U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: **INFORMATION:** Incorporating Resilience Betterments into ER-Funded Projects

Date: November 13, 2024

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In Reply Refer To:
HISM-10

To: Division Administrators
Emergency Relief Coordinators
Directors of Field Services

The Bipartisan Infrastructure Law (enacted as the Infrastructure Investment and Jobs Act, Public Law 117-58) amended the statutory authority for the Emergency Relief (ER) program at Title 23, United States Code (U.S.C.), Section 125 to emphasize eligibility of economically justifiable improvements that mitigate the risk of recurring damage from extreme weather, flooding, and other natural disasters.[1] The following process is suggested for State departments of transportation (State DOT), Territory governments, and local public agencies (LPA) to evaluate whether to incorporate a resilience betterment into an ER-eligible repair or reconstruction project.

Betterments

Within the ER program, improvements to damaged facilities are often accomplished through betterments. A betterment is an "added protective feature, such as rebuilding of roadways at a higher elevation or the lengthening of bridges, or changes which modify the function or character of a highway facility from what existed prior to the disaster or catastrophic failure, such as additional lanes or added access control."[2] A resilience betterment is one intended to help mitigate the risk of recurring damage from future hazard events, such as replacing a culvert with a bridge to protect against flooding.

Under the ER program, betterments are eligible for ER funding only where there is clear economic justification that the betterment will prevent future recurring damage. Economic justification must weigh the cost of the betterment against the risk of eligible recurring damage and the cost of future repair.[3] In some cases, resilience may be improved by building to current standards; for purposes of the ER program this is not considered a betterment and does not require an economic justification.

[1] 23 U.S.C. 125(d)(2).
[2] 23 CFR 668.103.
[3] 23 CFR 668.109(b)(6).

Prior to an Event

1. Prior to disasters, ensure that State/Territory transportation plans, metropolitan or other regional transportation plans, and State asset management plans include considerations of extreme weather and resilience as required by Federal law and regulations.[4] These plans can help facilitate identifying and incorporating resilience considerations into decisions, such as siting new transportation facilities, allocating funds to rehabilitate or protect assets, and including adaptive action in regular maintenance and rehabilitation of assets. The following links provide additional resilience resources:

    - Resilience - Sustainability - Environment - FHWA
    - Resources - Asset Management - Federal Highway Administration (dot.gov)
    - Addressing Resilience to Climate Change & Extreme Weather in Transportation Asset Management

2. Review the risks identified by the State DOT to comply with Title 23, Code of Federal Regulations (CFR), Part 515.7(c)(1) and the list developed to comply with 23 CFR part 667. Identify whether a resilience project has previously been completed or is planned at a site, or if one should be considered based on identified risks:

    a. A State DOT shall establish a process for developing a risk management plan. This process shall, at a minimum, produce the following information: identification of risks that can affect the condition of National Highway System (NHS) pavements and bridges and the performance of the NHS, including risks associated with current and future environmental conditions, such as extreme weather events, climate change, and risks related to recurring damage and costs as identified through the evaluation of facilities repeatedly damaged by emergency events carried out under 23 CFR 667.[5]
    b. Each State DOT shall conduct statewide evaluations to determine if reasonable alternatives exist to roads, highways, and bridges that have required repair and reconstruction activities on two or more occasions due to emergency events, such as from seismic events.[6]
    c. Information and strategies in 23 CFR 667 evaluations can be used to identify resilience improvements that have been or will be pursued in project development inside and outside of the Federal Highway Administration (FHWA) ER Program. For additional information see: Questions and Answers Regarding Implementation of 23 CFR Part 667: Periodic Evaluation

[4] Statewide and metropolitan planning requirements related to resilience are found at 23 CFR 450.206(a)(9), 450.306(b)(9), 450.316(b), and 450.324(f)(7). Asset management plans must identify risks, including current and future environmental conditions, that can affect NHS pavements and bridges and the performance of the NHS (23 CFR 515.7(c)(1) and 515.9(d)(6)), and asset management plans' risk and lifecycle cost analyses must include consideration of extreme weather and resilience (23 U.S.C. 119(e)(4)(D)). In addition, 23 CFR part 667 provides requirements to include consideration of resilience within approved asset management plans.
[5] 23 CFR 515.7(c)(1).
[6] *See* 23 CFR 667.1.

of Facilities Repeatedly Requiring Repair and Reconstruction Due to Emergency Events.

