



# Navigational Dredging in the Detroit Harbor, Washington Island, Wisconsin Permitting and Management

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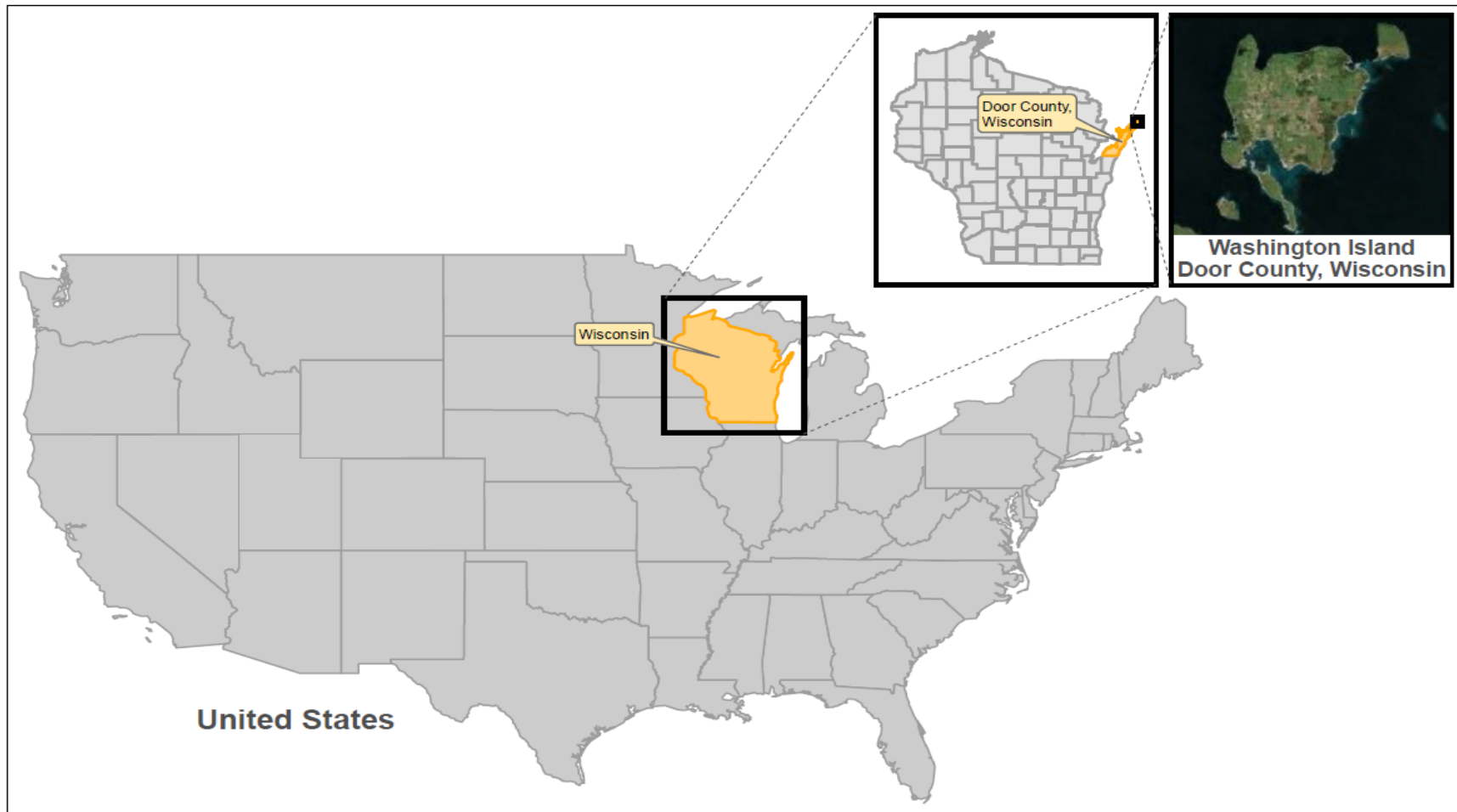
# Overview

