



U.S. DEPARTMENT OF TRANSPORTATION  
**OFFICE OF INSPECTOR GENERAL**

**FHWA Lacks Detailed Guidance on  
Infrastructure Resilience for Emergency  
Relief Projects and a Process To Track  
Related Improvements**

**FHWA**

Report No. ST2018014

January 10, 2018





## FHWA Lacks Detailed Guidance on Infrastructure Resilience for Emergency Relief Projects and a Process To Track Related Improvements

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*Self-initiated*

Federal Highway Administration | ST2018014 | January 10, 2018

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### What We Looked At

The Federal Highway Administration's (FHWA) Emergency Relief Program (ERP) provides funds for the repair and reconstruction of highways and roads that have sustained serious damage from catastrophic failures or natural disasters, including extreme weather events. Since fiscal year 2012, Congress has appropriated approximately \$5.7 billion to the ERP. The Department of Transportation's (DOT) current draft strategic plan states that the Department will better ensure that infrastructure is resilient enough to withstand extreme weather that could disrupt the transportation network and require major reconstruction. Because of the importance resilience plays in ensuring a safe and reliable transportation system, we assessed FHWA's guidance and processes for incorporating resilience improvements into emergency relief projects to rebuild damaged highway infrastructure.

### What We Found

While FHWA's primary guidance for the ERP was updated in 2013 to include a greater focus on infrastructure resilience, we found it to be inadequate in some areas. The guidance does not define "resilience improvement," inform States how to incorporate resilience improvements into emergency relief projects, or share related best practices. These gaps in the guidance have led to inconsistent interpretations of what resilience is by the Agency's Division Offices and State DOTs, and make it difficult for State DOTs to make informed decisions about how they should use emergency relief funding for projects. As a result, States may not be improving the resilience of transportation infrastructure to the extent possible.

FHWA also has no process to track State DOTs' efforts to include resilience improvements in their emergency relief projects. While no specific requirement exists for FHWA to conduct such tracking, the Agency's lack of data on resilience improvements impedes its ability to ensure that the benefits of resilience are achieved in emergency relief projects and enhance its stewardship of ERP funds.

### Our Recommendations

FHWA concurred with two of our recommendations to strengthen the Agency's ERP guidance on resilience and enhance its oversight of ERP-funded projects, and partially concurred with the third.

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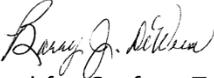


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## Memorandum

Date: January 10, 2018

Subject: INFORMATION: FHWA Lacks Detailed Guidance on Infrastructure Resilience for  
Emergency Relief Projects and a Process To Track Related Improvements |  
Report No. ST2018014

From: Barry J. DeWeese   
Assistant Inspector General for Surface Transportation Audits

To: Federal Highway Administrator

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Extreme weather events, such as recent Hurricanes Harvey, Irma, and Maria,<sup>1</sup> present significant risks to the safety, reliability, and sustainability of the Nation's transportation infrastructure and operations. The Federal Highway Administration's (FHWA) Emergency Relief Program (ERP)<sup>2</sup> provides funds for the repair and reconstruction of highways and roads that have sustained serious damage from catastrophic failures or natural disasters, including extreme weather events. Since fiscal year 2012, Congress has appropriated approximately \$5.7 billion to the ERP. The Department of Transportation's (DOT) current draft strategic plan<sup>3</sup> states that the Department will better ensure that infrastructure is resilient enough to withstand extreme weather that could disrupt the transportation network and require major reconstruction.

Resilience is generally defined as the ability to anticipate and prepare for, respond to, and recover rapidly from disruptions. Various FHWA guidance documents state that the creation of a resilient highway system is a priority for the Agency and that emergency relief projects should consider features to reduce the risk of damage from emergency events.<sup>4</sup>

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<sup>1</sup> By September 20, 2017, the President had declared major disasters in Florida, Georgia, Puerto Rico, Texas, and the U.S. Virgin Islands as a result of the destruction caused by the three hurricanes in August and September 2017.

<sup>2</sup> Established under 23 U.S.C. § 125.

