

# GREAT LAKES NAVIGATION UPDATE

**Marie Strum**  
Great Lakes Navigation  
Team Lead

Great Lakes Dredging Team  
Meeting  
September 15, 2022

*"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."*



**US Army Corps  
of Engineers®**





# SYSTEM INTERDEPENDENCY



- Non-linear interdependent system
- Commercial ports dependent on each other
- 95% of traffic is internal to the Great Lakes
- System saves **\$3.9 Billion per year** over next mode of transportation
- Ports/harbors located at manufacturing sites/centers
- Ports compete with other modes of transportation rather than each other



# WRDA 2020 – SIGNIFICANT HMTF CHANGES



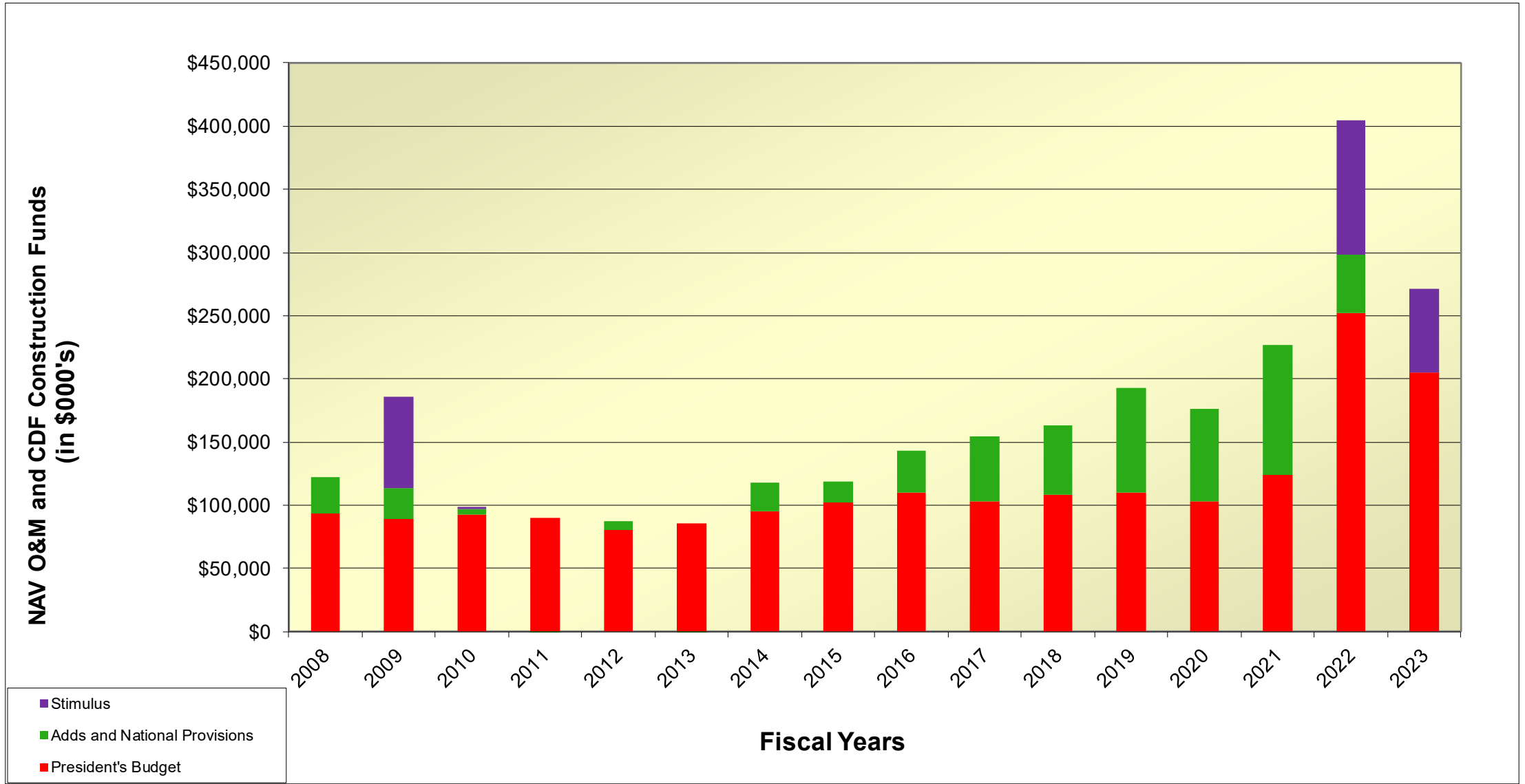
Significant changes in Water Resources Development Act (WRDA) 2020 related to Harbor Maintenance Trust Fund (HMTF)

- HMTF “off budget” – CARES Act March 2020
- No less than 13% of annual expenditures from HMTF to GL
- Not less than 15% for emerging harbors (<1M tons)
- For the first time, direction to spend the HMTF “surplus”
- Directs appropriation from HMTF = HMTF deposits two year prior plus:
  - \$500M for fiscal year 2021
  - \$600M for fiscal year 2022
  - \$700M for fiscal year 2023
  - 
  - 
  - Continuing up to 2030 to spend down the \$10B surplus





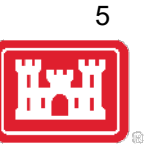
# GL NAVIGATION FUNDING HISTORY





# FY22 GREAT LAKES NAVIGATION PRESIDENT'S BUDGET

## PRESIDENT'S BUDGET + WORKPLAN



Great Lakes Navigation Operations & Maintenance  
 $\$224.5\text{M} + \$53.0\text{M} - \$6.9\text{M} = \$270.6\text{M}$

### Key O&M Items

\$56.7M in Dredging (31 projects; 3.5M cy) (\$49.8M + \$6.9M)

\$16.5M in Dredged Material Management (\$10.6M + \$3.5M+\$2.4M)

\$39.4M in Soo Locks Maintenance

\$16.7M in Chicago Lock Maintenance

\$8.5M in Black Rock Lock Maintenance

\$63.2M in Navigation Structure Maintenance/Repair

### Construction General

\$480M New Soo Lock Construction

\$9.1M Calumet CDF Construction

\$18.4M Indiana Harbor CDF Construction (Phase II)



# FY22 BIPARTISAN INFRASTRUCTURE LAW (BIL) DISASTER SUPPLEMENTAL APPROPRIATION ACT (DRSAA)

Great Lakes Navigation Operations & Maintenance - \$82.566M

DRSAA - \$25.4M

- 4 Structure repairs (Buffalo, Duluth, Keweenaw, Marquette, Muskegon)
- 1 Structure design (Manistee)

BIL - \$80.916M

- 1 Dredging project + 1 Dredging sampling
- 3 Confined Disposal Facility/Dredged Material Management packages
- 9 Structure Design, Maintenance, or Repair packages

Construction General - BIL

\$478.9M New Soo Lock Construction

\$37.3M Soo Locks Davis and Poe Pump Well Rehab



# FY23 GREAT LAKES NAVIGATION PRESIDENT'S BUDGET



Great Lakes Navigation Operations & Maintenance - \$205.4M

## Key O&M Items

\$56.1M in Dredging (25 projects; 3.3M cy)

\$8.2M in Dredged Material Management

\$38.3M in Soo Locks Maintenance

\$1.4M in Chicago Lock Maintenance

\$0.1M in Black Rock Lock Maintenance

\$32.1M in Navigation Structure Maintenance/Repair

\$2.5M in Section 111 Beach Nourishment

Awaiting FY 23  
Workplan



# FY23 BIPARTISAN INFRASTRUCTURE LAW (BIL)



Great Lakes Navigation Operations & Maintenance - \$55.2M

\$1.2M Dredging project – Big Suamico

\$0.45M Structures – minor repairs

\$53.5M Lock Repairs

\$14.9M Chicago Lock

\$38.6M Soo Locks





## FOCUS AREAS AND TRENDS

- Dredging Sampling and Analysis (preliminary work for dredging)
- Dredged Material Management Preliminary Analysis, Dredged Material Management Plans
- Structure Design and Repair
- Lock Design and Repair
- Critical Breakwater Safety Maintenance (signs, ladders, tripping hazards, etc.)

**Trends:** For some projects, inability to dredge due to lack of placement site  
Need for sampling, analysis year prior to dredging  
Significant increase in dredging unit costs – due to placement



# WEBSITE HAS DETAILS ON CONTRACTS AND FUNDING

[www.lre.usace.army.mil/missions/great-lakes-navigation](http://www.lre.usace.army.mil/missions/great-lakes-navigation)

<b>Great Lakes and Ohio River Division</b> <i>Construction Contracts Scheduled for Advertisement in FY22</i> <small>Last updated: 09/09/2022            Advertise dates subject to change</small>					
<b>BUFFALO DISTRICT PROJECTS (W912P4)</b>		<b>District Contracting Chief:</b> Jeffrey Ernest - (716) 879-4173 Email: Jeffrey.G.Ernest@usace.army.mil		<b>Deputy for Small Business:</b> Lynn Jennings - (412) 395-7127 Email: Lennoia.R.Jennings@usace.army.mil	
<b>CHICAGO DISTRICT PROJECTS (W912P6)</b>		<b>District Contracting Chief:</b> April Judd - (502) 315-7403 Email: April.C.Judd@usace.army.mil		<b>Deputy for Small Business:</b> Scott Vincent - (313) 460-5066 Email: Scott.H.Vincent@usace.army.mil	
<b>DETROIT DISTRICT PROJECTS (W911XK)</b>		<b>District Contracting Chief:</b> Travis Specht - (313) 643-0993 Email: Travis.J.Specht@usace.army.mil		<b>Deputy for Small Business:</b> Scott Vincent - (313) 460-5066 Email: Scott.H.Vincent@usace.army.mil	
Project Description/Location	District	Scheduled Advertise Date (MON-YY)	Magnitude of Construction (Range per DFAR 236.204)	Work Description	Anticipated Acquisition Type, Strategy
Detroit River Pointe Mouillee CDF	LRE	Sep-22	Between \$1,000,000 and \$5,000,000.	Pointe Mouillee CDF Repairs and material management	IFB
Monroe Harbor Advanced Maintenance Dredging	LRE	Oct-22	Between \$1,000,000 and \$5,000,000.	Advanced Maintenance Dredging	IFB
Grand Haven - Repair of North Pier and Wave Attenuator	LRE	Dec-22	Between \$5,000,000 and \$10,000,000.	Repair of North Pier and Wave Attenuator	IFB
Bl. Algoma Harbor, WI	LRC	Mar-23	Between \$10,000,000 and \$25,000,000	Repair of the South Breakwater	TBD
Charlevoix Maintenance Dredging	LRE	Feb-23	Between \$250,000 and \$500,000.	Maintenance Dredging	Task Order Under an Existing MATOC
DMDF Construction of Dock - Calumet Harbor	LRC	Feb-23	Between \$5,000,000 and \$10,000,000.	Construction of Dock for handling Dredged Material	IFB

