



NEW SOO LOCK

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

USACE HQ Recommendation



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

CECW-LRD

JUN 29 2018

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY CIVIL WORKS
(ASA(CW))

SUBJECT: Soo Locks, Sault Ste. Marie, Chippewa County, MI. New Soo Lock
Economic Validation Study and Post Authorization Change Report (PACR)

1. Purpose: I transmit for your review and approval of the Soo Locks, Sault Ste. Marie, Chippewa County, MI, New Soo Lock Economic Validation Study and Post Authorization Change Report (PACR) which documents the need to modify the project authorization to increase the authorized cost to \$922,432,000 (October 2018 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 100-percent federal cost. The revised estimated project first cost (without inflation) is \$922,432,000 (October 2018 prices), and includes \$32,132,000 in sunk costs through June 2018. The revised cost is a result of (1) Direct cost and design changes totaling \$193,000,000; (2) Refined contractor markups totaling \$111,000,000, and (3) increased contingency from 20-percent to 37-percent totaling \$170,000,000. There are no changes in project location, purpose, or scope. The currently estimated total project cost inflated through the midpoint of construction is \$1,030,670,000. The maximum cost for the authorized project, adjusted for allowable inflation in accordance with Section 902 of WRDA 1986, as amended, is \$532,900,000 (October 2018 price levels); 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 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 2017, the Poe Lock handled 89-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 4.b. for more detailed explanation).

c. In response to this potential bottleneck, Congress first authorized a second Poe sized lock in Section 1149 of WRDA 1986. The most recent authorization language in Section 3091 of WRDA 2007 reaffirmed the need for a second Poe sized lock at full federal expense.

4. Benefits and Costs:

a. The Validation Report and PACR concluded that construction of a new lock would result in average annual benefits of \$77,400,000; incur average annual costs of \$32,700,000; yield net average annual benefits of \$44,700,000; and result in a benefit-to-cost ratio (BCR) of 2.42 at the FY18 discount rate of 2.75%.

b. One of the complexities of the analysis was how to account for iron ore movements and the 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 on the lower Great Lakes. In order 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 at Escanaba, MI. They are feasible and necessary to the proxy model, but are not intended as proposed alternative 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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SUBJECT: Soo Locks, Sault Ste. Marie, Chippewa County, MI. New Soo Lock Economic Validation Study and Post Authorization Change Report (PACR)

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

c. A range of sensitivity analyses were calculated in the Validation Report to determine and communicate the robustness of the new lock recommendation. These include accounting for uncertainty in traffic forecasts (low and high), the implementation period, in the impacts to Gross Domestic Product (GDP), and others. The range of BCRs at the FY18 discount rate of 2.75-percent range from 0.97 to 6.89. This range reinforces the conclusion that a new lock is justified in almost every scenario.

5. Strategic Value to the Nation: The strategic importance of the Soo Locks cannot be overstated. Independent of the U.S. Army Corps of Engineers (Corps) analysis, the Department of Homeland Security (DHS) produced a report detailing the strategic value of the Soo Locks to the nation, titled 'The Perils of Efficiency: An Analysis of an Unexpected Closure of the Poe Lock and Its Impact'. That report confirms that no alternative transportation mode exists for iron ore transiting from mines in Minnesota to the steel mills located on the lower Great Lakes. It concludes that, "One of the Nation's most economically vital systems, the iron mining - integrated steel production - manufacturing supply chain, is also potentially the least resilient." The Corps conducted a specific sensitivity to 'parallel' the conclusions of the DHS report. The sensitivity is termed a GDP sensitivity, and yields a BCR of 6.89. While this BCR cannot be supported by the Corps under the 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies due to accounting for National Economic Development and Regional Economic Development benefits, it is none the less important for showing the value to the nation of the project.

6. Budgetary Position: The Corps has received approximately \$32,132,000 of Construction funding to date on the project. It is the Corps position that this constitutes a continuation of an existing project rather than a new construction start decision.

7. Recommendation: I recommend that the Validation Report and PACR be approved as the basis for increasing the authorized project cost of the new Soo Lock to \$922,432,000 (Oct 2018 price levels).