<sup>3</sup> DOT, *Draft Strategic Plan for FY 2018-2022*, October 19, 2017. DOT also emphasized the need for increased resilience in its previous strategic plan (DOT, *Transportation for a New Generation: Strategic Plan, Fiscal Years 2014-2018*).

<sup>4</sup> As defined by FHWA, an emergency event is a natural disaster or catastrophic failure resulting in an emergency declared by the State's Governor or an emergency or disaster declared by the President of the United States.

Because of the importance resilience plays in ensuring a safe and reliable transportation system, we conducted this audit of FHWA's use of the ERP to improve highway infrastructure resilience. Our objective was to assess FHWA's guidance and processes for incorporating resilience improvements into emergency relief projects to rebuild damaged highway infrastructure. Specifically, we assessed FHWA's (1) guidance for the ERP regarding resilience and (2) process for overseeing resilience improvements.

We conducted this audit in accordance with generally accepted Government auditing standards. As part of our work, we reviewed Federal laws and regulations, and DOT's and FHWA's policies and guidance for emergency relief projects and resilience. We interviewed officials at FHWA's Office of Program Administration, and five FHWA Division Offices and State Departments of Transportation (State DOT).<sup>5</sup> We sent questionnaires to seven additional FHWA Division Offices and State DOTs and reviewed their responses.<sup>6</sup> We reviewed documentation from a random sample of 97 out of 3,602 emergency relief projects authorized between fiscal years 2012 through 2016. We also interviewed other stakeholders, such as DOT's Office of the Secretary (OST), the Federal Transit Administration (FTA), and the American Association of State Highway and Transportation Officials. Exhibit A details our scope and methodology. Exhibit B lists the entities we visited or contacted.

We appreciate the courtesies and cooperation of Department of Transportation representatives during this audit. If you have any questions concerning this report, please call Barry J. DeWeese, Assistant Inspector General for Surface Transportation Audits, at (202) 366-5630.

cc: The Secretary  
DOT Audit Liaison, M-1  
FHWA Audit Liaison, HCFB-32

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<sup>5</sup> We visited Division Offices and State DOTs in California, Colorado, Louisiana, New York, and Washington—States that received substantial amounts of ERP funds since fiscal year 2012.

<sup>6</sup> We surveyed Division Offices and State DOTs in Alaska, Florida, Hawaii, New Jersey, North Dakota, Ohio, and Puerto Rico to include a diverse geographic representation of States. In this report, we refer to Puerto Rico as a State.

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## Results in Brief

**While FHWA’s 2013 update of the Emergency Relief Manual includes more focus on infrastructure resilience, it does not define “resilience improvement,” inform States how to incorporate resilience improvements into ERP-funded projects, or share related best practices.**

For example, the Manual lacks detail on how State DOTs should justify the risk and cost effectiveness of possible improvements, and how FHWA will evaluate the results. These gaps in the guidance have led to different interpretations of what resilience is by the Agency’s Division Offices and State DOTs. According to FHWA, the Agency’s responsibilities include assistance to State DOTs in their applications for ERP funding. However, because it lacks a process to identify and share best practice information from its Division Offices, the Agency does not communicate best practices at the national level. This lack of shared information about best practices for the inclusion of resilience in emergency relief projects makes it difficult for State DOTs to make informed decisions on how to spend ERP funds. These shortcomings in FHWA’s guidance also limit the Agency’s ability to oversee a national program consistently.

**FHWA also has no process to track State DOTs’ efforts to include resilience improvements in their ERP-funded projects.**

Although FHWA’s Emergency Relief Manual emphasizes that projects should consider features to reduce risk of damage from emergency events, Agency officials stated that they have little knowledge of the extent to which the funds are used for resilience improvements. FHWA uses its Fiscal Management Information System (FMIS) to manage ERP funds and projects but the system does not track investments for resilience improvements. Furthermore, we found that of the 12 Division Offices and State DOTs we contacted, only Colorado’s Division Office and State DOT could quantify the amount of ERP funds used to improve highway resilience and how those funds were spent. The Colorado State DOT found it useful to track resilience funding given the Governor’s goal to rebuild a more resilient transportation infrastructure system. However, FHWA officials stated that the Agency is not required to track resilience investments. While there may be no specific requirement for tracking, FHWA’s lack of basic data on resilience improvements impedes the Agency’s ability to adequately ensure that the benefits of resilience are achieved in emergency relief projects and enhance its stewardship of ERP funds.