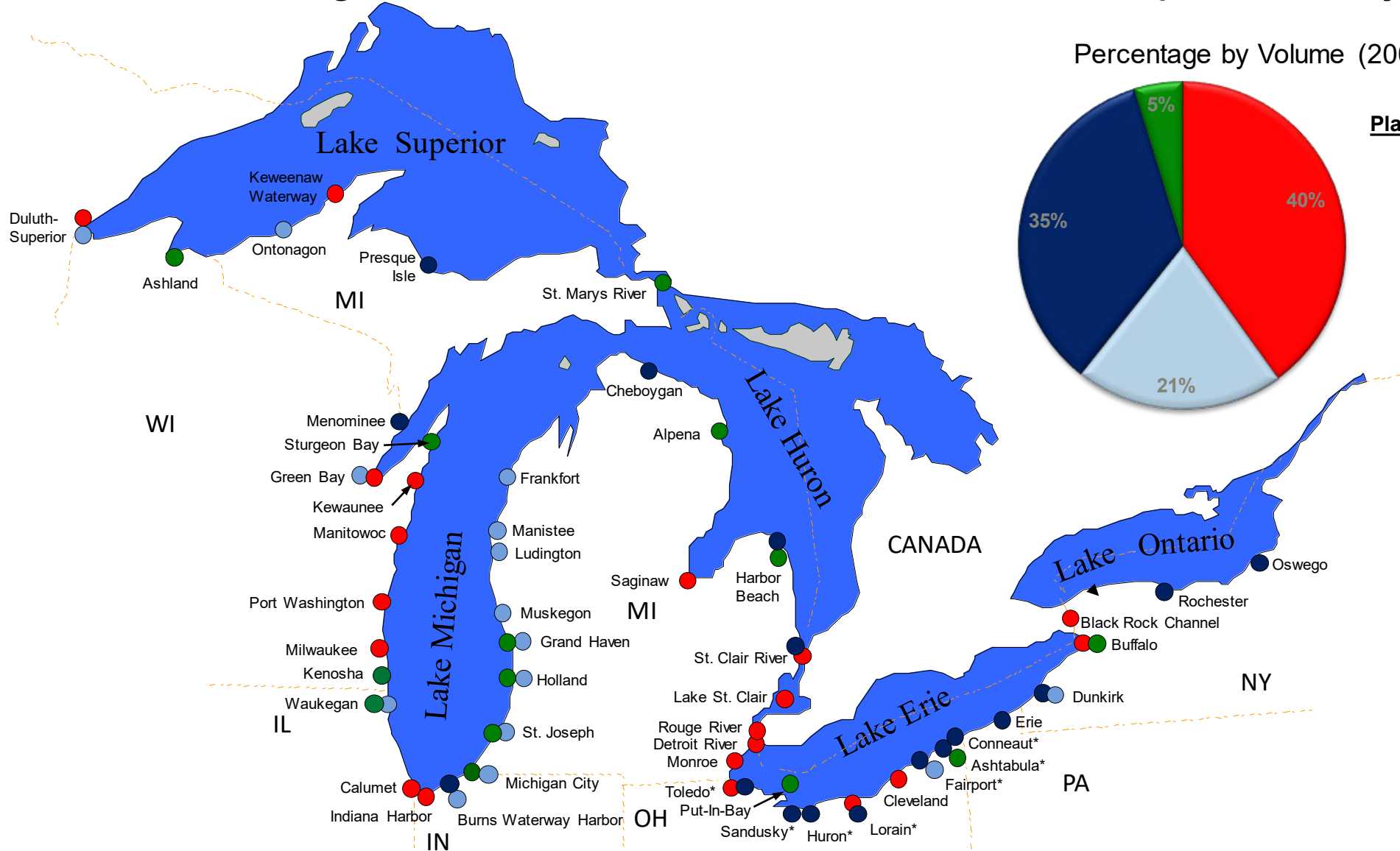
US Army Corps of Engineers  
 Great Lakes Navigation Business Line  
 FY23 President's Budget  
 March 28, 2022

**Navigation O&M      \$205.4M**

\$56.1M	Primary Dredging 3.26M cu yds
\$1.09M	Ashtabula Harbor
\$1.40M	Buffalo Harbor
\$3.36M	Calumet Harbor and River
\$8.52M	Cleveland Harbor
\$2.01M	Conneaut Harbor
\$3.15M	Detroit River
\$2.66M	Duluth-Superior Harbor
\$2.34M	Fairport Harbor
\$0.75M	Grand Haven Harbor
\$2.90M	Green Bay Harbor
\$0.80M	Holland Harbor
\$1.50M	Huron Harbor
\$3.44M	Indiana Harbor
\$0.95M	Lorain Harbor
\$0.65M	Ludington Harbor
\$2.41M	Milwaukee Harbor
\$1.13M	Monroe Harbor
\$0.97M	Oswego Harbor
\$1.00M	Port Clinton Harbor
\$2.63M	Saginaw River
\$1.00M	Sandusky Harbor
\$1.89M	St. Joseph Harbor
\$2.66M	St. Marys River
\$5.87M	Toledo Harbor
\$1.00M	Vermilion Harbor



