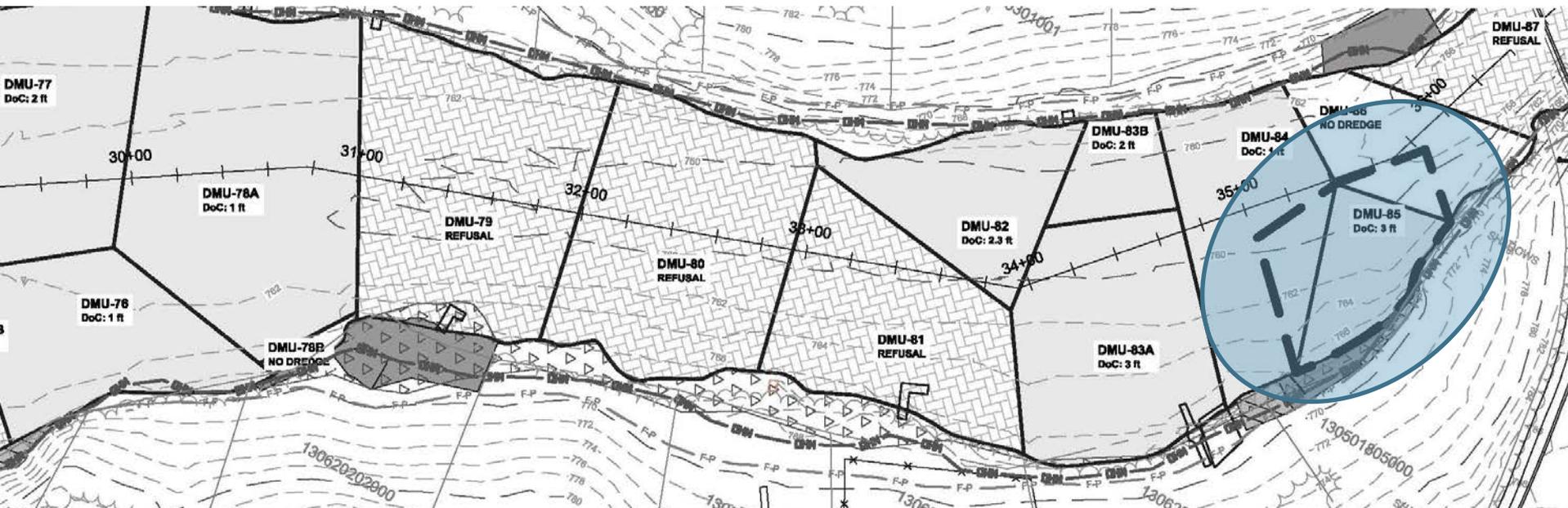
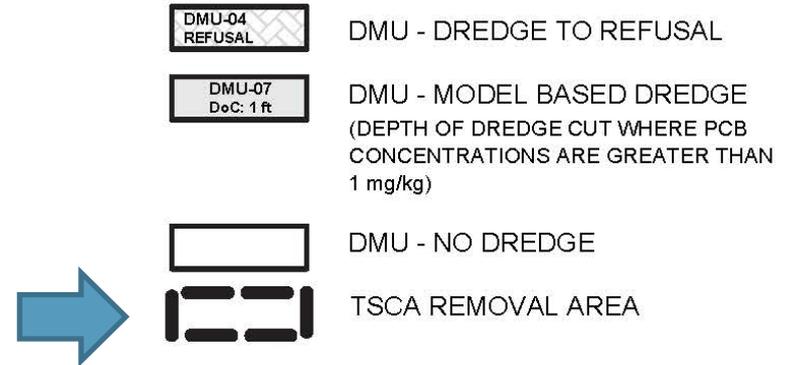
Removal Design Approach – In-Water Removal Areas

- 3D removal prisms incorporating:
 - Materials with different disposal requirements (e.g., Toxic Substances Control Act [TSCA] materials)
 - Location of the sediment containing PCBs within the vertical profile