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- ❖ Detroit Harbor History
- ❖ Harbor Issues/Project Objectives
- ❖ Permitting
- ❖ Dredging
- ❖ Fish Restriction Window
- ❖ Dredge Spoil Management
- ❖ Results/Lessons Learned

# Project Location

*Experience*  
**Washington Island**



# Detroit Harbor



# Detroit Harbor History

- ❖ Channel originally dredged in 1939
  - ▶ Authorization depth is 14 feet below low water datum (LWD),  $(577.5 - 14 = 563.5)$
  - ▶ Channel width is 150 feet
- ❖ No maintenance dredging
- ❖ Washington Island Ferry
  - ▶ started in 1940
  - ▶ servicing the Island







# Death's Door





# Harbor Issues/Project Objectives

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- ❖ Ferry boat size increase
  - ▶ draft of up to 11 feet
- ❖ Lake Michigan water levels
  - ▶ 2013 water measured at about 575
  - ▶ boat draft at 564; 563.5 is channel depth
- ❖ Community reliance on ferry service
- ❖ Budget constraints
- ❖ Environmental aesthetics

# Harbor Issues/Project Objectives

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- ❖ Create a deeper and wider channel
  - ▶ Minimal sediment; a lot of rock
  - ▶ 134,500 cubic yards
- ❖ Material disposal
  - ▶ We are on an island
- ❖ Tourist destination
- ❖ Environmental sensitivity
- ❖ Secure funding
  - ▶ Wisconsin DOT - Harbor Assistance Program





# Permits

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## ❖ WDNR Chapter 30 Permit

- ▶ Dredge 134,500 cubic yards
- ▶ Fish restriction window
- ▶ Turbidity barriers