# Current Dredged Material Placement Methods – Deep Draft Projects



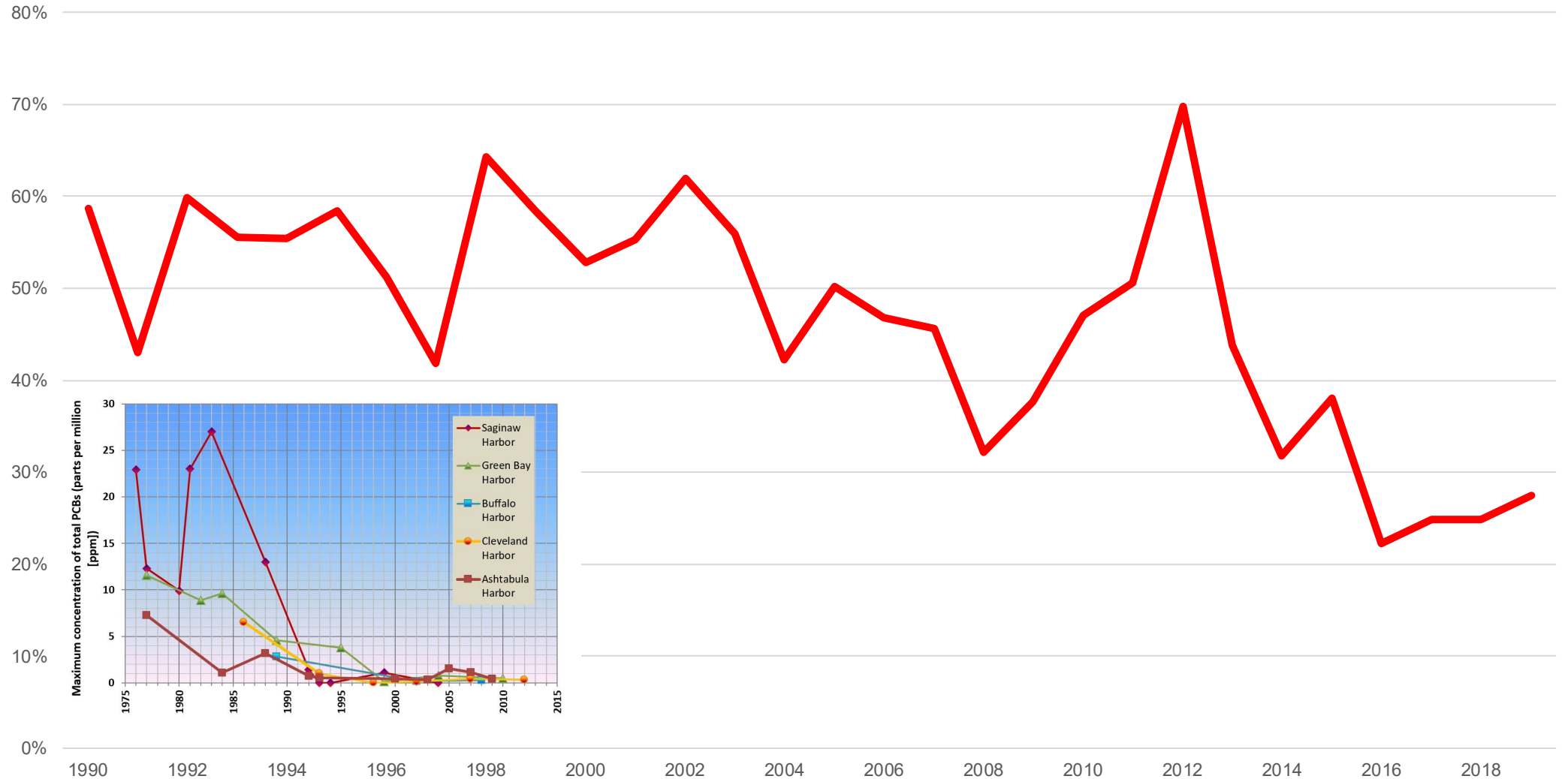
### Placement Method

- CDF
- NEAR SHORE
- OPEN WATER
- UPLAND



# PERCENT OF DREDGED MATERIAL TO CDF

% of Dredged material from GL Harbors placed in CDFs

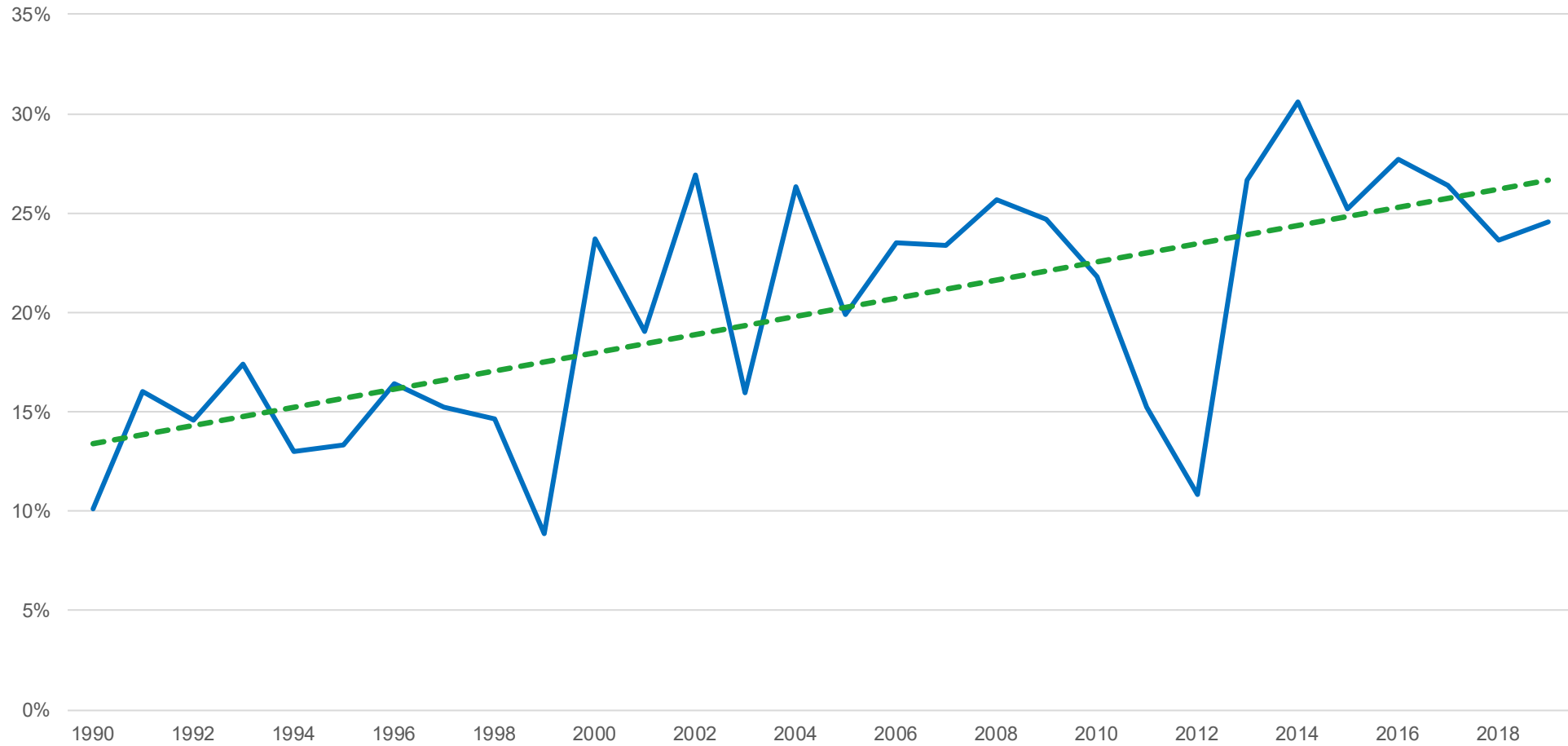




# BENEFICIAL USE OF DREDGED MATERIAL



% of Dredged Material from GL Harbors Beneficially Used \*



\* Beneficial use assumed to include all Nearshore and Upland Placement



# WRDA 2020 SECTION 125 – DREDGED MATERIAL



**This section renews the Congressional commitment to beneficial use (BU) of dredged material by:**

- (a) Establishing a national policy to maximize the beneficial use of material obtained from Corps projects; requiring the Corps to **consider the economic benefits and efficiencies from the beneficial use of dredged material in determining the Federal Standard** and amending section 204(d) or WRDA 92 to direct that other-than-least-cost placement of dredged material for certain purposes be funded using appropriations available for construction or operation and maintenance of the water resources development project producing the dredged material.
- (b) Increasing the number of Section 1122 dredged material pilot program projects from 20 to 35.
- (c) **Directing the Corps to develop five-year regional dredged material management plans.**
- (d) Emphasizing greater coordination across the Corps' dredging contracts.

WRDA2020 Implementation Guidance Tracker:

[https://www.usace.army.mil/Missions/Civil-Works/Project-Planning/Legislative-Links/wrda\\_2020/](https://www.usace.army.mil/Missions/Civil-Works/Project-Planning/Legislative-Links/wrda_2020/)



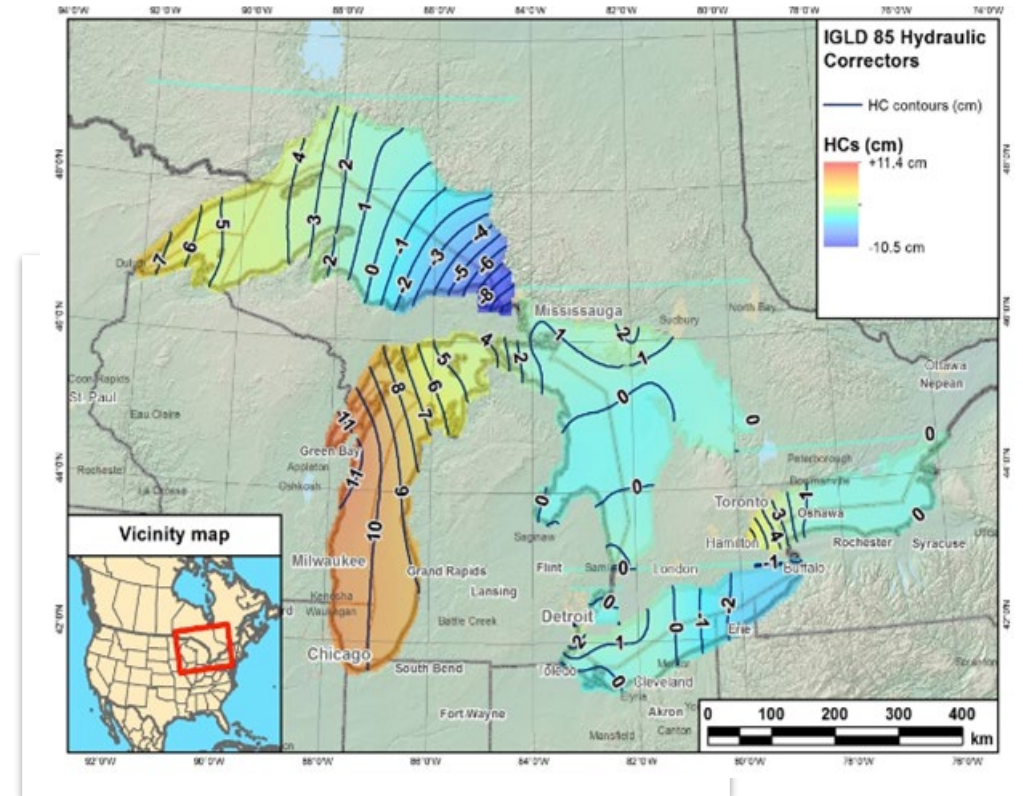
# DREDGED MATERIAL MANAGEMENT CHALLENGES/OPPORTUNITIES



- Many innovative beneficial use projects are ongoing – continue
- Strengthen communication with states, stakeholders, contractors
- Continue to communicate that dredged material is a resource, value of beneficial uses
  - Terminology – dredged material, not dredge spoils or waste
  - We **place** dredged material, not dispose or dump
- WRDA 2020 Section 125 – tools to increase use of beneficial use of dredged material

# SETTING NEW INTERNATIONAL GREAT LAKES DATUM 2020

- ❑ Based on new joint US and Canadian North American - Pacific Geopotential Datum of 2022
- ❑ New datum reference zero is 13 inches higher than previous IGLD
- ❑ No more traditional leveling, GNSS only
- ❑ New datum likely in place by **2027**
- ❑ Update includes **recalculation of Low Water Datum**

