

Indiana Harbor and Canal (IHC) Environmental Maintenance Dredging



Prepared for the WEDA Midwest Chapter Meeting
March - Toledo, OH

IHC Facility Operations & Dredging

- ❖ Located in northwest Indiana in the city of East Chicago
- ❖ Previous contract – 2011 to 2016
- ❖ Current contract – Joint Venture selected in September 2016
- ❖ Operations include:
 - ❖ Mechanical Dredging & Offloading
 - ❖ Groundwater Gradient Control
 - ❖ Environmental Monitoring
 - ❖ Waste Water Treatment

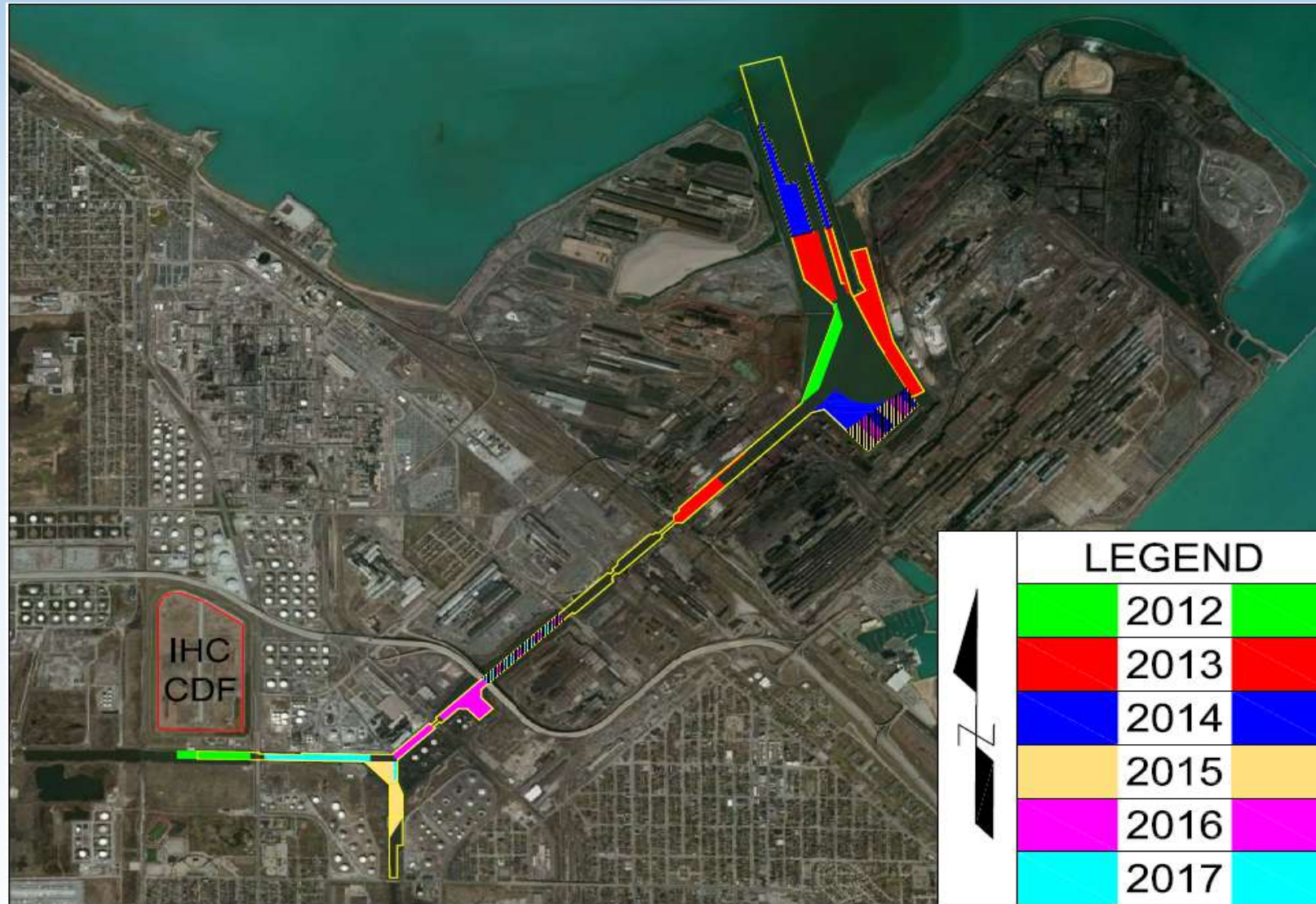


Dredge Quantities

- ❖ First Contract
 - ❖ 918,000 cubic yards
- ❖ Current Contract
 - ❖ Base year (2016)
 - ❖ $\approx 227,000$ CY
 - ❖ Option year 1 (2017)
 - ❖ $\approx 92,000$ CY
 - ❖ Mobilization this spring to dredge 100,000+ CY
- ❖ Dredged to date 1,238,000+ CY