## ❖ Solid Waste exemption

## ❖ State Historical Preservation Office (SHPO)

## ❖ WPDES - Carriage and Interstitial Water

- ▶ Dewatering at dredge and disposal locations

## ❖ NOI - Stormwater at construction site

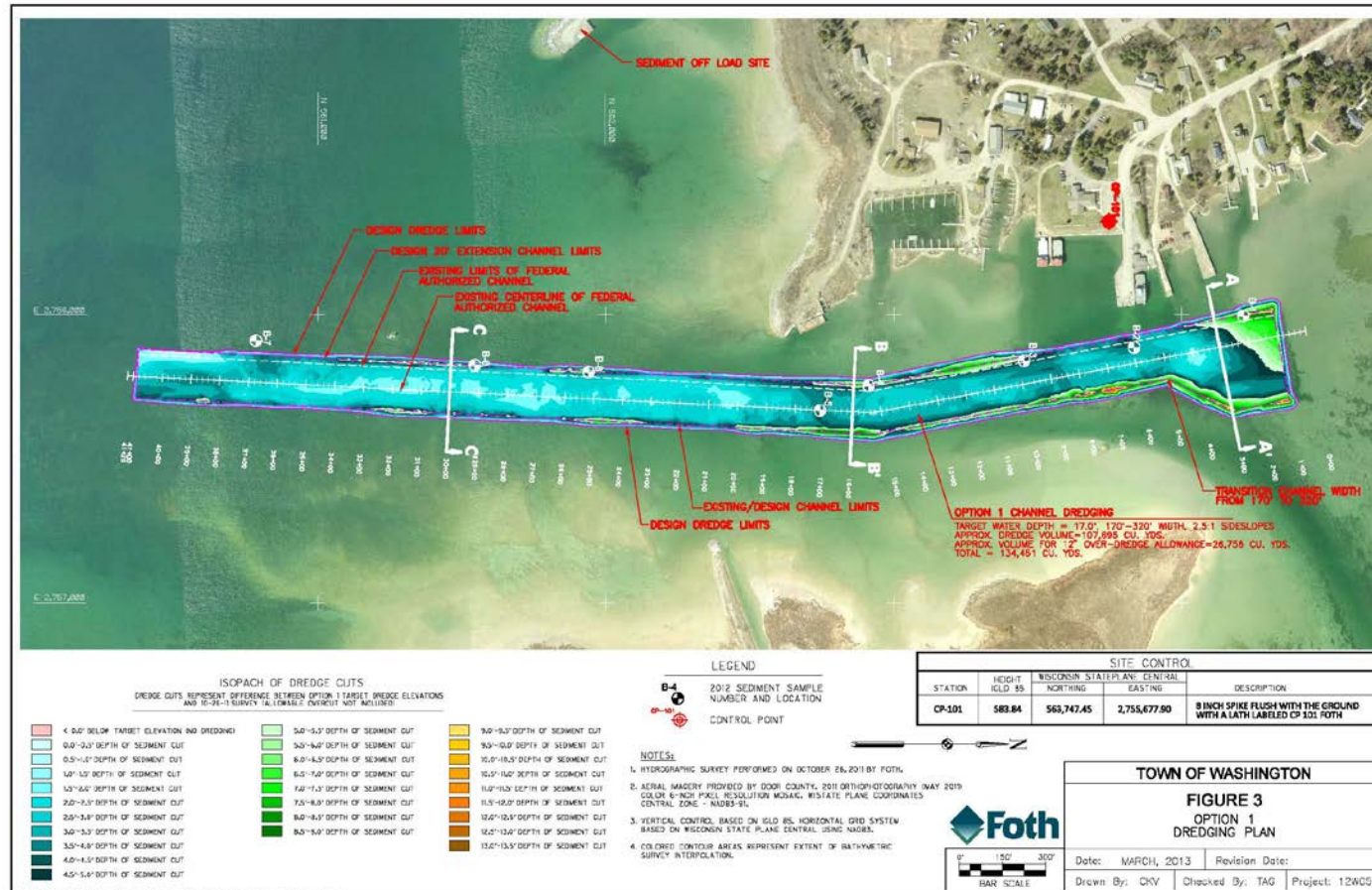
## ❖ USACE - Letter of Permission

# Dredging Specifics

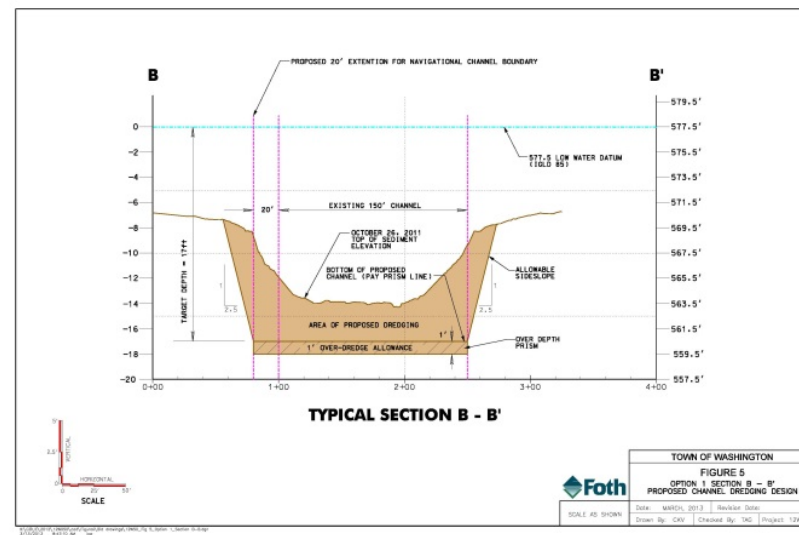
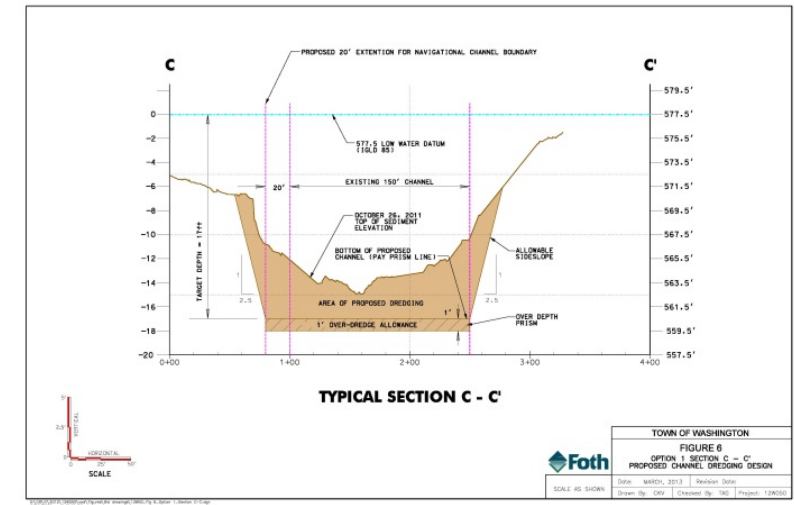
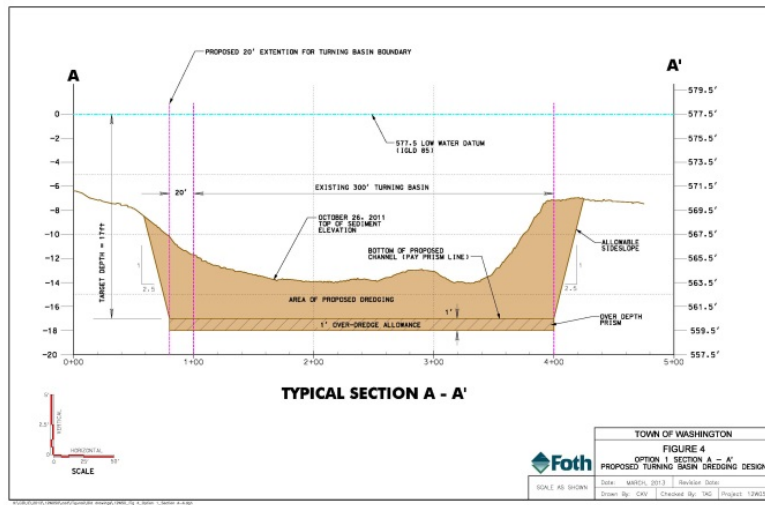
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- ❖ Pre-dredge survey identified dredge prism and material to be removed
- ❖ Roen Salvage selected project contractor
- ❖ No dredging during tourist season (Memorial Day to Labor Day)
- ❖ Intent to complete work in fall of 2013
- ❖ Dredge 134,500 cubic yards

# Project Area



# Dredge Prism





# ≡ Dredging – Fall of 2013





# Dredging Challenges

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- ❖ Dredged material – rock and residuals
- ❖ Water conditions – clear water and seiche effect
- ❖ Permit compliance
  - ▶ Turbidity barriers
  - ▶ Visual effect
- ❖ Weather
  - ▶ Ice and cold
  - ▶ Need to dredge in 2014



# Challenges – Fall 2013





# ≡ Winter Came Early

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# Dredging in the Fish Window

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- ❖ Production shortcomings and early winter
- ❖ Spring/Summer of 2014
- ❖ Turbidity Monitoring Plan
  - ▶ Trigger level criteria
    - ◆ Inspect BMPs
  - ▶ Specific areas to monitor twice daily
- ❖ Amendment 2 – Turbidity Monitoring
  - ▶ Multiple monitoring points

