



# LESSONS LEARNED

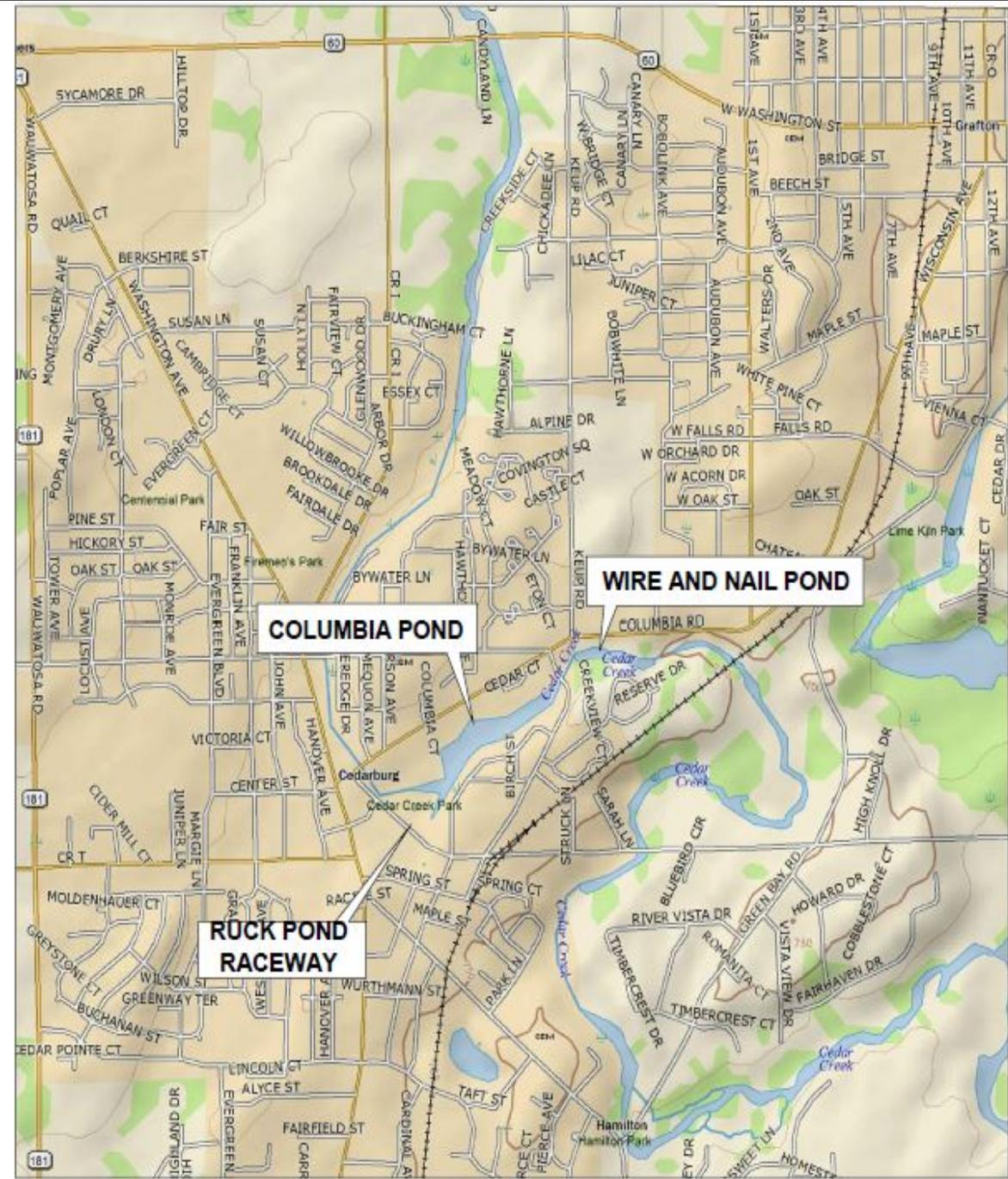
Managing Multiple Waste Streams at  
a Superfund Alternative Site



WEDA SUMMIT & EXPO '18

# PROJECT OVERVIEW

- Superfund Alternative Site: Cedar Creek OU2A
- Cedarburg, WI
- PCBs contamination
- Two years to complete
- Project team: Brennan, IAI, RAMS, Cardno and NRT



# PROJECT SITE

- Dredge Areas:
  - Ruck Pond Raceway
  - Columbia Pond
  - Wire & Nail Pond
- Landside operations: Legion Memorial Park, Adlai Horn Park

# PCB CONTAMINATION

- Varying levels, from ND to 340 mg/Kg (Anchor QEA, 2016)
- Some TSCA-regulated material
- TSCA and Non-TSCA material layered throughout the dredge prisms

# PROJECT GOALS

1. Complete the work safely and expeditiously, increasing production and efficiency to reduce project schedule;
2. Extract and process TSCA and non-TSCA material separately, without cross-contamination; and
3. Utilize the smallest footprint possible.