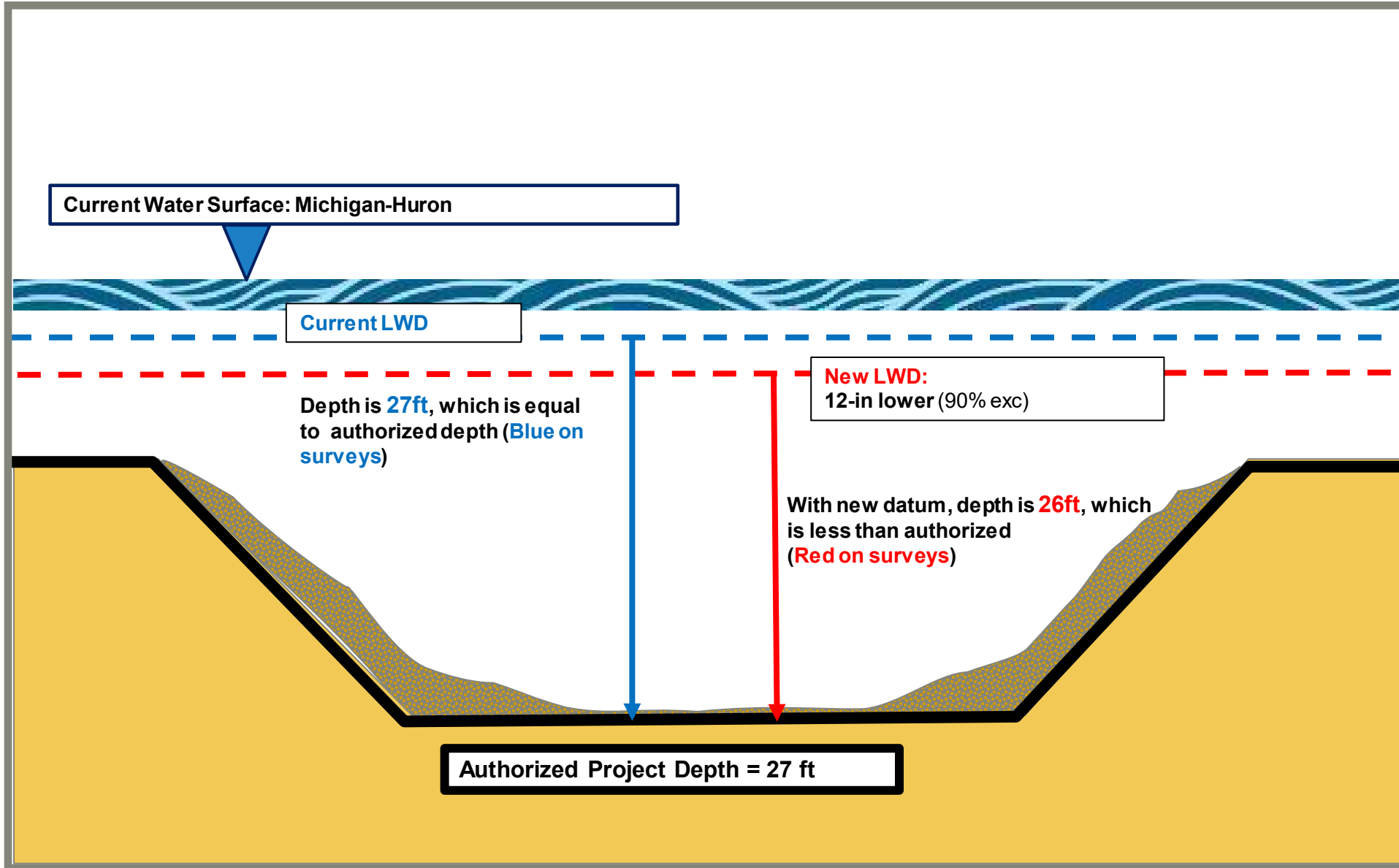


IGLD hydraulic correct model developed and implemented in the VDatum transformation tool





# NEW LOW WATER DATUM IMPLICATIONS TO AUTHORIZED PROJECT DEPTH





## THE LOW WATER DATUM CHALLENGE: ESTABLISH A LEVEL SUCH THAT THE WATER WILL “SELDOM” FALL BELOW IT.

### Frequency of Exceedance of Current Low Water Datum

Lake	Existing LWD	Time Below LWD	Potential Change Relative to LWD*
	(Feet)	(1918-2017)	(Inches)
Superior	601.10	40%	<b>-10</b>
Michigan-Huron	577.50	26%	<b>-12</b>
St. Clair	572.30	22%	<b>-1.5</b>
Erie	569.20	11%	<b>+3</b>
Ontario	243.30	15%	<b>-1.5</b>

\* Extreme value analysis using CGLRRM Supply/Routing model 90% exceedance.



# SOO LOCK RELIABILITY

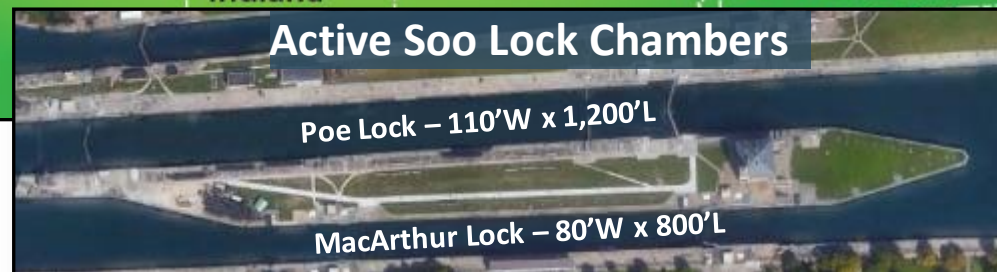
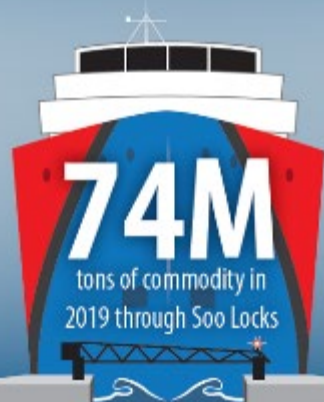
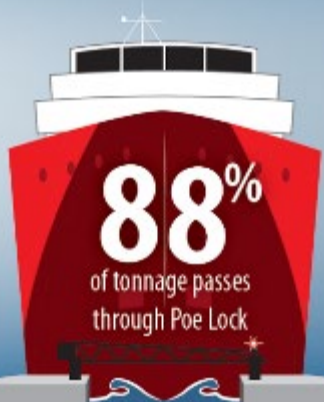
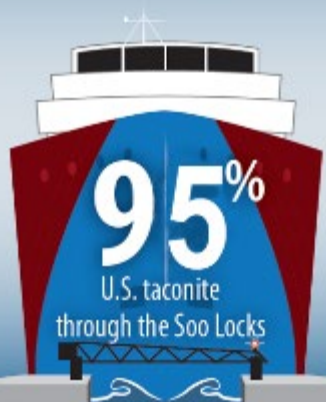




# SOO LOCKS IMPORTANCE



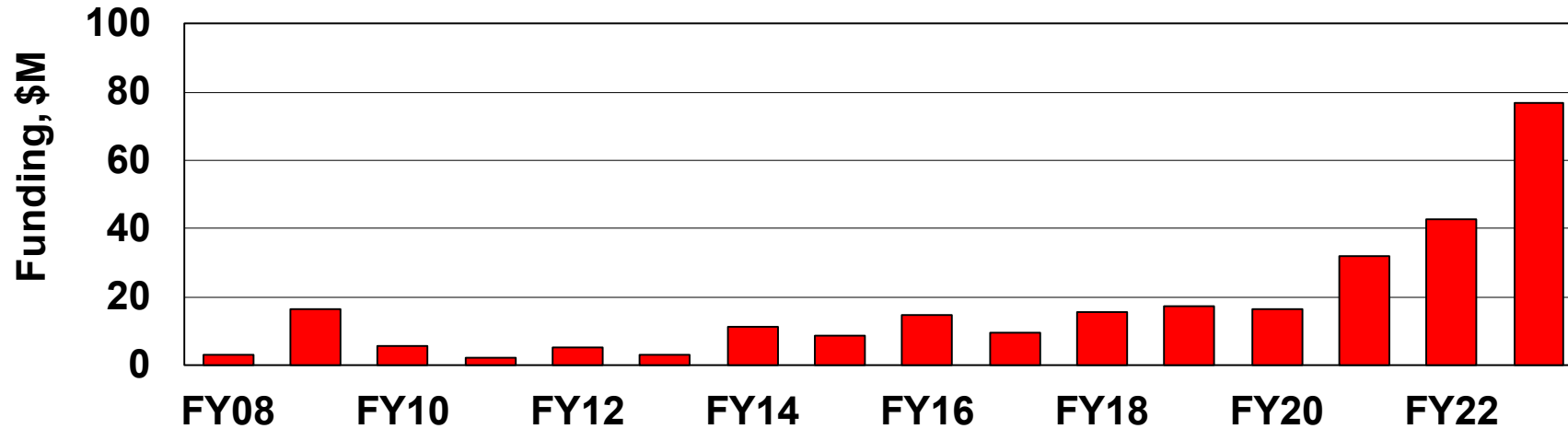
- 10% of our nation's waterborne domestic traffic is transported on the Great Lakes Navigation System
- Nearly all domestically produced high strength steel is made with iron ore that transits the Poe Lock
- Within 2-6 weeks of an unscheduled Poe Lock outage, 75% of our nation's high strength steel production would cease
- Six-month unscheduled outage would result in 11 million jobs lost and \$1.1 trillion economic impact
- **Only Corps lock in the country without an alternate mode of transportation**





# MAINTAINING EXISTING SOO LOCKS FACILITY

(ASSET RENEWAL, O&M FUNDED)



### Projects Funded in FY22 and FY23

#### **FY22 Pres Bud \$24.78M:**

- Lock Valve Repairs; Crane Barge Replacement; Facility Designs

#### **FY22 IJA \$4.0M:**

- 13.8kV ACB Replacement

#### **FY22 Work Plan \$13.9M:**

- Facility Service Road Rehabilitation - \$1.9M
- Poe Lock Ship Arrestor Rehabilitation - \$10.9M
- St. Marys River Rapid Response Survey Vessel - \$1.1M