# Visual Turbidity Sight



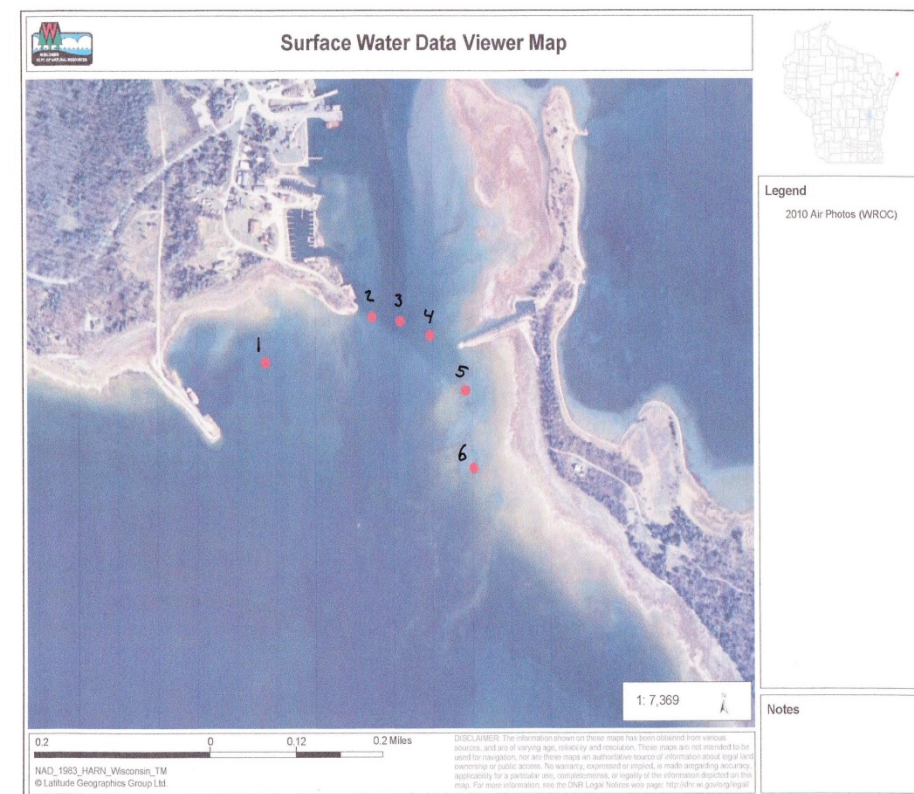
# ≡≡≡ Cont. Turbidity challenges

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# Turbidity Monitoring



# Turbidity Monitoring Report

<b>Foth</b>		Client: Town of Waukegan		Project ID: 13W058	
		Project: Detroit Harbor Dredging		Date: 6/6/2014	
		Prepared by: KDA1			
<b>Turbidity Monitoring Field Form</b>					
Sampling Personnel: KDA1					
Wind (Speed & Direction): South @ 12-16 mph		Dredge Location (Station): 3410+00			
Wave (Height & Direction): 2-3' and North					
Time	Location (Station)	Water	Turbidity Probe	Turbidity Reading	TSS Reading
15:05	-86.9359	19.0	6.0	0.0	0.0
	45.3368		12.0	0.0	0.0
			Background Average:		
15:07	-86.9361	19.0	6.0	5.0	5.0
	45.3347		12.0	5.5	5.5
15:12	-86.9346	15.0	5.0	7.6	7.6
	45.3337		10.0	7.0	7.0
15:14	-86.9345	11.0	4.0	12.3	12.3
	45.3329		8.0	11.4	11.4
15:17	-86.9337	10.0	3.0	31.5	31.5
	45.3324		6.0	34.4	34.4
			Zone of Influence Average:		
			14.5		
			Change (Zone of Influence Average - Background Average):		
			14.5		
15:19	1	12.0	4.0	1.7	1.7
15:21	2	7.0	2.0	1.5	1.6
15:24	3	12.0	4.0	1.4	1.4
15:29	4	10.0	6.0	3.3	3.3
15:31	5	10.0	12.0	4.4	4.4
15:32	6	9.0	6.0	5.0	5.0
15:34	7	6.0	10.0	0.0	0.0
15:35	8	7.0	2.0	0.0	0.0
15:46	9	6.0	4.0	0.0	0.0
			4.0	0.0	0.0