# SCHEDULE

Milestone Event	Start	Finish
Phase 1 Project Mobilization/Site Construction	<b>Oct. 2016</b>	Nov. 2016
Ruck Pond Raceway - Mechanical Dredging	Nov. 2016	Dec. 2016
Ruck Pond Raceway - Backfill Placement	Dec. 2016	Dec. 2016
Phase 2 Site Construction & Mobilization	Nov. 2016	Mar. 2017
Columbia Pond - Hydraulic Dredging	Apr. 2017	Oct. 2017
Columbia Pond - Backfill Placement	Nov. 2017	Dec. 2017
Wire & Nail Pond - Hydraulic Dredging	Aug. 2017	Oct. 2017
Wire & Nail Pond - Backfill Placement	Dec. 2017	Dec. 2017
Dewatered Sediments Load- Out and Disposal	Nov. 2017	Apr. 2018
Final Demobilization & Restoration	Apr. 2018	<b>Jun. 2018</b>

# PHASE I REMOVAL – Ruck Pond Raceway

- Mechanical Dredging and Backfill Placement
- Non-TSCA & TSCA Sediment Removal
- Sediments Amended with Portland Cement and Calciment®
- Approximately 5,500 cy of sediments removed
- Over 700 Lineal Feet of Underground Structures Remediated









# PHASE I WATER TREATMENT

- IAI utilized its Mobile Water Treatment System for Phase I
- 150 gpm water treatment plant
- Contained in two 52-ft. box trailers
- Clarification, filtration and carbon adsorption processes
- WI Certified Operator
- WPDES Permit Equivalency – Non-detect PCBs limit
- No discharge limit exceedances



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# PHASE II REMOVAL

- Approximately 58,000 cy of target sediments removed from Columbia Pond
- Approximately 9,000 cy of target sediments removed from Wire & Nail Pond

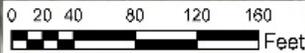
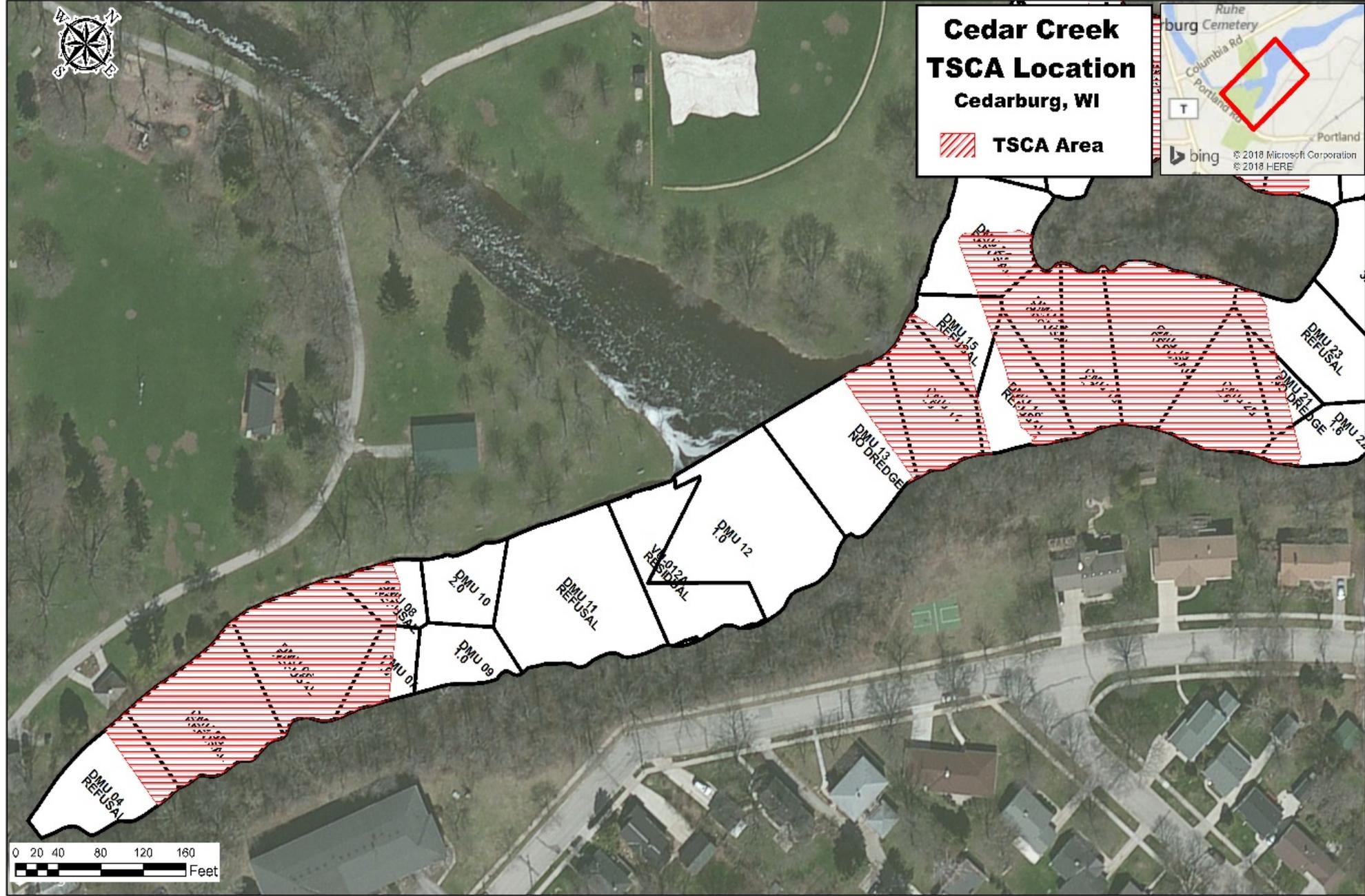
# DREDGE MANAGEMENT UNITS (DMUs)