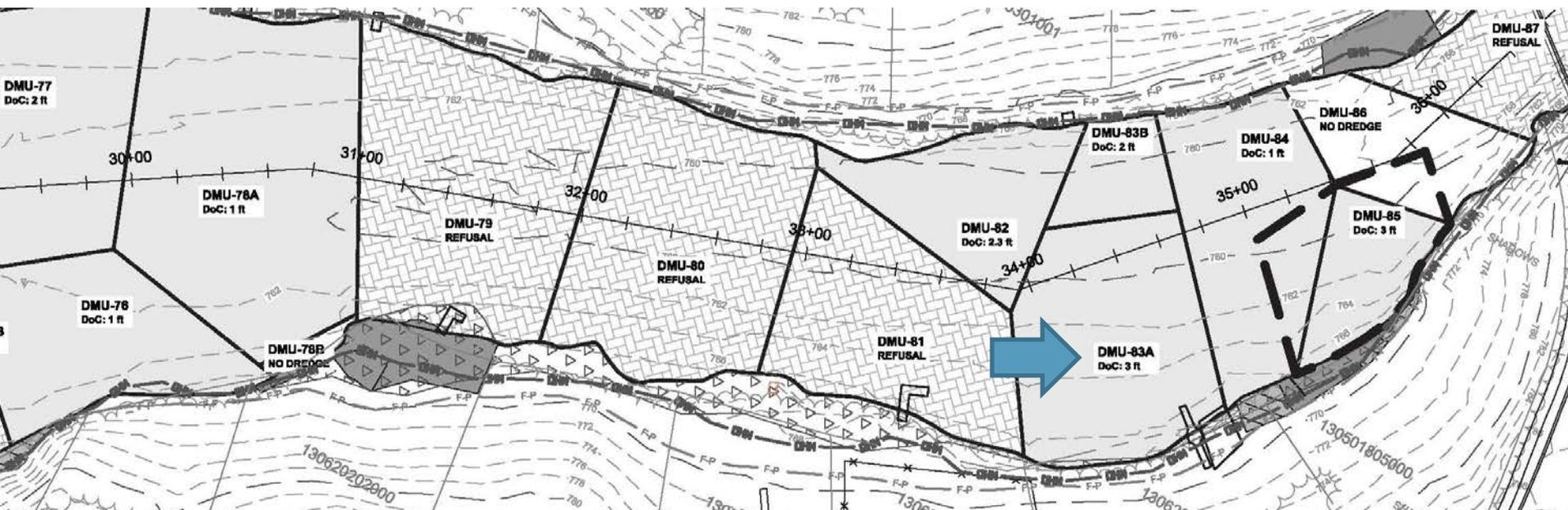
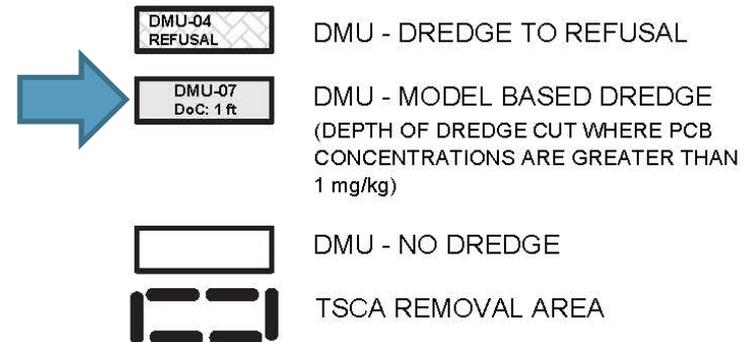
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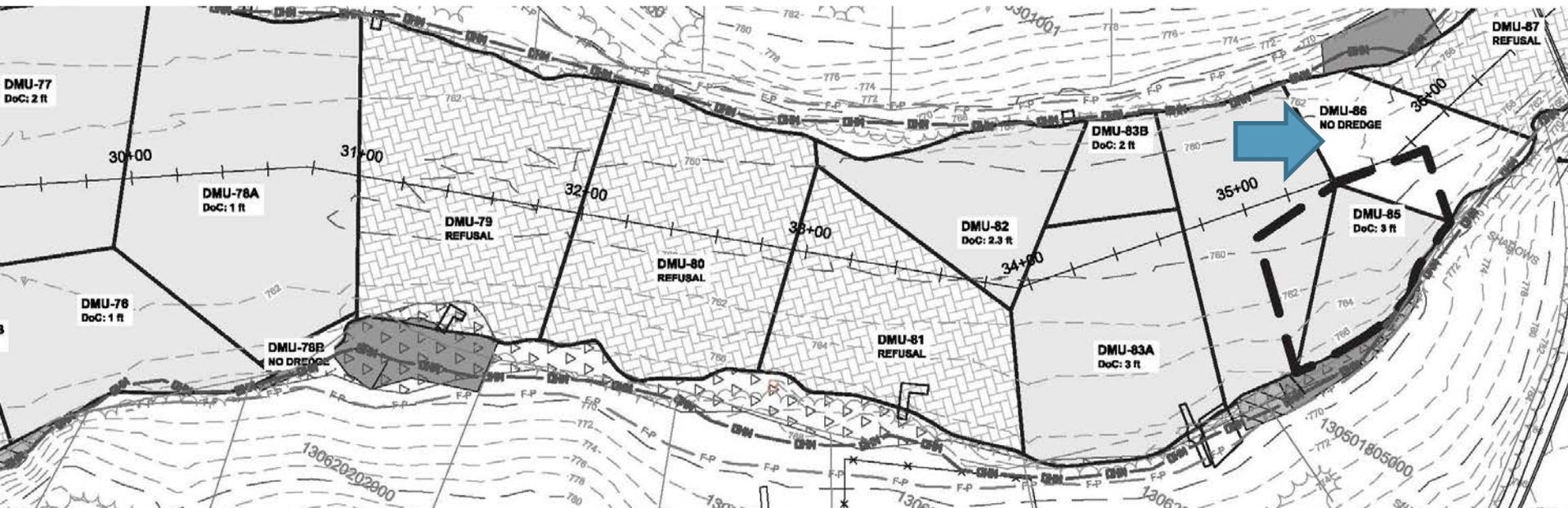
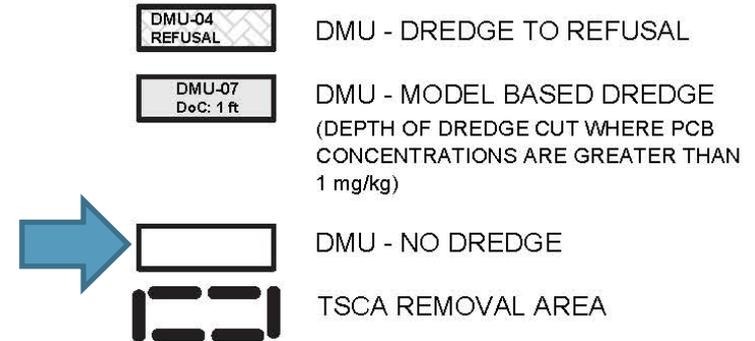
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Removal Verification

