21st Ave West Pilot Project
Duluth-Superior Harbor

Presentation to Open Water Summit
May 21, 2014
By Jim Sharrow, P.E.
Duluth-Superior to/from:

- Northern Europe: 15 days
- Spain: 15 days
- Italy/North Africa: 18 days

Duluth to Atlantic Ocean: 2,342 miles
The Port of Duluth-Superior
The 19+ miles of federal navigation channel in the harbor require about 100,000 CY of maintenance dredging annually. On average, 80,000 CY of that quantity is placed at Erie Pier each year; the remaining 20,000 CY is utilized as beach nourishment.
Worst-Case Scenario

- 2012 Dredging
  - 200,000 cy dredged in one calendar year.
  - All material placed in Erie Pier CDF.
Harbor Dredging
Open Water Management Units & Placement Units
Dredged Materials Placement
21st Avenue West Pilot Project
21st Ave. West Pilot Project

Placement of dredged materials behind silt curtain via materials transfer box & hydraulic pumps
21st Avenue 204 Project

- ERDC running model to evaluate environmental impacts.
- With and Without Project Conditions.
- Includes WLSSD discharge data.
21st Avenue Demonstration Project

Figure 3. Proposed Dredged Material Discharge Locations and Three-Year Sequencing.
21st Avenue West Placement Areas w/1:20 Slopes
Scope of Work

Project Description - 

- Navigation channel maintenance dredging of four areas (3, 11, 14 & 16) within Dul-Sup Harbor:
  - 114,000 CY (contract base w/2 options, based on 2013 condition surveys).
  - 94,000 CY available based on 2013 Priors.
  - 91,700 CY dredged in 2013 due to actual conditions.
- Deposit dredged material into four designated Placement Areas within the 21st Avenue West Embayment:
  - Placement Areas are intended to reduce water depths to help promote vegetation growth in support of aquatic habitat.
  - Maintain acceptable clarity of water outside of Embayment with the use of a permeable turbidity curtain to contain suspended material.
- Initial contract award amount (including 2 options): $1,393,900.
  - Revised Dredge Area Mod 02 (part 1) $248,500.
  - Definitization of Mod 02 (part 2 - estimate) $210,000.

  Estimated final contract amount $1,852,000 +/-
Project Partners

- City of Duluth, MN.
- Minnesota Department of Natural Resources.
- Minnesota Pollution Control Agency.
- Minnesota Sea Grant - Univ. of Minnesota-Duluth (UMD).
- Wisconsin Sea Grant
- UMD - Environmental / Water Resources.
- UMD - Natural Resources Research Institute (NRRI).
- USACE - Engineer Research & Development Center (Ithaca, NY).
- USEPA - Office of Research & Development (Duluth, MN).
- USEPA - Region 5, NEPA Implementation Section (Chicago, IL).
- Wisconsin Department of Natural Resources.
Remediation & Restoration Sites in the St. Louis River AOC
40th Ave. West
Conceptual Model
Overview of Operations

1. Offload Material
2. Hydraulically Separate Material
   - Sand “falls out” in separating area
   - Water carries fine grained material to settling ponds
3. Create Stockpiles
   - Sand is moved away from separating area and positioned into stockpiles
   - Fine grained material is excavated from ponds and stockpiled.
4. Truck Material Offsite for Beneficial Re-Use
Offloading from Dredge Barge & Hydraulic Sorting Operation

Pushing Coarse Material to Stockpiles
ERIE PIER RENOVATIONS
ERIE PIER RENOVATIONS
OBSTACLES

Reality vs. Perception

Dredge Spoils = Dredge Material = Reclaimed Soils

*Certification of Reclaimed Soils for Resale*

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>MPCA - No NPDES State Permit</td>
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</tbody>
</table>
| 2007 | Erie Pier Dredge Management Plan  
*HTAC & MIC Approved* |
| 2009 | MPCA Issues: NPDES (runoff) SDS (soil reuse) |
| 2008-10 | USACE Construction |
| 2010 | MPCA (water division) – Approve Tier I & II Reuse  
Stryker Bay & Rice Lake Landfill – 100,000 yards  
*No NEPA – No Landfill*  
*No Superfunds* |
| 2010 | 5-year Contract – Sale of all Sands at $2.05/yd |
| 2011 | WDNR – Certify Solid Waste – Public Project Approved  
*Wisconsin Landfill – Habitat Restoration & Cover* |
| 2012 | Mn/DOT – MPCA (soils division) – Solid Waste  
*Certify use for Highway Projects?* |
## Beneficial Use of Dredged Material Projects

<table>
<thead>
<tr>
<th>Projects</th>
<th>Pilot/Full Scale</th>
<th>Site Type</th>
<th>Date</th>
<th>Type of Material</th>
<th>Volume</th>
<th>Probability</th>
<th>Likelihood</th>
<th>Cost/cy</th>
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<tbody>
<tr>
<td>Keetac Tailings Basin</td>
<td>Demo</td>
<td>Mine</td>
<td>2010</td>
<td>Washed silt</td>
<td>40,000</td>
<td>100%</td>
<td>40,000</td>
<td>$ 30.00</td>
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<td>Northland Country Club</td>
<td>Full Scale</td>
<td>Recreation</td>
<td>2011</td>
<td>Washed silt</td>
<td>500</td>
<td>100%</td>
<td>500</td>
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<tr>
<td>Moccassin Mike Landfill</td>
<td>Pilot</td>
<td>Landfill</td>
<td>2011</td>
<td>Washed silt</td>
<td>1,000</td>
<td>100%</td>
<td>1,000</td>
<td>$ 6.50</td>
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<tr>
<td>Atlas Cement Co.</td>
<td>Pilot</td>
<td>Brownfield</td>
<td>2012</td>
<td>Silt and Sand</td>
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<tr>
<td>HibbTac Restoration Area</td>
<td>Demo</td>
<td>Restoration</td>
<td>2013</td>
<td>Washed silt</td>
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<td>100%</td>
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<td>$ 21.55</td>
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<td></td>
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<td></td>
<td></td>
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<td>47,500</td>
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Harbor Dredging

REUSE PROJECTS

Construction Material
  Backfill
  Bituminous Mix

Road Construction

Mine Land Reclamation

Daily Landfill Cover

Top Soil Creation
  Golf Courses
  Recreational Parks

Habitat Restoration & Creation

Storm Water Pond Buffering
Mineland Reclamation Project
U.S. Steel-Keetac

Dredged Material Deposit Site
Active Tailings Basin
U.S. Steel-Keetac
Mineland Reclamation Site

Vegetation WITH Erie Pier dredged materials

Vegetation WITHOUT Erie Pier dredged materials

U.S. Steel-Keetac
Summer 2011
Atlas Cement Brownfield site - storm water buffering ponds