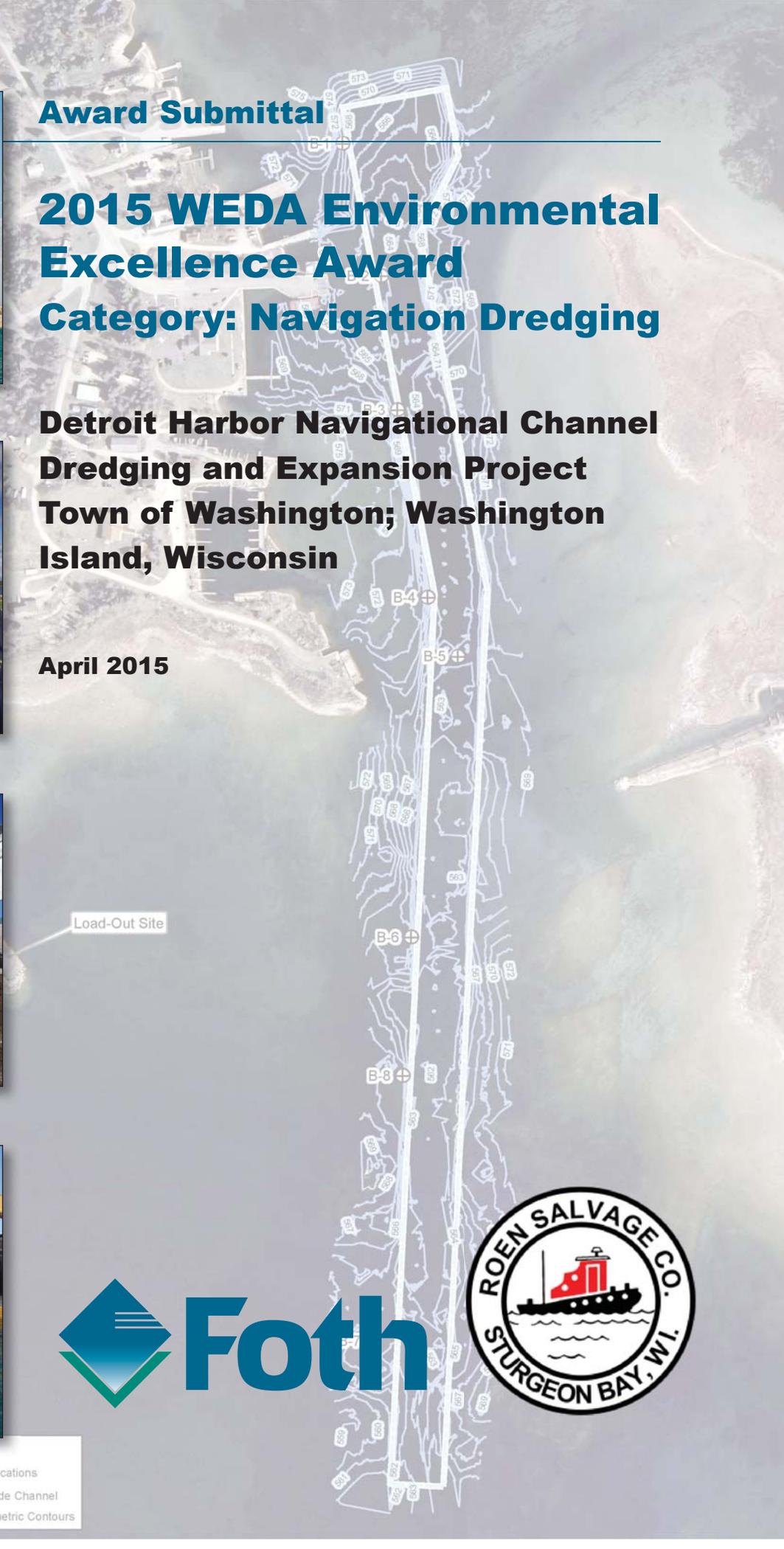


**Award Submittal**

**2015 WEDA Environmental  
Excellence Award  
Category: Navigation Dredging**

**Detroit Harbor Navigational Channel  
Dredging and Expansion Project  
Town of Washington; Washington  
Island, Wisconsin**

**April 2015**



**LEGEND**  
⊕ Existing Boring Locations  
--- Proposed 170' Wide Channel  
— Existing 1' Bathymetric Contours

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## Summary

The nominated project for Western Dredging Association (WEDA's) 2015 Environmental Excellence Award is the Detroit Harbor Navigational Channel dredging and expansion project. The project site is located adjacent to Washington Island, Wisconsin, which is within Lake Michigan (northern tip of Door County). (Figure 1) The dredging project began in August 2012 and was completed in July 2013.