Indiana Harbor & Canal Dredging Map



Mechanical Dredging

- ❖ 14 CY level cut environmental bucket \approx 50,000 lbs. of material/bucket
- ❖ Oil booms and absorbent around the “moon pool”
- ❖ Turbidity monitoring

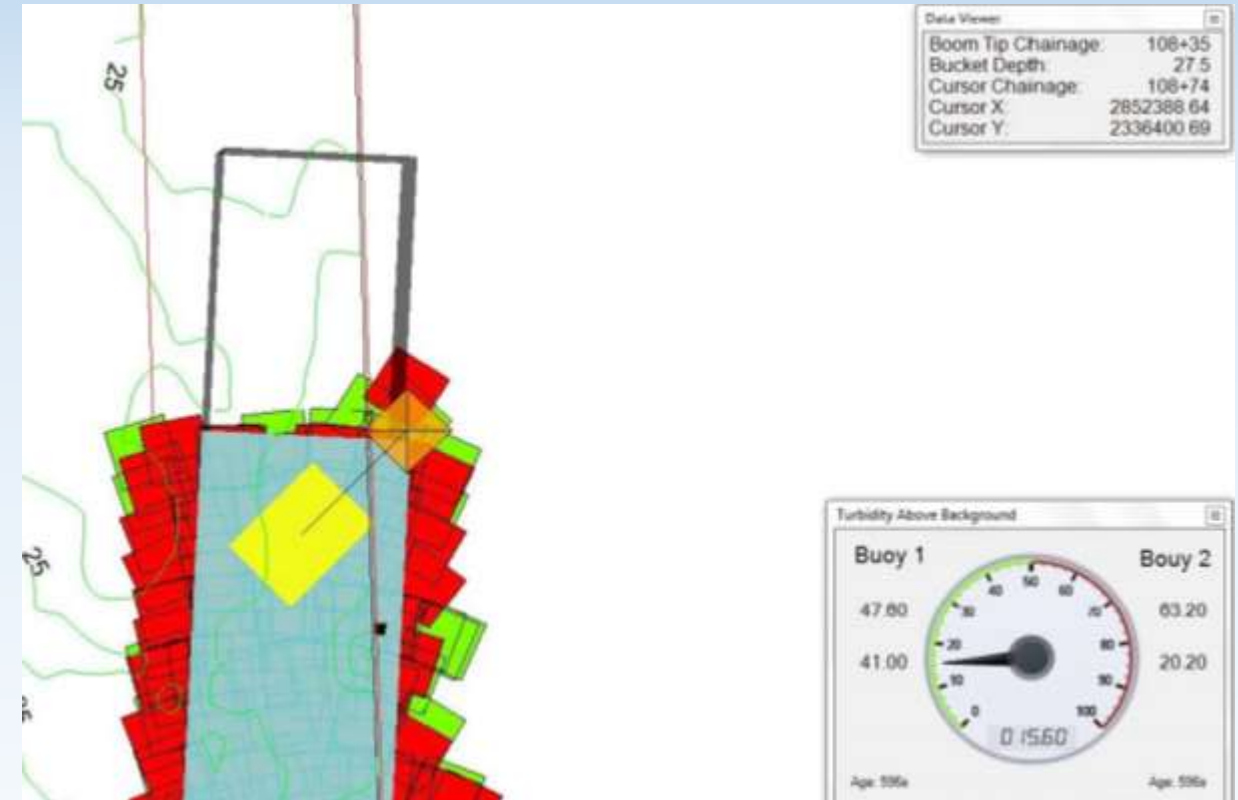


Mechanical Dredging Operation



Dredging Quality Control

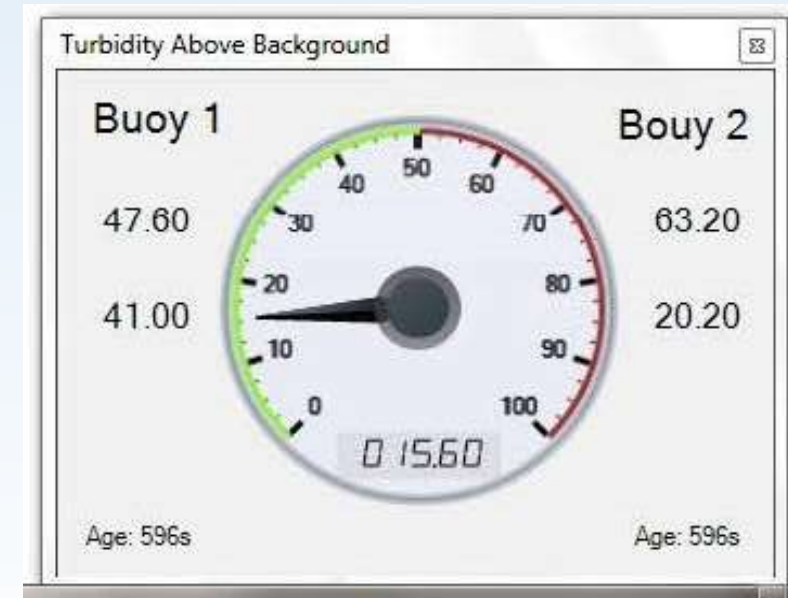
- ❖ Positioning, survey profile, and cut controlled with ClamVision® software
- ❖ Allows for integration of real time turbidity and FTP uploads