- Program consisted of physical (single-beam bathymetry) and chemical means of verification
- “Chemical” means differed by Dredge Management Unit (DMU)
 - **DMU – Model-Based Dredge:** Up to three sediment cores were collected within a 0.25-acre verification unit, and the surface samples (i.e., 0 to 0.5 foot) from each core were composited
 - **DMU – Dredge to Refusal:** A practical limit of less than 4 inches of sediment thickness based on sediment probing was specified, as the contractor was required to remove all soft material (as practical)

Residual Cover Placement

- 6-inch residual sand cover required:
 - All dredge to refusal DMUs
 - Model-based DMUs where PCB removal level met but in excess of SWAC goal

Design Challenges

- Limited space for staging area
 - Two city-owned public parks
 - Commercial business' parking lot
- Quality of life considerations
 - Restricted work hours (7am to 7pm, Monday through Saturday)
 - Sequenced work to minimize disruption to community
- Ownership of surrounding properties
 - Third-party private, commercial, and public land owners



Cedar Creek Park within OU-2A



Building adjacent to Ruck Pond Raceway



Aerial Depiction of residential neighborhoods near OU-2A

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Dredging and Cover Placement Operations

Remedial Construction

- J.F. Brennan was selected contractor
 - Infrastructures Alternatives, Inc. performed dewatering and water treatment
 - Rams Contracting, Ltd assisted with clearing and grubbing, excavation, and trucking



Ruck Pond Raceway Removal Activities

- Water diverted from raceway at Ruck Pond Dam
- Culverts cleaned with pressure washer and vacuum truck
- Sediments excavated with:
 - Small, low-ground-pressure equipment
 - Long-reach excavator
- Residual sand cover placed after excavation



Ruck Pond Raceway Material Management



- Removed materials processed in Remediation Support Area with Portland Cement or Calciment®
- Water treated with on-site plant
- 5,500 cubic yards (cy) removed and disposed



Removal in Ponds

- Sediment removal with two, 8-inch hydraulic dredges:
 - Cutterhead
 - Vic Vac attachment
- Removal positioned and tracked with RTK GPS and Dredgepack®
- Residual dredging occurred in one-quarter of dredged area
- More than 67,000 cy removed with average rate of 425 cy/day

Sediment Processing Area

- Dredged sediment dewatered in 42 geotextile bags
- 3,900-gallon per minute water treatment plant treated contact water and discharged back to creek



In-Water Cover Areas

- Cover placed over more than 11 acres of OU-2A
- SWAC <0.25 mg/kg achieved for all zones

Zone	SWAC (mg/kg)
Ruck Pond Raceway	<0.01
Columbia Pond	0.18
Wire and Nail Pond	0.06



4 Lessons Learned

Lessons Learned

- Community Interactions
 - Engaged with community through mailings, open houses, and individual meetings
 - Maintained core team of representatives
 - Empowered contractor to meet and address minor concerns
- Removal Verification Approach
 - Provided roadmap to construction team
 - Accepted by all parties
 - Adapted in field as project progressed

Lessons Learned (cont'd)

- Disposal of Dewatered Material
 - TSCA risk-based disposal option reduced total trucking mileage
 - Understanding landfill planned operations are key with unmeasurable “workability” criteria



Questions?