#### **FY23 Pres Bud \$38.3M:**

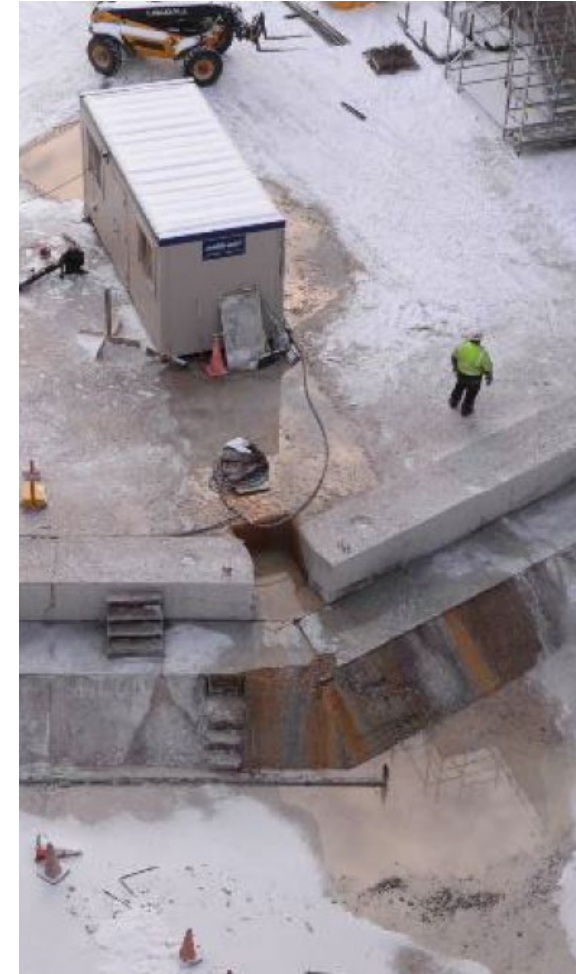
- Construction of Backup Generator - \$16.0M
- Construction of Facility Wastewater Sewer Rehab - \$4.40M
- Various Facility and Site Rehab - \$13.4M
- Various Lock Rehab Projects: \$4.48M

#### **FY23 IJA \$49.45M:**

- Poe Lock Gate 1 Replacement Fabrication: \$12.35M
- Crib Dam Repairs and Mooring Facility: \$24.7M
- Floating Plant Outfitting; Poe Lock Recess Design: \$1.25M

### Upcoming Asset Renewal Priorities

- Gate 3 Structural Repair
- Poe Lock Dewatering Emergency Bulkhead Design, Integration, Storage & Fabrication
- Construction Poe Lock Stop Log Recess Repairs
- Miter Gate Lifting Equipment



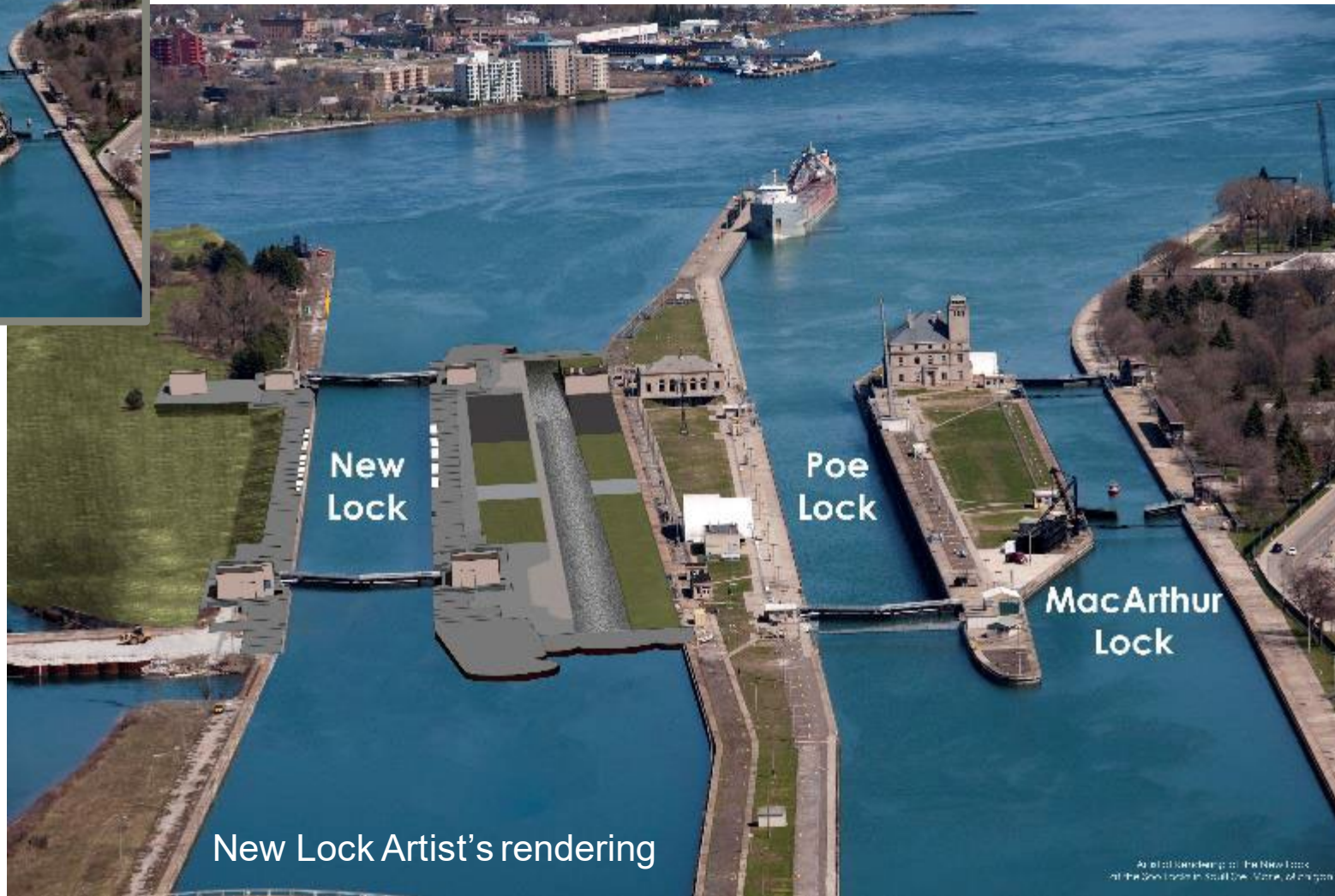
MacArthur Lock Sill Repairs  
Winter 2022



# NEW LOCK AT THE SOO – ARTISTIC RENDERING



Current Lock Configuration



New Lock Artist's rendering

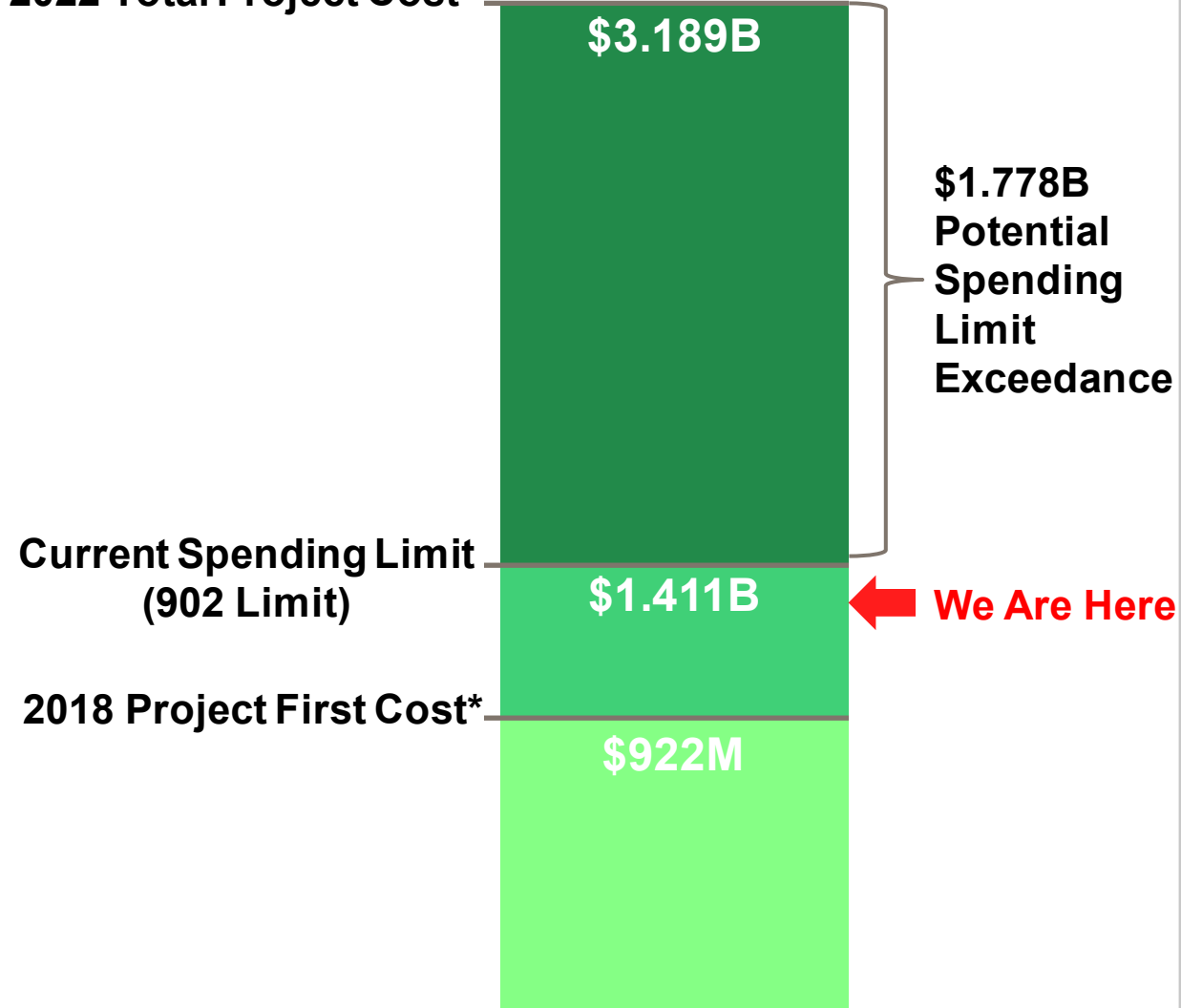
Artistic rendering of the New Lock at the Soo Locks in Sault Ste. Marie, Michigan