3. Consider the following factors:

    a. Criticality of the facility – Has a previous vulnerability assessment identified this facility as being part of critical infrastructure? If not, how important is the facility to the functioning and resilience of the transportation network? Factors that might be considered include how the facility contributes to emergency response, if it serves a major community activity center, its functional classification, average annual daily traffic, and whether it serves an area of persistent poverty or a historically disadvantaged community.
    b. Impact – If the facility is out of service for a long period, what will the consequences be? Do viable detours exist, and if so, how do they affect the movement of people and goods? Is an emergency response plan in place for the affected area that considers the consequences of the facility's potential closure?
    c. Results of 23 CFR 667 – If the affected facility is included on the list developed for 23 CFR 667, consider the results of the evaluations required as part of the process for developing an asset management plan's risk management plan[7] and how identified risks could be addressed through a resilience betterment.

Developing a Resilience Betterment After a Disaster

1. When developing the resilience betterment for the Detailed Damage Inspection Report (DDIR), the facility owner should evaluate:

    a. The likely cause of the facility failure.
    b. The risk analysis completed in accordance with 23 CFR 515.7(c)(1), and if the hazard event (i.e., natural disaster or catastrophic failure), changing environmental conditions, or climate change is likely to affect the facility again during its remaining useful life. If so, determine whether repairing or rebuilding to current standards will achieve goals and objectives for future performance of the facility or whether repairing or rebuilding with protective features might be necessary to achieve the performance objectives.[8]
    c. The condition of the asset as described in the asset management plan and informed by the evaluations performed to comply with 23 CFR 667 (as applicable).[9]

2. Determine if a resilience betterment might be needed to achieve the facility's continued functioning, based on the projected hazard event or future environmental

[7] *See* 23 CFR 515.7(c).
[8] Note that building to current codes and standards is not considered a betterment but may increase resilience. Improvements required by codes and standards do not need the economic justification required for betterments according to 23 CFR 668.109(b)(6).
[9] See 23 CFR 515.9(d)(3).

conditions and design requirements, evaluate the adaptive capacity of the current facility and what type of improvements could be effective to achieve this function. When identifying and evaluating resilience betterment alternatives, consider previously successful strategies used elsewhere, conduct outreach to other transportation agencies that have faced similar problems, evaluate case studies, consider lists of strategies from other sources, or contact the FHWA Division Office for technical assistance. Additional FHWA resilience resources are available at Resilience - Sustainability - Environment - FHWA (dot.gov).

3. In accordance with 23 CFR 668.109(b)(6), the facility owner must include an economic justification for the resilience betterment. Review economic justifications for the resilience betterment and ensure the betterment complies with all Federal requirements:

    a. The facility owner should develop a Benefit Cost Analysis (BCA), which is the approach FHWA uses to demonstrate cost effectiveness of projects. To be eligible for ER funds, the BCA must consider only the cost of the betterment against the risk of eligible recurring damage and the cost of future repair,[10] i.e., this BCA considers only the costs to develop the resilience betterment and the costs to repair/replace the damaged asset over time if resilience improvements are not completed.
    b. The facility owner should consider long term operations and maintenance (O&M) costs of the betterment and how the O&M will be funded, as the cost could impact the decision to pursue the betterment.

4. Evaluate the proposed resilience betterment to determine if it meets ER Program eligibility requirements.[11] A resilience betterment that does not satisfy economic justification for use of ER funding may still be desirable based on additional factors (traveler delay, reduced economic activity, etc.). In this case, the resilience betterment may be funded with State or agency resources or other apportioned or allocated Federal-aid funds for which the betterment would be eligible.

5. After the emergency event occurs, State DOTs are required to update the evaluation of facilities repeatedly needing repair to the extent needed to add any roads, highways, or bridges that were affected by the event.[12] The updated evaluation should reflect improvements to damaged facilities that are intended to increase resilience. This updated information should also be included in the DDIR that is submitted to FHWA.
6. Share best practices with other State DOTs, Territories, Federal Land Management Agencies, FHWA Divisions, Federal Lands Highway Divisions, and the Office of Tribal Transportation through FHWA's ongoing technical assistance and information sharing Webinars, case studies, and trainings. Some case studies can be found on the FHWA Emergency Relief website.

[10] 23 CFR 668.109(b)(6).
[11] ER program eligibility requirements are established in 23 U.S.C. 125 and further clarified in 23 CFR part 668.
[12] 23 CFR 667.7(a).

Except for the statutes and regulations cited, the contents of this document do not have the force and effect of law and are not meant to bind the States. Territories, LPAs or the public in any way. This document is intended only to provide information regarding existing requirements under the law or agency policies.

If you have any questions, please contact Alex Appel at Alex.Appel@dot.gov or Laurel McGinley at Laurel.McGinley@dot.gov.