The Detroit Harbor Navigational Dredging and Expansion project was a technically challenging project with limited financial resources and highly visible. The dredging component was ultimately delivered under budget, which allowed the Town to help cover its higher than expected road repair/improvement plans. The result was an extremely happy client, regulatory agency and town citizens.

In early 2011, Foth Infrastructure & Environment, LLC (Foth) was contacted by the Chief of Staff from Congressman Mr. Reid Ribble's office inquiring if Foth may be able to assist the Town of Washington. Due to Lake Michigan's shrinking water levels, a critical dredging project was needed to sustain the Washington Island community. The Detroit Harbor is located in Deaths Door, adjacent to the remote Washington Island in Lake Michigan. The U.S. Army Corps of Engineers (USACE) originally constructed, and last dredged, the 4,000-foot channel into the Detroit Harbor (Harbor) in 1939. The authorized channel was 150 feet wide, with a 200 by 300 turning basin at the north. The entire channel area was authorized to a depth of 14 feet. Pre and post dredge figures are provided as Attachments 1 and 2.

The Washington Island Ferry Line (WIFL) provides the only year-round, daily connection between Washington Island and mainland Door County. Not only does it transport tourists and residents, but also cargo essential to the island community, including medical non-emergencies. The local community has established a significant infrastructure around the harbor facilities that generates income from harbor users and visitors to the area. The channel also supports fishing and recreational interests, and Detroit Harbor serves as an important Harbor Refuge.

Modern ferry boats are larger with deeper drafts and wider beams than those used at the time of the original channel construction. This results in unsafe transits for the ferries during times of low lake levels or adverse weather conditions. The wider beam of modern ferries makes a wider navigational channel imperative to permit safe passing of two boats, particularly during windy conditions when ferries may have to travel at 45 degree angles to compensate for wind and current. It was imperative for the continued safe passage of the ferry line to construct a deeper and wider channel.

Project team members worked with the Town to obtain funding and permits, develop project designs and garner support of town residents and politicians for the project. At the request of the Town, the 7 million dollar plus project was developed by the Foth team as a design-bid-build project. Mechanical dredging methods were employed to remove 135,350 cubic yards of sediment. Dredging activities were conducted in the fall of 2013 (September – December) and in the spring of 2014 (April – July) to avoid high tourist season and accommodate permit requirements regarding fish spawning windows. Dredge material was disposed at a facility designed and constructed on the island to minimize disposal fees, provide future options for beneficial reuse of the dredge spoils by the town and its residents, and have the ability to accept additional dredge material from other projects to create revenue for the Town.



Figure 1 - Site Location Area

Activities conducted were permitted through various governmental agencies including the Wisconsin Department of Natural Resources (WDNR), U.S. Coast Guard, Wisconsin State Historical Preservation Office (SHPO) and USACE. The project was completed using town contributions and grant money from the Harbor Assistance Program (HAP) Wisconsin Department of Transportation (WisDOT). Roen Salvage company (Roen) provided contractor services.

## Project Team Members

Affiliation	Team Member	Role
Town of Washington	Joel Gunnlaugsson Valerie Carpenter	Town Chairman Town Clerk-Treasurer
Washington Island Ferry Line (WIFL)	Hoyt Purinton	Ferry Line Operator
Foth Infrastructure & Environment, LLC <sup>1</sup>	Brian Hinrichs Ken Potrykus Denis Roznowski Ken Aukerman Sharon Kozicki	Grant Coordinator Project Director Project Manager Construction Manager Regulatory Liaison
Roen Salvage Company	Tom Drager Tom Levy	Dredge Project Director Dredge Project Manager

<sup>1</sup>Foth is an active sustaining member of WEDA.

## Environmental Benefits

- ◆ **Innovative approach to keep the fish safe.** To protect fish spawning activities in the project area, dredging operations did not commence until late-summer 2013. However, early ice formation in the winter of 2013 prevented further dredging with the need to extend dredging work into 2014. To meet the strict dredging schedule and complete dredging in advance of the prime tourism schedule, Foth submitted a Chapter 30 permit amendment to the WDNR to continue dredging operations in the spring of 2014 within the regulated fish window. To prevent the impacts to fish spawning during this period, Foth provided robust turbidity monitoring outside of the turbidity curtain, near known fish spawning areas, to ensure total suspended solids (TSS) levels during dredging operations did not exceed established target levels. (Figure 2) Should the TSS level exceed the target level, Best Management Practices (BMPs) were put in place to keep turbidity under control. Turbidity control was critical in allowing dredging to proceed