# NEW LOCK AT THE SOO PROJECT COST INCREASE

- April 2022 fully funded cost estimate is \$3.189B
- Current project spending limit (902 Limit) is \$1.411B
- Potential spending limit exceedance of \$1.778B
- Due to cost estimate exceeding spending limit, USACE is seeking consideration of an increased authorized project cost in the Water Resources Development Act (WRDA) 2022
  - PACR Director’s Report transmitted to the House and Senate Authorizations Committees on 08 June 2022

2022 Total Project Cost\*\*



\* **Project First Cost** – cost estimate for authorization (e.g., \$922M in 2018, & requesting \$2.93B in 2022)

\*\* **Total Project Cost** (AKA “Fully Funded Cost”) – fully funded with escalation to estimated midpoint of construction (e.g., \$1.031B in 2018, \$3.189B in 2022)



# NEW LOCK AT THE SOO – POTENTIAL FUNDING REQUESTS & ALLOCATIONS



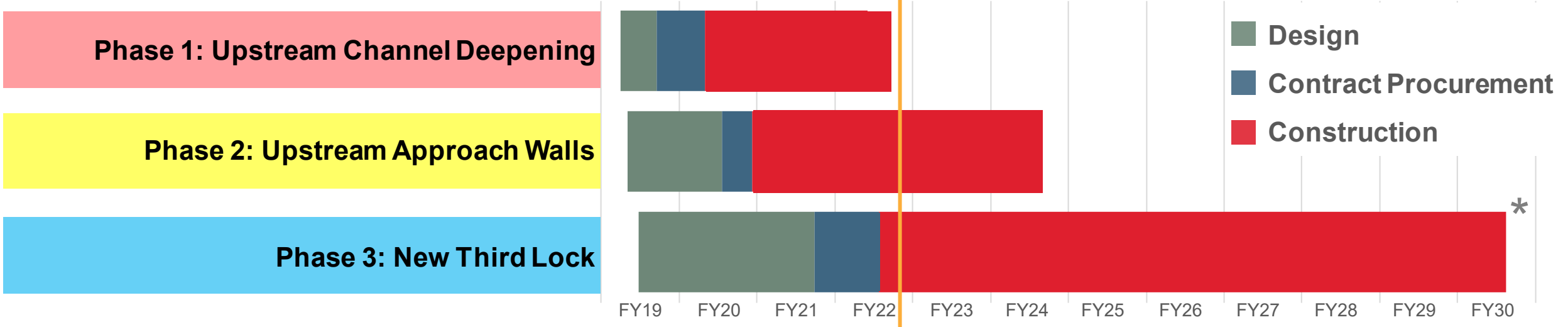
FY23 - FY25 Activities	Potential Funding Requests		
	FY23	FY24	FY25
Upstream Wide Wall Monoliths (Phase III - Opt 1A)	\$231.4M	-	
Chamber Wall Monoliths (Phase III - Opt 1B)	\$234.9M	-	
New Pump Well Completion (Phase III – Opt 2)	\$85.5M	-	
Upper Approach Wall Completion (Phase 2 continuation)	-	\$69.0M	
Lock Operational (Phase III – Opt 3)	-	\$260.1	
Downstream Work (Phase III – Opt 4)	-		\$55.8M
Hands Free Mooring (Phase III – Opt 5)	-		\$26.6M
Downstream Ship Arrestors (Phase III – Opt 6)	-		\$28.8M
<b>TOTAL</b>	<b>\$555.9M</b>	<b>\$329.1M</b>	<b>\$111.3M</b>

Note: NPP Bridge Ramp (Phase III – Opt 1C) for \$2.07M and Alligator’s Mouth Extension (Phase III – Opt 7) for \$7.4M to be funded through O&M



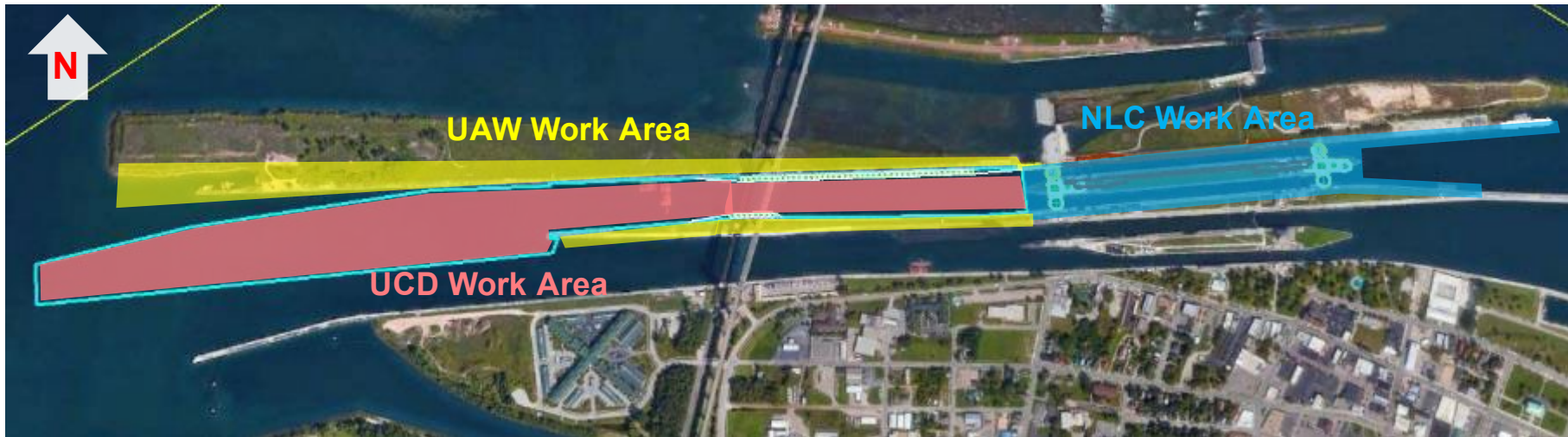


# NEW LOCK AT THE SOO - STATUS



**WE ARE HERE**

\* Completion date assumes efficient funding and favorable weather conditions





# PHASE 3: NEW LOCK AT THE SOO CONTRACT TIMELINE



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# FUTURE SOO LOCKS: ~2027-2030



Artistic Rendering of the New Lock of the Soo Locks in Sault Ste. Marie, Michigan.



# UPCOMING STAKEHOLDER MEETINGS



November 9 – Virtual Great Lakes Construction Roundtable (**Contractor Focused**)

November 10 – Great Lakes Navigation Stakeholder Meeting  
Detroit Wayne County Port Authority

~ April 2023 Virtual Shallow Draft Stakeholder Meeting

[www.lre.usace.army.mil/missions/great-lakes-navigation](http://www.lre.usace.army.mil/missions/great-lakes-navigation)



# Questions?



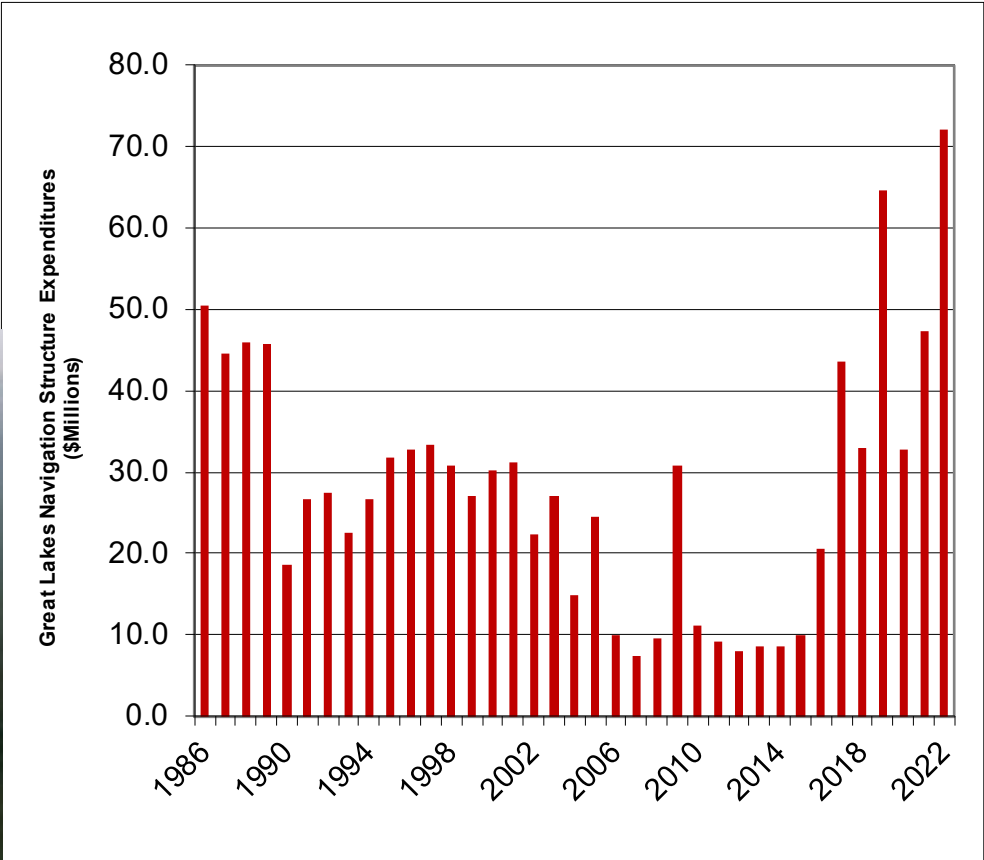


# GREAT LAKES NAVIGATION STRUCTURES



- 104+ miles of navigation structures on the Great Lakes
- Structures include piers, jetties, revetments, and breakwaters
- Most were built between 1860 and 1940
- Jetties and piers were constructed perpendicular to shore to keep the channel open for navigation
- Off-shore breakwaters were constructed to allow safe navigation entry to harbors and channels