We made three recommendations to strengthen FHWA’s ERP guidance regarding resilience and enhance its oversight of ERP-funded projects.

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## Background

ERP funds are available to States in addition to their regular Federal-aid highway funding and to Indian tribal Governments and Federal agencies for public roads under their jurisdictions. Since 1972, the ERP has been funded through a recurring annual authorization of \$100 million, and Congress has provided supplemental appropriations when needs have exceeded available funding. FHWA's Office of Program Administration manages the ERP nationally by allocating funds and establishing policy, regulation, and guidance, and delegates oversight of States' implementation of the Program to its Division Offices.

ERP funds are generally intended to help jurisdictions reopen roads to traffic and restore highways to their pre-disaster condition. However, rebuilding infrastructure to pre-disaster conditions may leave roads and highways vulnerable to another disaster and increase the risk of future losses. Consequently, ERP funds can also be used to improve the resilience of a highway to mitigate the risk of damage from future emergency events when economically justified. Additionally, the Moving Ahead for Progress in the 21<sup>st</sup> Century Act of 2012<sup>7</sup> (MAP-21) makes ERP funds eligible for rebuilding highways to current design standards—allowing for associated resilience improvements. MAP-21 also calls for State DOTs to consider reasonable alternatives<sup>8</sup> for highways that have required Federal funds for multiple repairs due to emergency events.<sup>9</sup>

In the fall of 2012, Hurricane Sandy caused widespread damage to transportation infrastructure in the mid-Atlantic and northeastern United States. After Sandy, DOT's then Deputy Secretary testified before Congress that rebuilding highways with resilience will be the future standard, and that cost savings can be realized by ensuring that transportation infrastructure is built to withstand future storms. FHWA has also placed an emphasis on infrastructure resilience in its plans and policies applicable to the ERP and many of its other Federal-aid highway programs, such as the Surface Transportation Program. FHWA supports the assessment of infrastructure vulnerabilities and the consideration of resilience in the transportation planning and project development process. Accordingly, the Agency encourages<sup>10</sup> States to use their regular Federal-aid highway funding to improve the resilience of highway infrastructure, and through its Office of Planning, Environment, and Realty, provides technical assistance to States and local agencies to help them improve infrastructure resilience.

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<sup>7</sup> Public Law No. 112-141.

<sup>8</sup> Reasonable alternatives include activities that could reduce the need to expend Federal funds on repairs and reconstruction, better protect public safety and health and the environment, and meet transportation needs.

<sup>9</sup> Implemented by 23 C.F.R. § 667.

<sup>10</sup> FHWA Order 5182.1, *Emergency Relief Program Responsibilities*, February 2016.

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# FHWA's ERP Guidance Lacks Detail on Resilience and Incorporating Best Practices

FHWA's updated guidance on the ERP for Division Offices and State DOTs includes more focus on infrastructure resilience but does not provide sufficient information on resilience, including a definition of "resilience improvement." It also does not inform States how to incorporate resilience improvements into their ERP-funded projects, or share related best practices. These shortcomings in FHWA's guidance limit the Agency's ability to oversee the ERP consistently throughout its Divisions and enhance its stewardship of ERP funds.

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## FHWA's ERP Guidance for Division Offices and State DOTs Does Not Include Sufficient Detail on Resilience

FHWA's Emergency Relief Manual—which provides guidance, criteria, and procedures for FHWA and State DOTs to implement the ERP—does not clearly define a resilience improvement or include procedures that State DOTs should use to incorporate resilience into their ERP-funded projects.