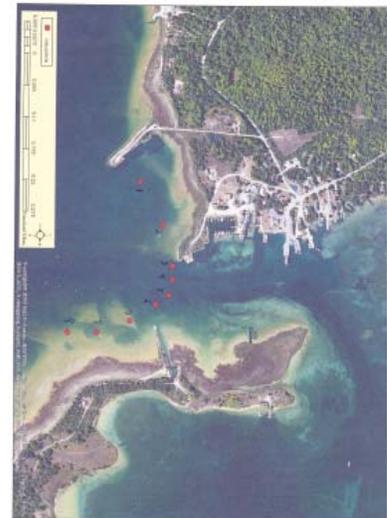


Figure 2 - Fish protection turbidity monitoring locations

during fish spawning activities. TSS was found to be directly correlatable to turbidity (NTU) (Attachment 3)

- ◆ **Turbidity Monitoring.** During all dredging activities, a turbidity barrier was used to keep re-suspended sediments from migrating beyond the dredge area. The turbidity barrier consisted of a 50-foot by 50-foot tubular steel frame with floats attached. Attached to the frame on all four sides was a 12 foot long silt curtain weighted at the bottom with 3-inch metal cable.



Dredging within the turbidity curtain



- ◆ **On-island disposal of dredged material.** A challenge for the project was dredge material disposal. Open water disposal is not an approved option with WDNR, and the closest confined disposal facility was a 12-hour barge trip. Foth received a WDNR permit to dispose of dredge materials at a newly constructed on-island disposal cell. (Figure 3) This provided a considerable cost savings (\$2,000,000) and a lower carbon footprint. The disposal cell was built large enough to accept dredge spoils generated from any other nearby dredging project, thus creating a cash generator for the Town.

- ◆ **Protection of historical sites during operation (shipwreck).** Of particular concern was the project’s potential impact on the schooner Quickstep, a late 19th century shipwreck in the West Channel to Detroit Harbor (between Detroit and Washington Islands). The dredging footprint, 150 × 30 ft, west of and beyond the tip of the breakwall, was just within the northeast boundary of the wreck site. The dredging design avoided impacting the area adjacent to the shipwreck.

- ◆ **Beneficial reuse of the dredged material.** The dredged material consisted of granular and rock material. The sand is being used for asphaltting projects, and the boulders are being used for landscaping and breakwater construction on the Island.



Figure 3 - Location of On-Island Disposal Site



Boulders for Beneficial Reuse

## Innovation

The Detroit Harbor Navigational Dredging Project was a technically challenging project. The successful project and outcomes are a direct result of the outstanding project management and technical leadership from the team. Plans and specifications were developed that allowed the project to advance within a budget that funding agencies and the client could work within, allow for permits from multiple agencies to be obtained, and facilitate a project that contractors could perform in the short construction windows afforded by the northern Lake Michigan environments. The leadership exhibited by the team not only allowed for the project to be permitted and constructed but was also completed within budget in a manner that was innovative and adaptive.



Project barge and tug boat

Technical challenges were a big part of the active construction management and primarily stemmed from:

- ◆ Encountering very dense sediment and more hard rock during dredging than anticipated;





Dredging Activities

The first grant application was not successful. A 7.1 million dollar dredging application was denied in the February 2012 cycle of Wisconsin Department of Transportation (DOT) grant requests because questions still remained on the dredging approach and where the dredged material would be disposed. However, the Town persisted and was able to secure \$182,700 in funds from a Harbor Assistance Grant issued by DOT. This funding allowed the Town to conduct the additional engineering studies to support the dredging project and secure additional funds.

On April 30, 2013, the Joint Committee on Finance of the Wisconsin State Legislature approved a motion that includes \$5.2 million for the dredging of the Detroit Harbor channel through DOT’s Harbor Assistance Program (HAP).

This knowledge and experience gained from the numerous attempts to secure grant funding from various agencies, along with the team collaboration, will help in future attempts to secure funds for other dredging projects in the Great Lakes Watershed. Additionally, the innovative approach to reducing the costs for dredged material disposal and the reuse of the dredged material will be useful in helping other port communities who have limited funds for dredging projects.

## Outreach and Education

The project team immersed themselves into the Detroit Harbor Navigational Dredge Project. Given the remoteness of the job site and logistical issues (all material and personnel had to be transferred to the site by ferry or barge); key team members took up residence on the Island for the duration of the project activities. This facilitated key team member to be available 24/7 for project activities, and allowed interaction with the residents and Town Government representatives on a daily basis, addressing issues and concerns as they arose.

Additionally, multimedia outlets including; newspaper, pamphlets, web blogging, and signage, were used to inform, educate, and update interested stakeholders. Meetings were held before the start of the project and throughout the project to extract comments and questions and keep interested parties informed of the operations. Every vehicle and person that was transported to the island by the ferry was provided a pamphlet that described the project, warned of truck traffic and routes, and provided contact information if questions arose. A ribbon cutting was held at the start of the project and a celebration was also held at the end of the project so that the public was engaged in the activities on the Island.