- 60% of GL coastal structures were built before WWI
- Over 90% of all coastal structures exceed 60 years of age
- Over 30% of structures have timber crib core sections; past low water levels have accelerated deterioration of the wood
- Over 40% of structure segments are rated C - F; backlog funding need is estimated at \$320M





# GREAT LAKES NAVIGATION SYSTEM

The GL system's savings over the next  
least costly mode of transportation



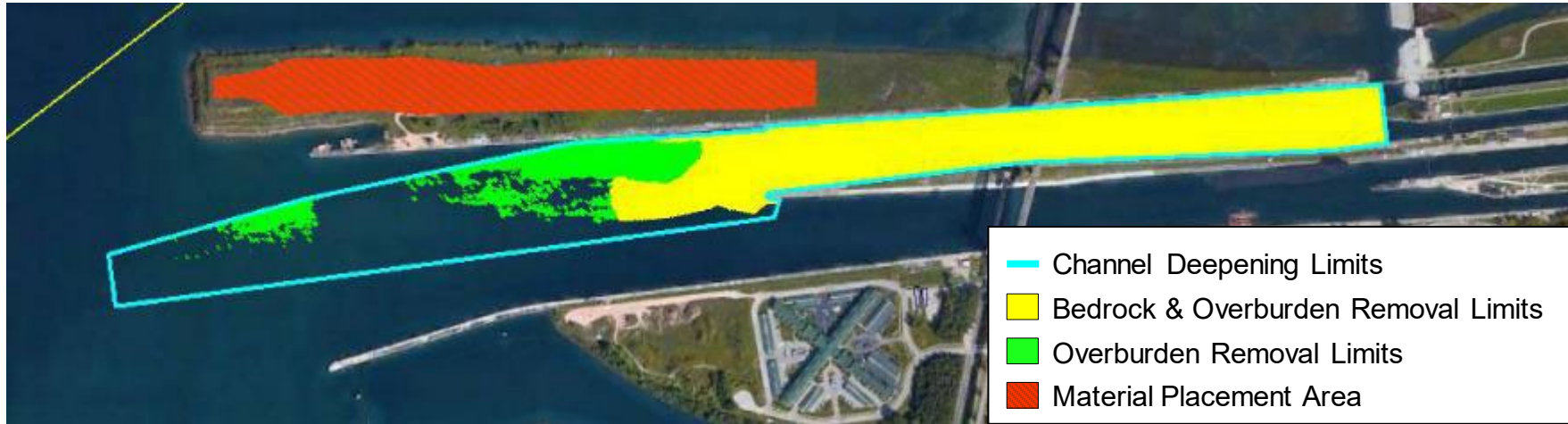
**\$3.9 Billion/year**

- More competitive American steel
- Essential to sustaining U.S. auto industry
- Lower cost energy
- Lower cost concrete (construction)
- More competitive grain for export
- Less fuel consumption and greenhouse gas emissions
- Less congested highways/rails





# PHASE 1: UPSTREAM CHANNEL DEEPENING UPDATE



**Scope:** Remove 300,000 CY of bedrock and overburden to deepen the Approach Channel to depth of 30 feet

**Construction Status:**

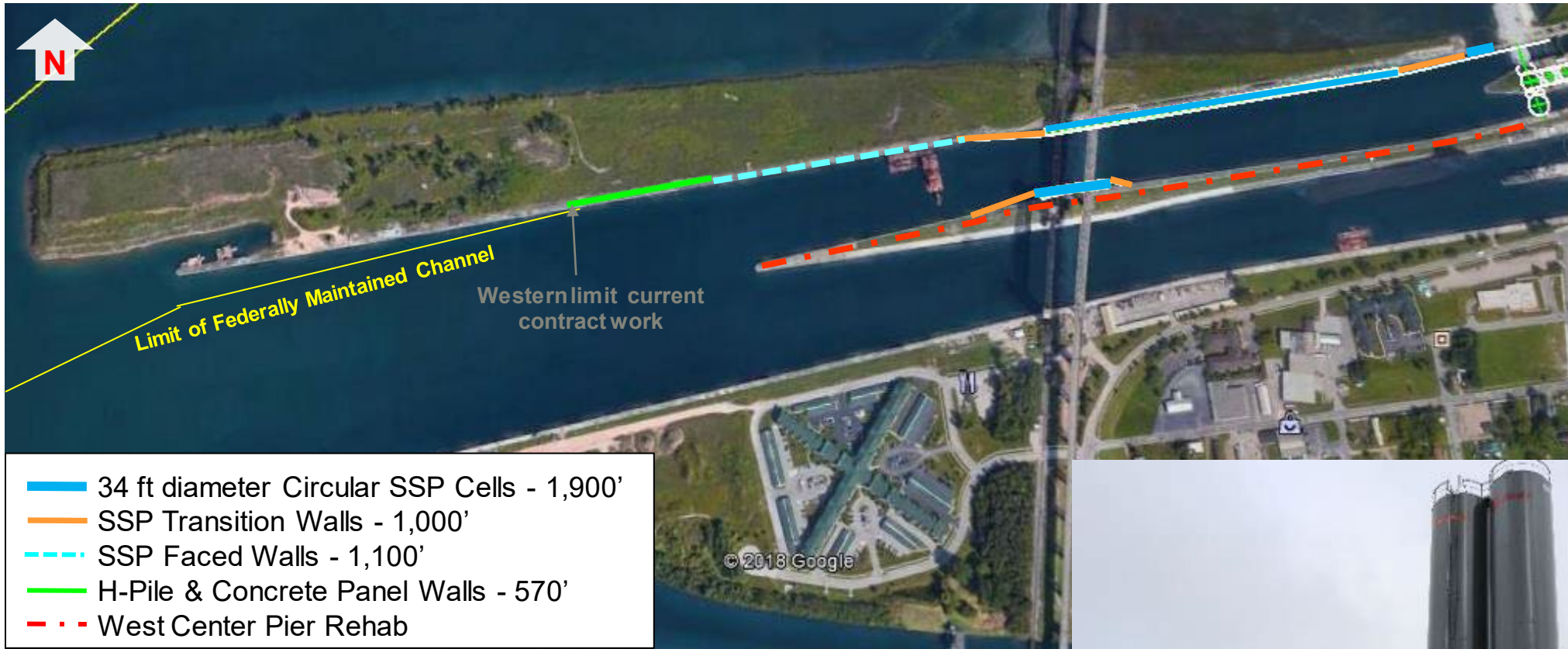
- \$52.6M Contract awarded in January 2020 to Trade West Construction Co. of Nevada.
- Completed Summer 2022







# PHASE 2: UPSTREAM APPROACH WALLS UPDATE



**Scope:** Rehabilitate approach walls upstream of new lock including reconstruction/refacing existing 100 year old walls, installation of new lighting, bollards, and concrete cap repairs.

**Construction Status:**

- \$117M Contract awarded in September 2020 to Kokosing-Albericci
- Contractor is working from East to West and has **completed** 51% of the required contract work.

**Estimated Completion:** Summer 2024





# PHASE 3: NEW LOCK AT THE SOO SCOPE

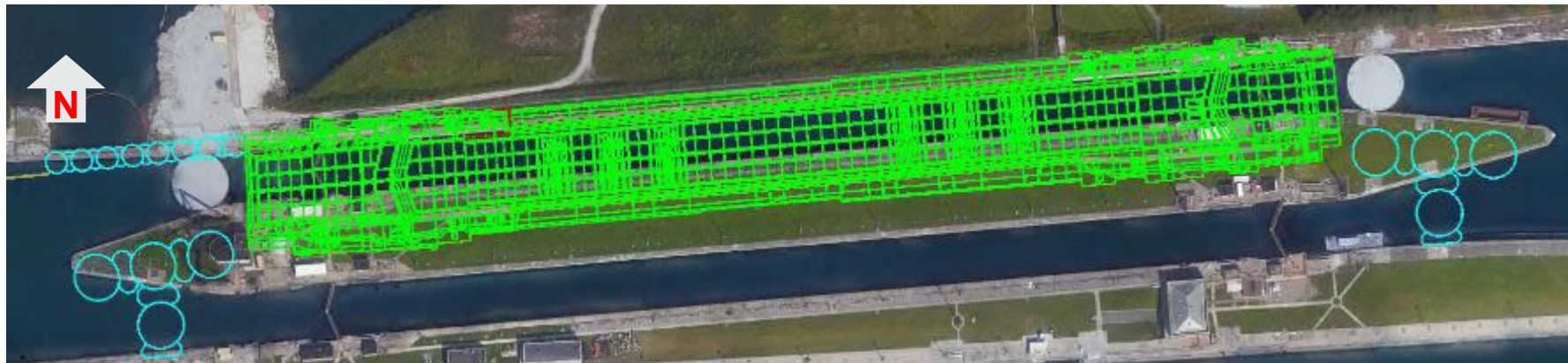


**Scope:** Construct new 1,200' long by 110' wide by 32' deep chamber, New Pump Well, and New Power Plant Bridge, and rehabilitate downstream approach walls.