FHWA's strategic plan,<sup>11</sup> which details the Agency's goals and long term objectives, includes an objective for the Agency to achieve greater consistency in interpreting and communicating Federal policies and guidance among all offices in order to enhance the stewardship of Federal funds. Additionally, the Government Accountability Office's (GAO) *Standards for Internal Control in the Federal Government*<sup>12</sup> (Federal Control Standards) indicates that Federal agencies' management should provide guidance to staff on how to achieve mission objectives and document their processes in management directives, administrative policies, or operating manuals.

In 2013, FHWA updated its Emergency Relief Manual to include an increased focus on infrastructure resilience. The Manual states that the design and construction of repairs should consider long-term resilience. It also calls for State DOTs to evaluate proposed replacements' resilience and consider incorporation of cost effective features that will make the replacements resilient and reduce the risk of future damage. In January 2017, FHWA published on its website

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<sup>11</sup> FHWA Strategic Plan (FHWA-PL-08-027), January 2017.

<sup>12</sup> GAO, *Standards for Internal Control in the Federal Government* (GAO-14-704G), September 2014.

supplemental guidance on the ERP and resilience in the form of frequently asked questions.<sup>13</sup>

Despite the updates, however, FHWA's Manual lacks detail on what constitutes a resilience improvement. It defines resilience as the capability to anticipate, prepare for, respond to, and recover from significant, multi-hazard threats with minimum damage to social well-being, the economy, and the environment.<sup>14</sup> The Manual does not, however, define what constitutes a "resilience improvement." As a result, Division Offices and State DOTs have different understandings of what a resilience improvement is. For example, Colorado State DOT considers anything beyond an in-kind repair or replacement a resilience improvement—including building to current design and construction standards—while California State DOT considers only added protective features as resilience improvements.

The Manual also lacks detail on how State DOTs should justify possible improvements' cost effectiveness and how FHWA evaluates these justifications. Officials at seven FHWA Division Offices and five State DOTs informed us that the Manual also does not provide adequate guidance on what State DOTs should do to incorporate resilience into emergency relief projects. For example, in one section, the Manual calls for the use of a risk-based analysis for the design and construction of repairs to ensure cost effectiveness and reduce future losses. However, it does not describe how such a risk-based analysis should be conducted or evaluated. In contrast, FTA has developed a tool for transit agencies to evaluate potential resilience improvements and assess their cost effectiveness.<sup>15</sup> While FHWA has also developed a tool for State DOTs to use to evaluate possible resilience improvements and assess their cost effectiveness, the tool was not designed specifically for the ERP.<sup>16</sup>

The Manual also defines betterments as a type of resilience improvement with added protective features that go beyond current design and construction standards or a change that modifies the function or character of the highway. Regulations<sup>17</sup> require that betterments be economically justified to prevent future damage. The Manual states that a betterment can be justified by comparing its cost to the projected cost of possible future ERP-eligible repairs throughout the life of the unimproved highway. However, the Manual does not explain what information State DOTs should consider in these justifications, or how FHWA will

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<sup>13</sup> FHWA, *FAQ: Emergency Relief Program and Resilience*, January 2017.

<sup>14</sup> The definition of resilience in the Manual is stricter than the definition in subsequent FHWA policy. FHWA Order 5520 defines resilience as the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.

<sup>15</sup> FTA, *Hazard Mitigation Cost Effectiveness Tool*, March 2017.

<sup>16</sup> FHWA, *Adaptation Decision-Making Assessment Process* (FHWA-HEP-17-004), September 2016.

<sup>17</sup> 23 C.F.R. § 668.109(b)(6).

evaluate the justifications. In a related 2011 report, GAO recommended<sup>18</sup> that FHWA develop standards for approving betterments. FHWA responded with an Order<sup>19</sup> to strengthen its administration and oversight of the ERP, and referred to a plan to update its Manual with improved guidance. However, according to an FHWA official, this update will not be complete until mid-2018.