Instream Water Quality Monitoring



- ❖ Two environmental monitoring buoys to measure contribution
 - ❖ Data Loggers
 - ❖ Two turbidity YSI sondes
 - ❖ Radio communication



Scow Transport

- ❖ Over 4 miles of federal channel
- ❖ Six low bridges
 - ❖ Two passenger car bridges
 - ❖ Four rail bridges
- ❖ Obstacles include:
 - ❖ Bridge hour restrictions and maintenance
 - ❖ Vessel Traffic



Offloading - Confined Disposal Facility

- ❖ Located on the site of a former refinery
- ❖ ≈ 90 acre CDF facility
 - ❖ Split into two ≈ 45 acre cells
- ❖ Capacity of 2.5 million CY



Offloading Operation Cycle



Mechanical Unloading

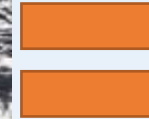
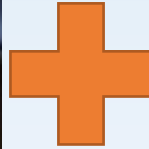
- ❖ Hopper barges are unloaded with a hydraulic clamshell
- ❖ Sediment is screened to prevent debris from entering the submersible pumps
- ❖ Debris is stored in the debris separation barge until limiting draft requires the debris to be offloaded into the CDF.



Debris Challenges



Debris Encountered



Hydraulic Disposal

- ❖ Two separate pumping trains
 - ❖ One submersible and one booster pump in each train
 - ❖ Each train controlled with Variable Frequency Drives to regulate the flow desired by the operator
- ❖ Farthest discharge is over 3000' from pump out barge
- ❖ Capable of remote operation



Dredge Material Placement

- ❖ 10 discharge locations in each cell
- ❖ Material is discharged evenly into one cell at a time
- ❖ Maximum allowable exposed sediment is 15% of CDF area to prevent airborne contamination
 - ❖ Maximum exposed sediment to date : 10%



Recirculation

- ❖ Water is recirculated to provide the necessary water to make a slurry without drawing additional water from the canal.



- ❖ Water is also used in a manifold system to break up sediment placed on the debris screen to allow its passage to the submersible pumps.

Environmental Monitoring



❖ Instream Water Quality Monitoring

❖ Ground Water Gradient Control Systems

❖ Real-time Volatile Emission Monitoring

❖ Total VOCs at the dredge site

❖ 4 Air Monitoring Stations at the CDF

❖ Naphthalene

❖ Airborne particulate



Groundwater Gradient Control



- ❖ Lift Stations and Wells direct ground water back into the CDF



- ❖ An inward gradient is maintained to prevent ground water contamination of the surrounding community

Waste Water Treatment

- ❖ Design May 2015
- ❖ Engineering approval August 2015
- ❖ Construction October 2015
 - ❖ Multi-Media Filter Tank, Activated Carbon Tanks, Frac Tanks



Waste Water Treatment - 2015

- ❖ Started November 7, 2015
- ❖ Ended December 31, 2015
- ❖ Total Treated Water for 2015: 26,033,000 gallons.
- ❖ Problems encountered:
 - ❖ pH levels from Algae growing in pond
 - ❖ Frozen pipes.



Waste Water Treatment-2016

- ❖ Started March 16, 2016 to September 8, 2016
- ❖ Goal was to drop the water level in the West Cell to accommodate material to be dredged in 2016
- ❖ Late fall treatment November 14, 2016 to December 8th
- ❖ Water Treated this year 116,082,983 gallons



Waste Water Treatment-2017

- ❖ Started April 5, 2017-Ended August 5, 2017
- ❖ Water Treated this year 70,584,000 gallons
- ❖ Goal was to drop the water level in the East Cell to accommodate material to be dredged in 2017
- ❖ No future pond water treatment this year



Daily Real-time Measurements

- ❖ Photo-ionization detectors (PID) used to measure VOC's
- ❖ Monitoring takes place at the dredge and at the offloading operations
- ❖ Concentration of VOC's determine the need for respirators



Questions? Comments?



Views expressed in this presentation are those of the Kokosing/ O'Brien & Gere JV and not those of the U.S. Government