TSS/Turbidity Correlation

y = 1.0001x  
R<sup>2</sup> = 0.9521

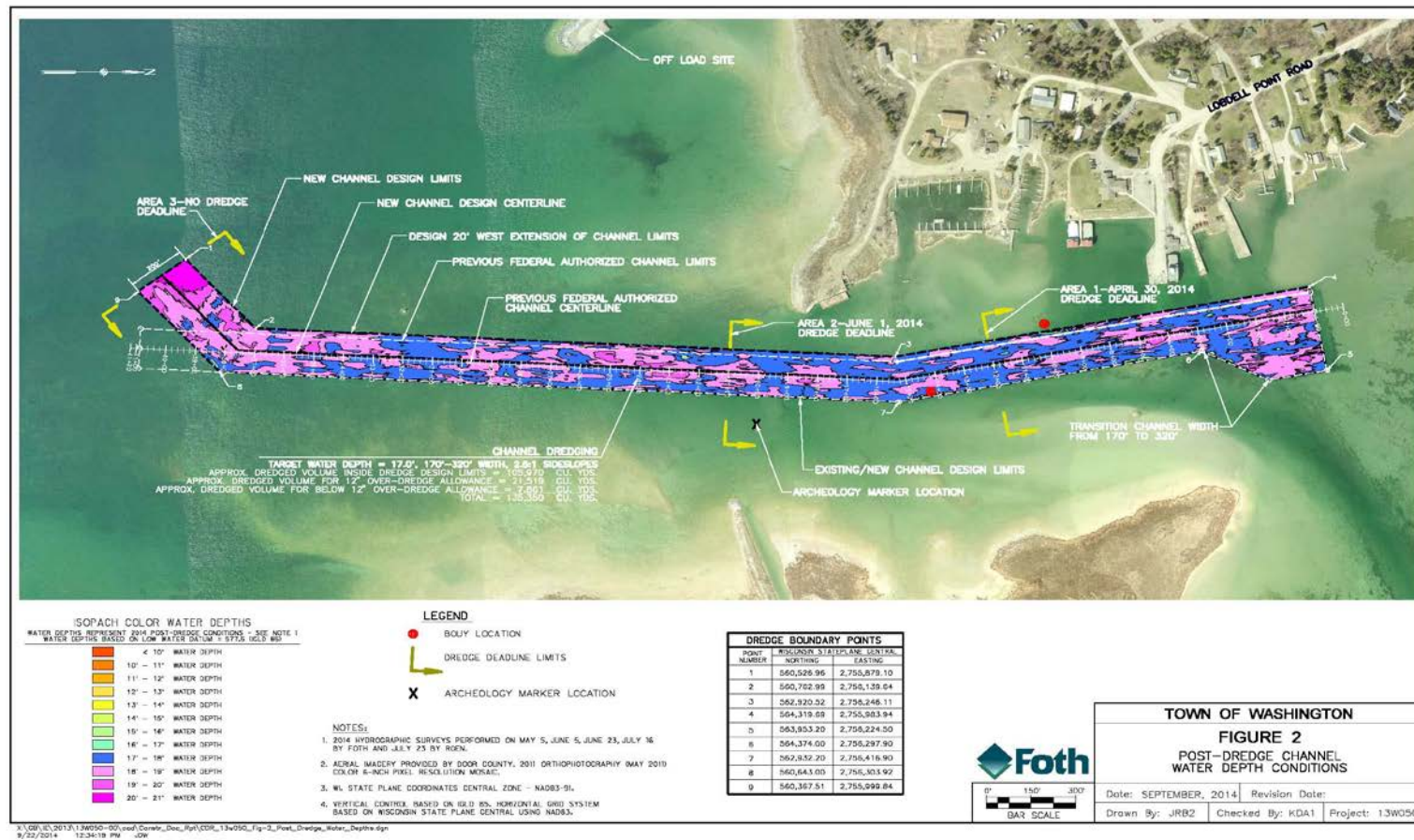
\*Direct correlation or correlation curve

**Notes:** Zone of Influence Turbidity Measurements were taken from monitoring boat.  
 Shallow water points shown on attached Figure 1 were navigated to using phone GPS. Points that were in water depth 4' or less only collected zone measurement from the mid-point of the water column.