These shortcomings in FHWA's guidance limit the Agency's ability to oversee the ERP consistently throughout its Divisions and enhance its stewardship of ERP funds. While FHWA's Office of Program Administration is responsible for overall management of ERP funds and maintenance of the Program's guidance, FHWA officials informed us that the Agency defers interpretation of what a resilience improvement is to the Division Offices and State DOTs. The FHWA officials also stated that the Office of Program Administration allows the Divisions and States to decide what procedures States use to incorporate resilience into ERP-funded projects.

FHWA's lack of guidance on how to manage resilience improvements also makes it difficult for State DOTs to make informed decisions about how they should use ERP funding for projects. For example, according to New Jersey DOT officials, their Agency spent significant time and resources to identify, analyze, and apply for funding for numerous resilience improvements that FHWA ultimately denied.<sup>20</sup> While FHWA has established a working group to update its Manual, the Agency does not have a process in place to consider input on the Manual from State DOTs and local agencies. In contrast, FTA has published a public notice in the Federal Register,<sup>21</sup> as required by law,<sup>22</sup> to solicit feedback on guidance it has proposed for States and transit agencies on its ERP.

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## **FHWA's ERP Guidance Does Not Establish a Process for Capturing and Sharing Best Practices for Improving Resilience**

FHWA's Office of Program Administration does not have a process to incorporate best practices into its ERP guidance to help Division Offices and State DOTs develop highway resilience improvements.

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<sup>18</sup> GAO, *Highway Emergency Relief: Strengthened Oversight of Project Eligibility Decisions Needed* (GAO-12-45), November 2011.

<sup>19</sup> FHWA Order 5182.1.

<sup>20</sup> According to FHWA, some of New Jersey DOT's resiliency projects that did not meet ERP requirements were funded with other apportioned Federal-aid highway program funds.

<sup>21</sup> 80 Fed. Reg. 6170, *Emergency Relief Program: Proposed Guidance*, February 4, 2015.

<sup>22</sup> Under 49 U.S.C. § 5334(k), FTA is required to submit significant guidance documents for notice and comment.

FHWA's strategic plan includes an objective for the Agency to continually improve its ability to efficiently deliver Federal-aid highway programs through innovation, streamlining, and value-added stewardship. According to the Emergency Relief Manual, FHWA's roles and responsibilities include assistance to State DOTs and other agencies in their applications for highway funding, including determination of eligibility. While FHWA's Office of Planning, Environment, and Realty provides technical assistance and tools to help transportation agencies improve resilience, the assistance goes to the broader Federal-aid highway program, not just the ERP. Notably, a 2013 review of the ERP by FHWA's Program Management Improvement Team recommended that the Office of Program Administration develop ways to improve the exchange of information and knowledge and training for the Program.<sup>23</sup>

Furthermore, six of the seven State DOTs we surveyed informed us that they could use information from FHWA on best practices for improving resilience in ERP-funded projects. These State DOTs suggested various ways to collect and communicate such information, including the following:

- Post-event meetings to solicit feedback and surveys on completed emergency relief projects;
- Exchanges of information among States with similar disasters or types of damage to their highway infrastructures;
- FHWA's website and written guidance; and
- Training classes.

However, FHWA lacks a process to identify and share information about these best practices because of the Office of Program Administration's delegation of primary responsibility for ERP oversight to the Division Offices. Consequently, information on best practices is not identified or communicated at the national level. An FHWA case study regarding resilience in emergency relief projects in Louisiana<sup>24</sup> indicates that while each State faces its own unique challenges, many best practices can be applied nationwide.

FHWA's lack of a process to identify and share information to facilitate the consideration of resilience improvements in emergency relief projects makes it difficult for State DOTs to make informed decisions about what to consider when rebuilding damaged infrastructure. For example, after Colorado experienced severe flooding 2013, the State DOT worked with its FHWA Division Office to develop a risk and resilience model with criteria to evaluate improvements that

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<sup>23</sup> FHWA, *National Review of the Emergency Relief Program*, May 2013.

<sup>24</sup> FHWA, *Rebuilding Resiliently in Louisiana* (FHWA-HEP-17-046), April 2017.

would reduce the risk of damage from future events in a cost effective manner. However, FHWA has not shared information about this model or lessons learned from its use with the other Division Offices and States.