JAMES C. DALTON, P.E.
Director of Civil Works



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USACE Lakes and Rivers Division Recommendation



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DIVISION, GREAT LAKES AND OHIO RIVER
CORPS OF ENGINEERS
550 MAIN STREET
CINCINNATI, OH 45202-3222

CELRD-PDS

19 Jun 2018

MEMORANDUM FOR Commander, US Army Corps of Engineers, ATTN: CECW-LRD,
Janet Cote, 441 G Street NW, Washington, DC 20314-1000

SUBJECT: Transmittal of Economic Validation Study Report and Post Authorization
Change Report (PACR) for the New Soo Lock, St. Marys River, Sault Ste. Marie,
Michigan

1. Reference. CELRE-ZA 15 June 2018 memorandum entitled "Soo Locks, Sault Ste. Marie, Chippewa County, MI. New Soo Lock Economic Validation Study and Post Authorization Change Report (P2# 112425) Request for Report Concurrence" with enclosures.
2. Purpose. Request headquarters approval of the enclosed Economic Validation Study Report and PACR submitted by the Detroit District, which provides an update to the economic benefits and cost of the project.
3. Background and Discussion. The authorized project involves constructing a new 110-foot x 1200-foot second lock in the footprint of the current Davis and Sabin locks (the smallest and oldest locks at the complex) at Sault Ste. Marie, MI. The scope and authorized purpose of the new Soo Lock is to provide reliability for the Soo Locks Complex.
4. Economic Analysis. The results of the Validation Study determined that the project is economically justified and that the new lock is expected to provide average annual benefits of \$77.4 million at a BCR of 2.42 at the current discount rate of 2.75% or a BCR of 2.32 at 7.0%.
5. Post Authorization Change. Originally authorized in Section 1149 of WRDA 1986, as amended, at a total cost of \$227,428,000. The Current Authorization in Section 3091 of WRDA 2007 (PL 110-114, 8 Nov 2007) provided for construction at full federal expense at a cost of \$341,714,000 (FY07 Price Level). The current project first cost estimate is \$922,432,000 (FY19 price level). The fully funded cost estimate which considers inflation through the mid-point of construction is approximately \$1 billion. This increase is primarily due to design changes, reassessment of contractor markups and contingency adjustment based on a Cost and Schedule Risk Analysis (CSRA) as certified by the Cost Engineering Mandatory Center of Expertise (Cost MCX) on 20 February 2018.

CELRD-PDS

SUBJECT: Transmittal of Economic Validation Study Report and Post Authorization Change Report (PACR) for the New Soo Lock, St. Marys River, Sault Ste. Marie, Michigan

6. Conclusion. I hereby submit the enclosed PACR and supporting Validation Study report and concur with the findings and recommendations of the District Engineer, LTC Dennis Sugrue. In addition, I confirm that these reports comply with all applicable policy and laws in place at the time of its completion and recommend they be used as the basis for increasing the authorized project cost to \$922,432,000 for the New Soo Lock, St. Mary River, Sault Ste. Marie, MI.

7. Any questions on this matter should be directed to Mr. Gary Mosteller, District Support Program Manager, 513-684-6502; gary.a.mosteller@usace.army.mil.

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Encls

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Date: 2018.06.21 16:17:27 -0400

R. MARK TOY
Brigadier General (P), USA
Commanding



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USACE Detroit District Recommendation



DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
477 MICHIGAN AVENUE
DETROIT MI 48226-2550

REPLY TO
ATTENTION OF:

CELRE-ZA


MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Great Lakes and Ohio River Division (CELRD-PDS-P/ATTN: Gary Mosteller) 550 Main Street, Cincinnati, OH 45202

SUBJECT: Soo Locks, Sault Ste. Marie, Chippewa County, MI. New Soo Lock Economic Validation Study and Post Authorization Change Report (P2# 112425) Request for Report Concurrence.

1. The Detroit District provides the Final New Soo Lock Economic Validation Study and Post Authorization Change Report for LRD concurrence.
2. Construction of a new lock at the Soo Locks Complex, located on the St. Marys River at Sault Ste. Marie, Michigan, is necessary and prudent to ensure reliability at this critical location in the Great Lakes Navigation System, which is essential to U.S. manufacturing and National Security. The new lock will be the same dimensions as the largest existing lock at the site, and will replace two obsolete locks which were built during WWI.
3. The Validation Study concluded that the new lock is expected to provide annual benefits of \$77.4 million and a BCR of 2.42 at the current Federal discount rate (2.75%). At the OMB 7.0% discount rate, the BCR is 2.32. The project first cost is \$922,432,000 in FY19 dollars. The fully funded cost estimate which considers inflation through the mid-point of construction is approximately \$1 billion.
4. The Detroit District submitted the Draft Validation Study and Post Authorization Change Report to LRD in May 2018 for review and comment. All LRD comments have been addressed and are closed out in Dr. Checks. All USACE HQ review comments have been addressed. ATR certification was received 13 June 2018. A successful USACE Headquarters Change Control Board was held on 18 April 2018.
5. Point of contact for this memorandum is Project Manager, Lisa Morgan, at (304) 399-5545 or lisa.r.morgan@usace.army.mil or Lead Project Planner, Susan Henshaw, at 313-226-2099 or susan.henshaw@usace.army.mil.

Encls.

1. Validation Study
2. Post Authorization Change Report
3. Report Certifications


DENNIS P. SUGRUE
LTC, EN
Commanding