## Construction Status:

- \$1.068B base construction contract awarded in July 2022 to Kokosing Alberici Traylor, LLC, a joint venture out of Westerville, OH
- \$804M in options for future award required for an operational lock
- Total construction valued at \$1.872B

**Estimated Completion:** Summer 2030





# NEW LOCK AT THE SOO

## FY22 COST INCREASE ROOT CAUSES



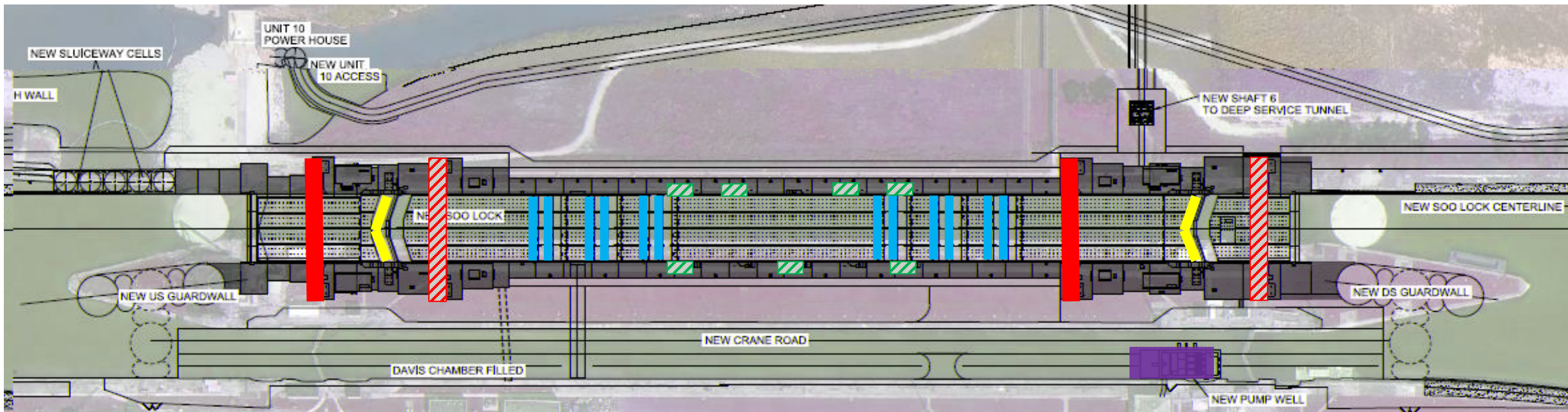
### Driving Factors for Cost Growth







- **Inflation:** From 2018 to 2022, the cost of raw steel increased from \$0.46/lb to \$1.50/lb. From Nov 2021 to March 2022 fuel costs increased from \$3.25/gal to \$5.25/gal resulting in a \$69M cost increase
- **Changing market conditions:** surplus of construction projects
- **Nationwide labor shortage:** A nationwide labor shortage resulted in increased labor attraction and retention costs, coupled with a revised larger labor force needed in a remote area
- **Design modifications:** USACE incorporated design modifications to reduce risk and improve safety and operability
- **Early estimate assumptions:** USACE has better defined the unique challenges of building a mega project on an island, with an extremely busy waterway in a harsh northern climate

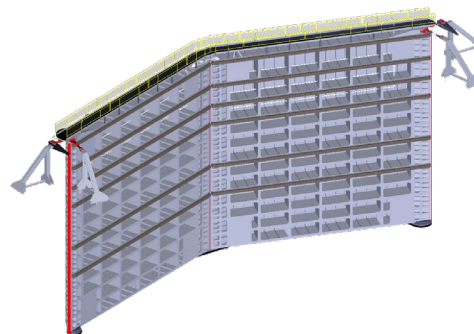




# NEW LOCK CHAMBER KEY FEATURES



-  Miter Gates
-  Filling and Emptying System
-  Upstream Ship Arrestors
-  Downstream Ship Arrestors
-  Hands Free Mooring
-  New Pump Well



Miter Gates



Ship Arrestor



Hands Free Mooring Unit

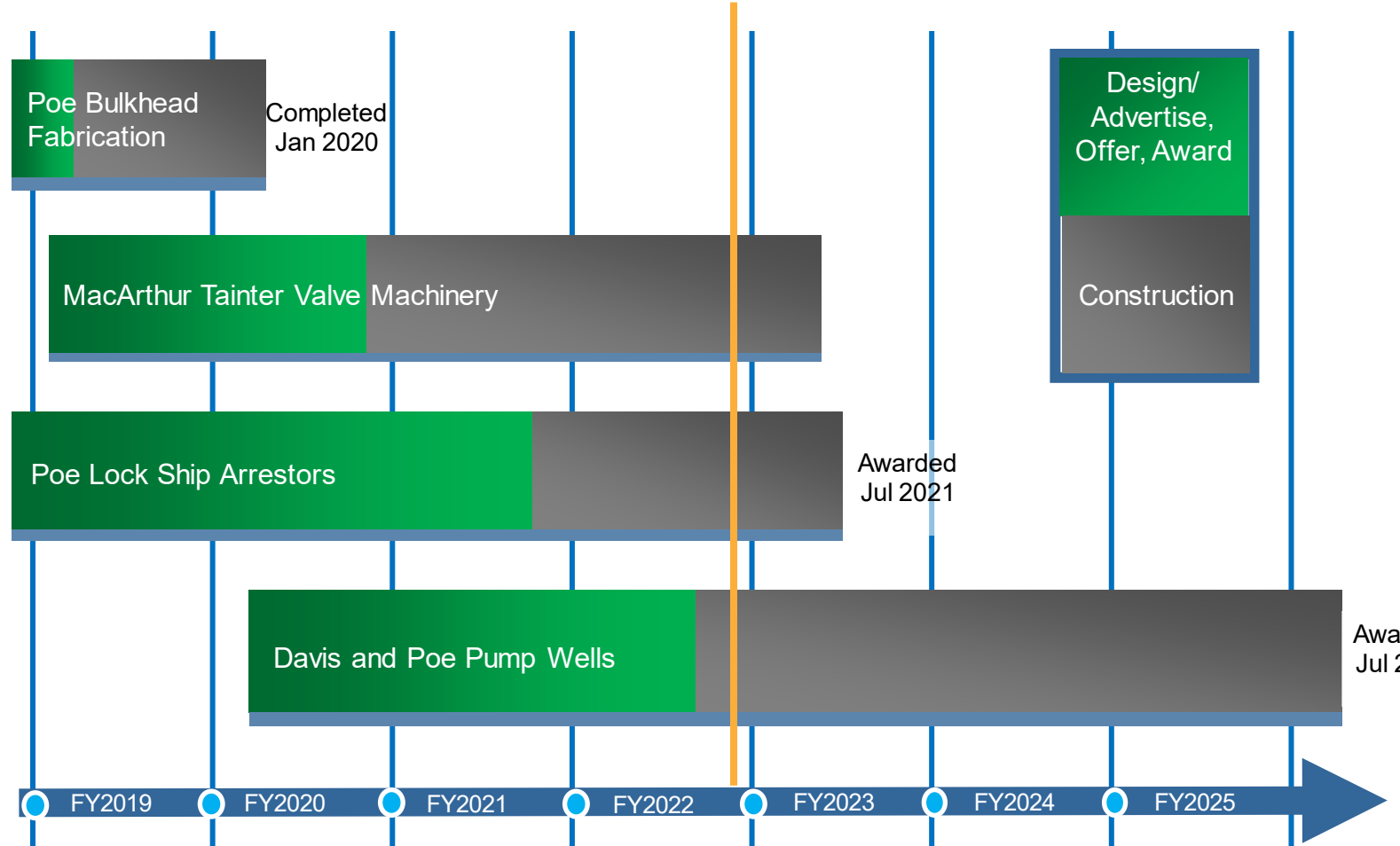
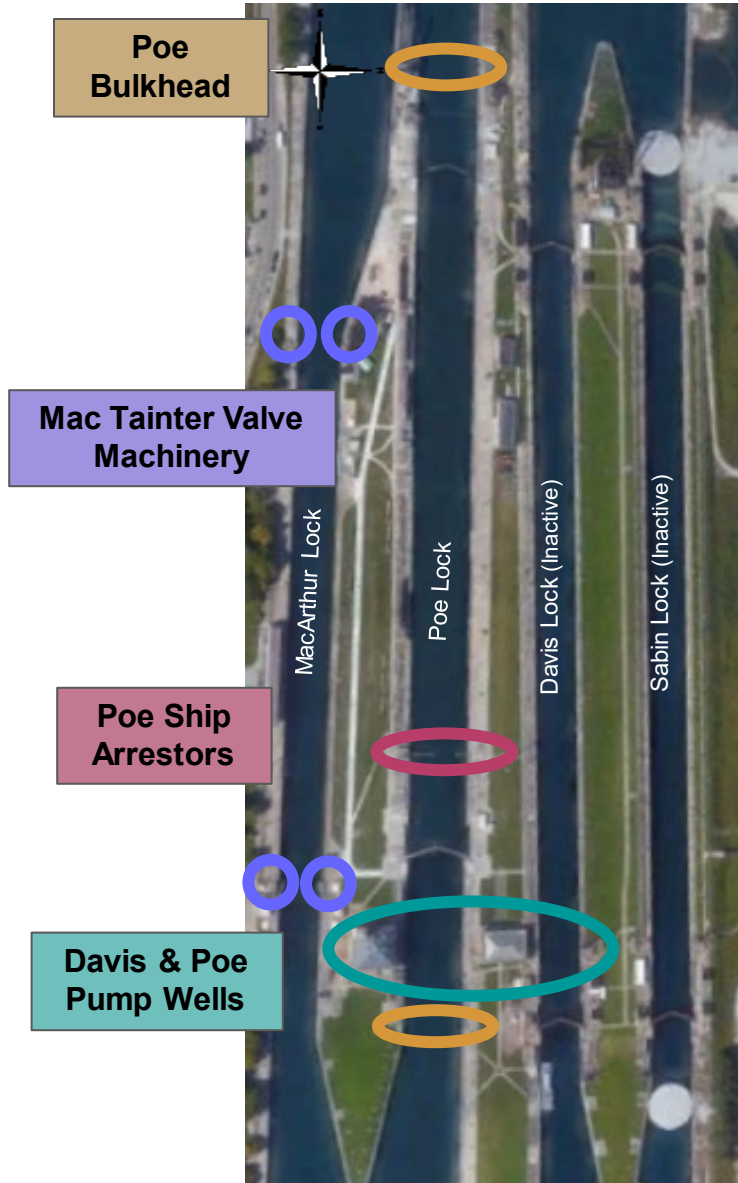


# MAINTAINING EXISTING SOO LOCKS FACILITY

## MAJOR REHAB (CG FUNDED)



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\$57.6M Funded through FY18 Work Plan  
 + \$37.3M Funded through FY22 BIL  
 -----  
 \$94.9M Funded Total