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## FHWA Lacks a Process To Track Efforts Related to Resilience in Emergency Relief Projects

FHWA also does not have a process to track the extent to which resilience improvements are considered and incorporated and consequently, does not know the extent to which State DOTs incorporate resilience improvements into their ERP-funded projects.

Under Federal law,<sup>25</sup> FHWA is required to establish an oversight program to monitor the effective and efficient use of funds, including those provided for emergency relief. Furthermore, the Federal Control Standards state that agencies' management should identify, analyze, and respond to risks related to achieving defined objectives.

Moreover, FHWA's Emergency Relief Manual emphasizes that emergency relief projects should consider features to reduce the risk of damage from future events. But while it states in the Manual that repairs to restore highways to pre-disaster condition are the most common uses of ERP funds, FHWA does not track funds for emergency relief work to associate them with the categories of work eligible for ERP funds, such as emergency repairs, permanent restoration work, and betterments. According to FHWA officials, resilience improvements may be included as part of permanent restoration work and betterments. FHWA uses FMIS to manage ERP funds and projects,<sup>26</sup> but does not require State DOTs to capture or include detailed information about their projects' scopes and types of work. We reviewed FMIS documentation for a sample of 97 emergency relief projects with a total obligated amount of \$1 billion for rebuilding damaged infrastructure, but were unable to determine whether any funds were used for resilience improvements. Consequently, FHWA cannot identify the extent to which ERP funds are used for the various categories of work or track the funds used to make emergency relief projects resilient.

Furthermore, according to information from 12 Division Offices and their respective State DOTs, only Colorado was able to quantify the specific amount of

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<sup>25</sup> 23 U.S.C. § 106(g).

<sup>26</sup> FMIS contains project information related to all Federal-aid highway programs that FHWA uses to plan and execute program activities, evaluate program performance, and identify financial trends and requirements related to current and future funding.

ERP funds it had dedicated to improve the resilience of its highway infrastructure. After the flooding in 2013, the Governor of Colorado established a goal to rebuild a more resilient transportation infrastructure and the State DOT found it useful to track resilience funding and quantify the financial benefit of their investments. The Colorado Division Office also used the information to support the use of ERP funds for the resilience improvements. Several other States in our sample could identify the general scope of resilience improvements but could not associate specific project costs to resilience.

During the 2013 internal review of the ERP, the FHWA review team found that in their detailed damage inspection reports (DDIR)<sup>27</sup>—which State DOTs submit to Division Offices to verify eligibility for ERP participation—States did not identify new protective features or upgrades to design and construction standards that could lead to improved resilience. In FMIS, the team found discrepancies in scope of work descriptions compared to the descriptions in the corresponding DDIRs and multiple repair projects authorized as a single project. These deficiencies inhibited the Agency’s ability to track individual projects. The review team recommended that to address the issues, FHWA update both guidance and its DDIR form, but to date, the Agency has not completed any corrective actions. The review team also recommended that the Office of Program Administration identify opportunities to improve its tracking of the ERP application process, Program allocations, obligations, and expenditures, and project milestones.

FHWA Headquarters officials acknowledge they have little information on the extent to which States use ERP funds for resilience improvements but have not taken action to identify how the funds are spent. FHWA’s lack of information about resilience investments limits the Agency’s ability to monitor the effective and efficient use of ERP funds and prevents the Agency from targeting its assistance to effectively promote resilience in emergency relief projects. The lack of data on resilience improvements also makes it difficult for FHWA to be sure that the benefits of resilience in highway infrastructure are achieved.

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## Conclusion

The destruction caused by Hurricanes Harvey, Irma, and Maria and other natural disasters has underscored the value of increased resilience in transportation infrastructure. To enhance the safety, reliability, effectiveness, and sustainability of the Nation’s transportation infrastructure and operations, DOT also emphasizes the need for increased resilience as part of its strategic plan.

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<sup>27</sup> FHWA uses DDIRs to document the extent of damage to transportation infrastructure, scope and costs of preliminary repairs, and funding eligibility.