*“Chairman Joel Gunnaugsson and the Town of Washington Supervisors should be commended for their ability to see this project’s benefits through the rather daunting amount of engineering and paperwork the application requires. Included is an engineering study based on recent soundings, and the expertise to complete the application. The Town was assisted by Foth & Van Dyke Engineering of Green Bay, a company familiar with marine construction projects and also the State of Wisconsin HAP grant process.” Ferry Cabin News, January 31, 2012.*



Project signage at the Ferry Landing





Attachment 1 - Pre-dredge Site Conditions



Attachment 2 - Post-Dredge Site Conditions



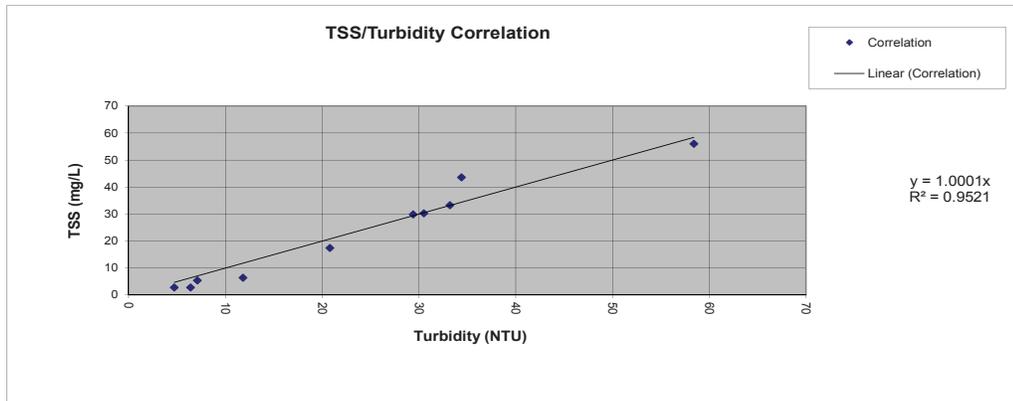
Client: Town of Washington  
 Project: Detroit Harbor Dredging  
 Prepared by: KDAI

Project ID: 13W050  
 Date: 6/6/2014

### Turbidity Monitoring Field Form

Sampling Personnel: KDAI

Wind (Speed & Direction): <u>Southwest @ 8 mph</u>		Dredge Location (Station): <u>3370+00</u>			
Wave (Height & Direction): <u>Calm</u>					
Time	Location (Station)	Water Depth	Turbidity Probe Depth	Turbidity Reading (NTU)	TSS Reading (mg/L)*
10:14	-86.9358	19.0	6.0	0.0	0.0
	45.3368		12.0	0.0	0.0
Background Average:				<b>0.0</b>	<b>0.0</b>
10:19	-86.9363	20.0	7.0	1.3	1.3
	45.3335		14.0	4.0	4.0
10:21	-86.9365	12.0	4.0	1.1	1.1
	45.333		8.0	9.0	9.0
10:25	-86.9381	19.0	6.0	5.8	5.8
	45.3324		12.0	6.6	6.6
10:28	-86.9376	14.0	5.0	3.8	3.8
	45.3319		10.0	3.7	3.7
Zone of Influence Average:				<b>4.4</b>	<b>4.4</b>
Change (Zone of Influence Average - Background Average):				<b>4.4</b>	<b>4.4</b>
10:33	1	11.0	4.0	0.0	0.0
10:37	2	7.0	8.0	0.0	0.0
			2.0	0.0	0.0
10:40	3	11.0	4.0	0.0	0.0
			8.0	0.4	0.4
10:42	4	18.0	6.0	0.0	0.0
			12.0	0.0	0.0
10:44	5	15.0	5.0	0.0	0.0
			10.0	0.0	0.0
10:46	6	10.0	3.0	0.0	0.0
			6.0	0.0	0.0
10:50	7	4.0	2.0	0.0	0.0
10:53	8	4.0	2.0	0.0	0.0
10:58	9	4.0	2.0	0.0	0.0



\* Direct correlation or correlation curve: Correlation Curve

Notes: Zone of Influence Turbidity Measurements were taken from monitoring boat. Current direction was northwest to southeast.

Shallow waypoints shown on attached Figure 1 were navigated to using phone GPS. Points that were in water depth 4' or less only collected one measurement from the mid-point of the water column.

Auditor: Ken Aukerman

Date: 6/6/2014

Signature: *Ken Aukerman*

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