



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS  
441 G STREET, NW  
WASHINGTON, DC 20314-1000

CECW-LRD

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

SUBJECT: New Soo Lock Construction Project, Sault Ste. Marie, Chippewa County, Michigan, Post Authorization Change Report

1. Purpose. I transmit for your review and approval the New Soo Lock Construction Project Post Authorization Change Report (PACR) prepared by the Detroit District Office (LRE) and endorsed by the Great Lakes and Ohio River Division (LRD) documenting the need to modify the project authorization to increase the authorized costs to \$2,932,000,000 (October 2021 price level).

2. Post Authorization Change. Section 1149 of the Water Resources Development Act (WRDA) of 1986 originally authorized the project at a total cost of \$227,400,000. Section 3091 of WRDA 2007 modified the project to authorize the Secretary of the Army to complete the project at a total cost of \$341,700,000 and at a 100-percent federal cost. Subsequently, Section 1401 of WRDA 2018 authorized the Secretary of the Army to complete the project at a total cost of \$992,432,000. The revised estimated project first cost (without inflation) is \$2,932,000,000 (October 2021 price level) and includes \$118,952,000 in sunk costs through April 2022. The fully funded project cost increased by \$2,157,000,000. The cost drivers have been categorized into two groups 1) Controllable Root Causes and 2) Uncontrollable Root Causes. There are no changes in project location, purpose, or scope. The currently estimated total project cost inflated through the midpoint of construction is \$3,190,000,000. The maximum cost for the authorized project, adjusted for allowable inflation in accordance with Section 902 of WRDA 1986, as amended is \$1,410,000,000 (October 2021 price level); therefore, the revised total project cost exceeds the Section 902 limit.

3. Background and Discussion.

a. The St. Marys River connects Lake Superior with Lake Huron in Sault Ste. Marie, MI. The water drops approximately 21 feet in an area known as the St. Marys Rapids. This natural barrier to navigation led to the construction of the St. Marys River Complex. The Complex consists of the four navigation locks (MacArthur, Poe, Davis, and Sabin Locks), two hydropower units, and Compensating Works structure. The MacArthur Lock was completed in 1943 and has a length of 800 feet between the sills, a width of 80 feet, and a depth of 31 feet of water over the sills at low water datum. The Poe Lock was completed in 1968 and has a length of 1200 feet between the inner gates, a width of 110 feet, and a depth of 32 feet of water over the sills at normal lower pool. The Poe Lock holds back a head of 21.5 feet (the difference between normal

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upper pool and normal lower pool). The Davis and Sabin locks are in inactive status and not operational.

b. The selected plan provides a replacement lock of nominal 1200-foot length by 110-foot width primarily aligned with the existing Sabin Lock chamber. The Poe Lock is the only lock at the Soo Locks complex capable of locking 1000-foot vessels (also known as Poe restricted). One 1,000-foot vessel is the equivalent of seven 100 car trains with a 10,000-ton capacity or 3,000 large semi-trucks with a 25-ton capacity. Since the completion of the Poe Lock, a greater share of the Great Lakes vessel fleet has been converted to Poe restricted vessels. In 2021, the Poe Lock handled 88-percent of the total tonnage that transited the Soo Locks. In the event of an unplanned outage at the Poe Lock, the MacArthur Lock does not have the capacity to keep up with the transportation demand, effectively creating a bottle neck. At that point, alternative modes of transportation would need to be employed at extremely high costs to shippers and consumers. In the case of iron ore, which is almost exclusively transported on vessels that can only fit through the Poe Lock, no alternative transportation modes exist (see paragraph 3c for more detailed explanation).

c. The project is currently in the construction phase. Construction is divided into three phases which include:

- Phase I: Upstream Channel Deepening – 97% complete. Contract awarded January 2020 for \$52,600,000. This contract consists of removing 300,000 cubic yards of material to a depth of 30 feet.
- Phase II: Upstream Approach Walls – 40% complete. Contract awarded September 2020 for \$117,200,000. This contract consists of reconstruction of approximately 5,400 feet of existing 100-year-old approach wall.
- Phase III: New Lock Chamber – 0% complete. Design completed by the Inland Navigation Design Center (INDC) on 20 August 2021. Construction award is expected FY22. This contract will include constructing the lock chamber, new pump well, and downstream approach wall rehabilitation.

To date, a total of \$1,370,000,000 has been allocated for construction efforts including contract awards, pre-construction engineering and design (PED), and construction contract management. To date, a total of \$118,952,000 has been spent on construction, construction management and design efforts. The project is fully federal funded. However, the State of Michigan has voluntarily contributed \$52,000,000 to the construction effort.