However, FHWA has not translated this emphasis into adequate guidance for its Division Offices and State DOTs to realize the Department's objectives and enhance stewardship of Federal funds. As a result, States may not be improving the resilience of transportation infrastructure to the extent they could with ERP funds.

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## Recommendations

We recommend that the Federal Highway Administrator:

1. Revise the Emergency Relief Manual to include a definition of resilience improvement and identify procedures States should use to incorporate resilience into ERP-funded projects.
2. Develop and implement a process to identify best practices for improving the resilience of emergency relief projects and share them with Division Offices and State DOTs.
3. Develop and implement a process to track the consideration of resilience improvements for emergency relief projects and their associated costs.

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## Agency Comments and OIG Response

We provided FHWA with our draft report on November 13, 2017, and received its management response on December 13, 2017, which is included as an appendix to this report. FHWA concurred with recommendations 1 and 2 and provided appropriate actions and completion dates. FHWA partially concurred with recommendation 3.

For recommendation 3, FHWA did not support the tracking of associated costs for resilience improvements given that such improvements may be incorporated as part of the project's design and construction standards. The Agency also highlighted that the ERP accounts for less than 0.25 percent of the \$40 billion annual investment in the Federal-aid highway program. However, that figure does not include all appropriations to the program. In addition to the \$100 million appropriated to the program annually, Congress has provided supplemental appropriations totaling—on average—approximately \$850 million annually since fiscal year 2012. Consequently, the ERP actually accounts for over 2 percent of the overall Federal-aid highway program. Nevertheless, after further review, we agree that it would be a significant challenge to separate the cost of resilience improvements from the total costs of an emergency relief project. As an alternative action, the Agency proposes to develop a process to track the

consideration of resilience improvements in emergency relief projects by December 31, 2018, which meets the intent of recommendation 3.

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## Actions Required

We consider recommendations 1 through 3 resolved but open pending completion of the planned actions.

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## Exhibit A. Scope and Methodology

We conducted this performance audit from September 2016 through November 2017 in accordance with generally accepted Government auditing standards as prescribed by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Our objective was to assess FHWA's guidance and processes for incorporating resilience improvements into emergency relief projects to rebuild damaged highway infrastructure. Specifically, we assessed FHWA's (1) guidance for the ERP regarding resilience and (2) process for overseeing resilience improvements.

To conduct our work, we reviewed Federal laws, regulations, policies, procedures, and other guidance to understand the requirements for emergency relief projects and incorporating resilience improvements. We reviewed FMIS documentation for our sampled projects to determine whether resilience improvements were noted or quantified in the system. We reviewed sampled project documentation and interviewed officials during site visits at five FHWA Division Offices and at State DOTs. We also used a questionnaire to assess Division Office and State DOT policies and procedures for incorporating resiliency improvements into Emergency Relief Projects for seven other States.

We were unable to generate a nation-wide universe of emergency relief projects that incorporate resilience improvements since this information is not tracked in FMIS, or collectively by the Division Offices or State DOTs. Consequently, we developed a risk based approach to select a sample of states and emergency relief projects to review. Using FMIS data provided by FHWA, we generated a universe of 3,602 emergency relief projects that are managed by State DOTs and were authorized in FMIS during the period October 1, 2011 through September 30, 2016.<sup>28</sup> We selected a statistical sample of 97 projects with a total obligated amount of \$1 billion, or 36 percent of \$2.8 billion.<sup>29</sup> We used the audit sample to determine what information the Division Offices and State DOTs have regarding resilience improvement on these projects. We incorporated five State DOTs in our review that received the largest amounts of emergency relief funding. We also

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<sup>28</sup> We received a file from FHWA with 3,963 records, which we aggregated by recipient and project number to identify a universe of 3,602 projects.

<sup>29</sup> The obligation amount is the Federal share of a project's eligible cost.

incorporated seven other States to obtain a diverse geographic representation across the country.