**Auditor:** Ken Askerman  
**Signature:** *Ken Askerman*  
**Date:** 6/6/2014



# Conditions after Dredging





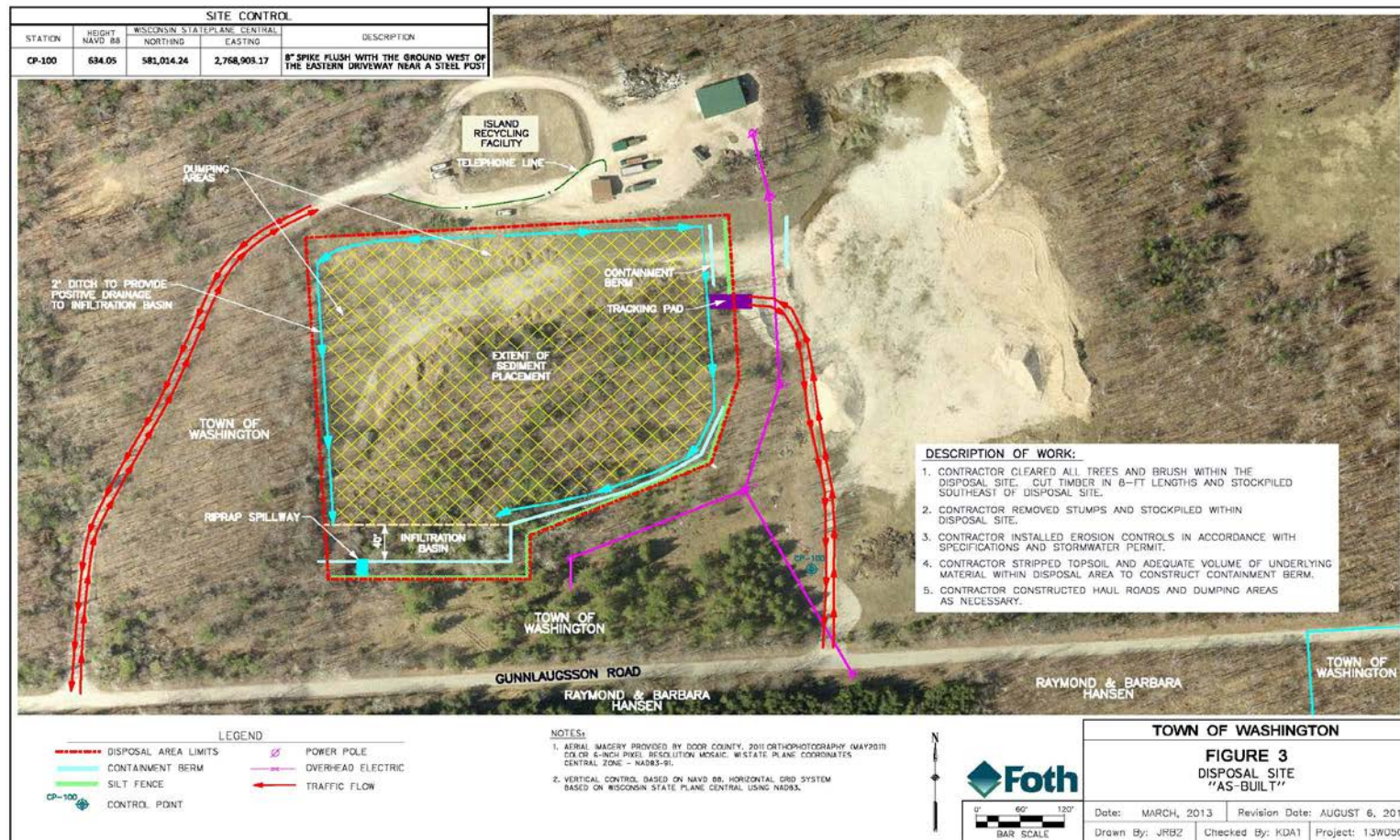


# Dredge Spoil Management

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- ❖ Distant from existing disposal cell
- ❖ Designed and constructed disposal cell on island
- ❖ Beneficially re-use material
  - ▶ Rocks used for breaker
  - ▶ Sand used for roads or concrete

# Disposal Site





# Disposal Cell





# Beneficial Re-use





# Lessons Learned

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- ❖ Very successful project
- ❖ Dialogue with stakeholders
- ❖ Negotiate strategically
  - ▶ Can't wait for answers
  - ▶ Understand vision with agencies
- ❖ Think innovative
- ❖ Equipment maintenance





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