



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

CECW-ZB (1105)

12-Jun-2026

**MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)**

**SUBJECT: Rio de Flag, Flagstaff, AZ Validation Report**

1. Purpose. To provide for your review and concurrence the enclosed Validation Report for the Rio de Flag Flood Risk Management Project located in Flagstaff, Arizona. The report supports the authorization of a new project cost and affirms continued project justification and Federal interest. The report documents the need to increase the authorized project first cost from \$102,884,000 (FY 2017 price levels) to \$244,633,000 (FY 2026 price levels). The estimated total cost has exceeded the limit imposed by section 902 of the Water Resources Development Act of 1986, as amended (33 U.S.C. § 2280), requiring additional congressional authorization. The primary driver of the cost increase is due to engineering design changes. Specifically, the reasons for the design changes include advancing design and construction efficiency, engineering best practices, input from subject matter experts on railroad related impacts and considerations, construction methodology changes, change in stone source, quantity increases, subsurface variability, and site-specific conditions identified through the design process.

2. Authorized Project. The project was first authorized for construction in WRDA 2000, Section 101(b)(3) (P.L. 106-541), for the purpose of flood damage reduction for the City of Flagstaff, Arizona. The authorization was modified to increase the authorized cost in WRDA 2007 (P.L. 110-114) and again in WRDA 2016 (P.L. 114-322). The authorized project consists of open-channel modifications, a detention basin, berms, floodwalls, and large buried concrete box culverts.

3. Post-Authorization Change. The project is currently in the construction phase. Constructed phases of the project include Phase 1 - Clay Avenue Wash Detention Basin, Phase 2 - Butler Tunnel, and Phase 3 - Thorpe Bridge. Remaining phases include Phase 4 - Lower Rio de Flag Reach; Phase 5 - Upper Rio de Flag Reach; and Phase 6 - Clay Avenue Wash Reach.

a. Constructed phases of the project (primarily Clay Avenue Wash Detention Basin) are providing flood risk management benefits; approximately 49% of total project benefits are being realized while the other 51% of the benefits will be realized with the completion of the remaining phases 4 through 6. The remaining project feature (comprised of phases 4-6) primarily includes an integrated channel system, underground concrete box channel and open channel improvements and floodwalls.

Upon completion, the project will provide flood risk management benefits along the Rio de Flag and Clay Avenue Wash through downtown Flagstaff.

b. The aggregate design maturity is approximately 85% and construction of Phase 4 is projected to start in 2027.

c. Approximately \$41 million of the increase in project first cost is attributable to the change in price levels since the prior WRDA 2016 project authorization. An additional \$3 million is due to the inclusion of costs for Phase 3 of the project that were not included in the previous authorized cost. The remaining increases in project first cost are due to the following factors that do not substantially alter the scope or purpose of the project.

1) \$47 million due to design refinements. The design changes are consistent with the authorized project scope and purpose, and there are no changes in location or project alignment. Reasons for the design changes include:

i. Increased reinforced concrete box and channel section thickness based on design loading refinements and increased reinforced concrete box and channel depth based on addition of risk and uncertainties methodology to hydraulic design (\$28 million).

ii. Revised bedrock excavation method from mechanical to use of micro-blasting excavation to construct the reinforced concrete box and channel to minimize impacts to adjacent railroad and business operations (\$4 million).

iii. Increased shoring requirements for excavation to minimize real estate easement and accommodate railroad track loading (\$10 million).

iv. Change in availability of riprap material and market assumptions at time of estimates required shift to importing stone from a commercial quarry 40 miles offsite (\$2 million).

v. Variations in quantities for other project elements (\$3 million).

2) \$25 million due to updated labor cost estimates.

3) \$22 million due to increased contingency across all accounts.

4) \$4 million due to increases in parcel values.

#### 4. Economic Evaluation and Federal Interest.

a. The authorized project remains economically justified under the increased total project cost estimate. At current FY 2026 price levels and based on a 3.25 percent discount rate and a 50-year period of analysis, the project has equivalent annual benefits of \$16,868,000 and equivalent annual costs of \$11,339,000. Equivalent annual net benefits total \$5,529,000 and the updated benefit to cost ratio (BCR) is 1.5 (with a remaining benefit/remaining cost ratio of 0.9). The project includes a small recreation component (with a first cost of \$533,000), which is economically justified with equivalent annual benefits of \$158,000, equivalent annual costs of \$22,000, equivalent annual net benefits totaling \$136,000, and a BCR of 7.2.

b. The project also remains in the Federal interest from a comprehensive benefits perspective, including the following benefits:

1) Protecting critical infrastructure and access to critical infrastructure in the project area, including the City's only 24-hour emergency medical center, police, fire, the City's wastewater treatment plant, and BNSF Railway's high-traffic Southern Transcon route;

2) Protecting national supply chains, the local tourism industry and the regional economy;

3) Protecting major community infrastructure projects such as the Downtown Mile;

4) Promoting social connectedness and communal identity, through impacts to the community's vision of the future, core values, sources of group pride and honor, and views of community belonging and cohesiveness; and

5) Supporting the Department of War (DoW) mission by reducing flood risks to Route 66, which is a critical transportation route to Camp Navajo, a DoW training installation, managed by the Arizona National Guard. Other Federal assets impacted by flooding of Route 66 include the Naval Observatory Flagstaff Station, field training sites for the National Aeronautics and Space Administration, and the US Geological Survey Science Campus.

5. Environmental Compliance. An Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act was completed in 2000 as part of the Feasibility Report for the project and a Record of Decision was signed in 2002. This included environmental compliance under the Endangered Species Act, Clean

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Water Act, and the National Historic Preservation Act. Two supplemental Environmental Assessments (EA) were completed subsequent to the 2000 EIS in 2004 and 2009 to inform decisions regarding earlier design changes. Both of these EAs resulted in Findings of No Significant Impact (FONSI) beyond those documented in the 2000 EIS and 2002 Record of Decision. A draft supplemental EA was released in 2023 that discussed the design changes proposed since the 2009 EA, which are now also addressed in the Validation Report. The final supplemental EA, while not integrated within the validation report, contains the alternatives presented in the validation report and can be found in Appendix B. Earlier consultations with resource agencies were confirmed to be sufficient for the proposed design changes, but an amended Memorandum of Agreement under the National Historic Preservation Act was signed on 2 Jun 2021. Mitigation identified in the 2000 EIS remained unchanged.

## 6. Risks

a. The primary risk to completion of this project is acquisition of the real estate, especially from the BNSF Railway. The remaining Project feature will be constructed both above and below ground within approximately 20 feet of the BNSF's high-volume Southern Transcon railway lines.

b. USACE conducted a change control board in June 2025, which recommended a post-authorization change report, subject to resolution of the significant real estate risk. Without agreement with BNSF Railway by 30 June 2026, USACE will consider termination of the Project.

6. Recommendation. I report that the project remains engineeringly feasible, environmentally acceptable, economically justified, and in the Federal interest. I recommend the enclosed validation report be transmitted to Congress as a basis for increasing the authorized project cost of the Rio de Flag, Flagstaff, AZ project, to \$244,633,000 (FY 2026 price levels).



JASON E. KELLY

Major General, USA

Deputy Commanding General

for Civil and Emergency Operations