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### 3. Updated Project Costs and Benefits.

a. A Validation Study and PACR completed in 2018 demonstrated the project benefits to the nation with both documents approved via a Director's Report in June 2018. The National Economic Development (NED) benefits from the 2018 Validation Study were updated as part of the 2022 PACR effort. NED benefits of the New Lock at the Soo Locks Complex include net reductions in the cost of resources required to transport commodities, reduction of maintenance and repair costs to continue operations at the project, and incidental benefits such as recreation and labor resource benefits. These benefits are primarily realized by reducing the risk of future unscheduled service disruptions at the project, reducing delay times at the project, providing recreational opportunities at the project, and employing unemployed or underemployed labor resources as allowed by policy.

b. The 2022 PACR prepared by LRE concludes that construction of a new lock would result in average annual NED benefits of \$95,600,000; incur average annual costs of \$107,200,000; yield net average annual benefits of \$(-11,600,000); and result in a benefit-to-cost ratio (BCR) of 0.9 at the FY22 discount rate of 2.25%. Since the project's net benefits are negative, in accordance with Civil Works policy the no action alternative is the NED plan. An exception to policy allowing the New Lock plan to be justified based upon comprehensive benefits or other Federal, State, local and international concerns was sought by the district and supported by LRD. The policy exception was approved by Michael L. Connor, Assistant Secretary of the Army (Civil Works) on 20 May 2022 including a requirement that an updated economic analysis is to be completed during Fiscal Year 2023. To achieve that requirement, the Detroit District is directed to provide a scope of work, resourcing plan and schedule, including involvement by non-federal interests, to perform the economic update by July 2022.

c. One of the complexities of the 2018 economic analysis was how to account for iron ore movements and subsequent higher costs incurred if the Poe Lock experienced an unscheduled outage. Typically, in navigation projects, it is assumed that an alternate land route exists that could move the commodities in question. The difference between the water route and the overland route becomes the benefits of the project. In the case of the Poe Lock, there is no alternative land route available to move iron ore from mines in Minnesota to the steel mills in the lower Great Lakes. To account for this, hypothetical transportation modes were established to estimate the benefits of iron ore movements. These hypothetical modes include stockpiling, conveyance, and a build out of a railroad and port in Escanaba, Michigan. They are feasible and necessary to the proxy model but are not intended as proposed alternative transportation modes to the new lock. Currently, disruptions to Poe Lock serviceability would have an immediate impact on the supply chain, which would directly impact production of Advanced High Strength Steel.

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That disruption would, in turn, impact manufacturing, particularly the automobile industry.

4. Project Cost Sharing. Per WRDA 2007, construction of the new lock is at full federal expense. There is no cost share sponsor. There are no local cooperation requirements.

5. Strategic Value to the Nation. The strategic importance of the Soo Locks to the United States cannot be overstated. Key points include:

- The Department of Homeland Security has identified the Soo Locks as National Critical Infrastructure due to its critical importance in the supply chain for U.S. automobile manufacturing.
- The Department of Homeland Security's 2015 report, "*The Perils of Efficiency: An Analysis of an unexpected closure of the Poe Lock and its impact*" concluded that a 6-month unexpected closure of the Poe Lock could result in up to 75% of U.S. integrated steel production stopping within 2-6 weeks. Nearly 100% of the North American appliance, automobile, construction equipment, farm equipment, mining equipment, and railcar production would shut down due to the unavailability of steel. This shutdown of U.S. manufacturing would result in the unemployment of upwards of 11 million people and significantly reduce U.S. Gross Domestic Product (GDP).
- National defense benefits can also be realized from the production of critical inputs to machinery and vehicles used by the U.S. Armed Forces.
- The severity of these impacts was confirmed by the USACE Detroit District New Soo Lock Validation Study (2018) and also included a detailed assessment of the automobile industry dependence on the Soo Locks (Appendix B; attachment 5). The USACE analysis concluded that a 12-month unexpected closure of the Poe Lock would result in a temporary reduction of employment of about 8.5 million U.S. jobs, all related to manufacturing. The USACE study also confirmed that an unexpected closure of the Poe Lock would significantly reduce GDP.

6. Environmental Considerations. There have been no major changes to the project's environmental circumstances or considerations since the project was authorized, and the project is still consistent with the Record of Decision signed in 2009. A Supplemental Information Report (SIR) was complete in 2018 during the development of the Validation Study. The SIR indicated that no significant new circumstances or substantial changes have been identified.

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7. Recommendation. I have reviewed the PACR and concur with the increase of the authorized cost to \$2,932,116,000 (October 2021 price level). I recommend that the enclosed PACR be transmitted to Congress as a basis for increasing the authorized project cost of the New Soo Lock Construction Project.

Encl

ALVIN B. LEE  
Director of Civil Works