- Project footprint divided into 124 Dredge Management Units
- Complex design due to target sediment thickness and mapped concentrations
- Average DMU size: approximately  $\frac{1}{4}$  acre



# Cedar Creek TSCA Location Cedarburg, WI

 TSCA Area



# DREDGES

- (2) 8” Hydraulic swinging ladder Moray Class dredges
- (1) standard ladder length and (1) customized long ladder
- Utilized both standard cutterhead and patented Vic Vac™ attachments
- Utilized “Excavator Assist” method for bank areas







# MANAGING WASTE STREAMS: From the Water

- Pre-Planning Operations for Efficiency of Waste Stream Removal
- Mapping of Sediments Prior to, During and After Removal
- Customized Software for Operator Visibility of Removal Operations
- Coordination and Execution of Plans





DO NOT OPERATE  
EQUIPMENT  
UNLESS YOU HAVE  
RECEIVED  
PROPER  
SAFETY TRAINING

ENGINEERED  
BY  
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# HIGH FLOW DREDGED MATERIAL PROCESSING

- Process flow from both dredges (up to 3000 GPM) simultaneously
- Space restrictions (limited area available in public park)
- Separate TSCA and Non-TSCA processing areas
- Also needed space for WTP, sized to handle 3,000 GPM flow

# SEDIMENT PROCESSING AREA (SPA)

- Two pads: TSCA and Non-TSCA
- Common Sump
- Clarifier Underflow Sent to TSCA Pad





# CHALLENGES OF SMALL SPACE

- Managing trucking and deliveries, in residential area
- Tight tolerances on pad, sump and haul road sizes
- Stacked geotextile tubes to minimize footprint

# GEOTEXTILE TUBE DEWATERING

<b>Total no. geotextile tubes deployed</b>	42 tubes
<b>Geotextile tube sizes</b>	60 – 82.5 ft., dia. Up to 285 ft., length
<b>Total volume material dewatered</b>	70,555 cu yds
<b>Stacking</b>	4 layers in Non-TSCA Pad 3 layers in TSCA Pad
<b>Time to fill each geotextile tube</b>	2-4 days

# SEPARATE PROCESSING: TSCA, NON-TSCA

- Two pipelines entering SPA
- Engineering control:
  - Lock-out/tag-out system to prevent valve mis-alignment
  - JFB & IAI PMs held keys
- Administrative controls:
  - Frequent communication between JFB and IAI
  - Recordkeeping (surveys and material tracking by JFB)



# CHEMICAL CONDITIONING

- Single-product application for both TSCA and Non-TSCA material
- Cationic emulsion polymer
- Approved for use on the project by WDNR
- 1% solution made down on site with IAI's container polymer application system
- Injected into geotextile tube headers in the SPA
- Flow- and density-paced application





# STACKING GEOTEXTILE TUBES

- First row must be properly consolidated prior to stacking
- Chemical conditioning is key
- Physical means of opening pores in the geotextile fabric
- Type of material being dredged (grain size, organic content)



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# SPA DRAINAGE & FILTRATE COLLECTION

- One sump located between TSCA and Non-TSCA pads
- Pad surfaces sloped toward sump
- Collected tube filtrate and storm water
- Approx. storage capacity of 300,0000-gal.



# PHASE II WATER TREATMENT

- IAI utilized a 3000 gpm WTP for Phase II
- Free-standing treatment units
- Clarification, filtration and carbon adsorption processes
- WI Certified Operator
- WPDES Permit Equivalency – Non-detect PCBs limit
- No discharge limit exceedances





# WPDES PERMIT EQUIVALENCY LIMITS

<b>TSS, daily max. limit</b>	10 mg/L
<b>TSS, monthly avg. limit</b>	5 mg/L
<b>Oil and grease, daily max. limit</b>	15 mg/L
<b>Total PCBs, daily max. limit</b>	Non-detect or <0.003 ng/L

***All effluent limits met throughout the course of the project***

# CONCLUSIONS

- Hydraulic dredging to geotextile tubes is a viable option, even for sites with:
  - Multiple waste streams
  - Limited space for landside operations
  - Close proximity to public spaces
- Hydraulic dredging to geotextile tubes allowed:
  - Effective production rate
  - Material transport in closed system (reduced risk of public exposure to contaminants)
  - Separate extraction and handling of TSCA and Non-TSCA material, without incident