We interviewed officials from FHWA's Office of Program Administration, Office of the Chief Financial Officer, Office of Planning, and Environment, and Realty. We also interviewed officials in the Office of Secretary of Transportation and Federal Transit Administration, and representatives from the American Association of State Highway and Transportation Officials. We visited FHWA Division Offices and State DOT offices in California, Colorado, Louisiana, New York, and Washington—States that received substantial amounts of ERP funds since fiscal year 2012. At those locations, we discussed with FHWA and State officials their roles and responsibilities and policies and procedures for including resilience improvements in emergency relief projects. We also discussed how resilience improvements are defined and tracked and the adequacy of FHWA's guidance for incorporating resilience improvements in emergency relief projects. We also assessed the extent to which best practices are incorporated into the Emergency Relief Program. To gather additional information, we also surveyed Division Offices and State DOTs in Alaska, Florida, Hawaii, New Jersey, North Dakota, Ohio, and Puerto Rico to include a diverse geographic representation of States.

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## **Exhibit B. Organizations Visited or Contacted**

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### **Office of the Secretary of the U.S. Department of Transportation**

Headquarters, Washington, DC

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### **Federal Highway Administration**

Office of Program Administration, Washington, DC

Office of the Chief Financial Officer, Washington, DC

Office of Planning, Environment, and Realty, Washington, DC

Alaska Division Office, Juneau, AK

California Division Office, Sacramento, CA

Colorado Division Office, Lakewood, CO

Florida Division Office, Tallahassee, FL

Hawaii Division Office, Honolulu, HI

Louisiana Division Office, Baton Rouge, LA

New Jersey Division Office, West Trenton, NJ

New York Division Office, Albany, NY

North Dakota Division Office, Bismarck, ND

Ohio Division Office, Columbus, OH

Puerto Rico and U.S. Virgin Islands Division Office, San Juan, PR

Washington Division Office, Olympia, WA

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### **Federal Transit Administration**

Headquarters, Washington, DC

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## State Departments of Transportation

Alaska Department of Transportation and Public Facilities, Juneau, AK  
California Department of Transportation, Sacramento, CA  
Colorado Department of Transportation, Lakewood, CO  
Florida Department of Transportation, Tallahassee, FL  
Hawaii Department of Transportation, Honolulu, HI  
Louisiana Department of Transportation and Development, Baton Rouge, LA  
New Jersey Department of Transportation, Trenton, NJ  
New York Department of Transportation, Albany, NY  
North Dakota Department of Transportation, Bismarck, ND  
Ohio Department of Transportation, Columbus, OH  
Puerto Rico Highway and Transportation Authority, San Juan, PR  
Washington State Department of Transportation, Olympia, WA

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## Transportation Association

American Association of State Highway and Transportation Officials, Washington, DC

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## Exhibit C. List of Acronyms

DDIR	detailed damage inspection report
DOT	Department of Transportation
ERP	Emergency Relief Program
FHWA	Federal Highway Administration
FMIS	Fiscal Management Information System
FTA	Federal Transit Administration
GAO	Government Accountability Office
MAP-21	The Moving Ahead for Progress in the 21 <sup>st</sup> Century Act of 2012
OIG	Office of Inspector General
OST	Office of the Secretary

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## Exhibit D. Major Contributors to This Report

JAYDEEP BORWANKAR	PROGRAM DIRECTOR
ARON WEDEKIND	PROJECT MANAGER
DEBORAH KLOPPENBURG	SENIOR AUDITOR
ADAM DUFFY	TRANSPORTATION INDUSTRY ANALYST
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## Appendix. Agency Comments



U.S. Department  
of Transportation  
Federal Highway  
Administration

# Memorandum

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Subject: **INFORMATION**: FHWA Response to the OIG Draft Report, “FHWA Lacks Detailed Guidance on Infrastructure Resilience for Emergency Relief Projects and a Process to Track Related Improvements”

Date: December 13, 2017

From: Brandye L. Hendrickson  
Acting Administrator

In Reply Refer To:  
HCFB-30

To: Barry J. DeWeese  
Assistant Inspector General  
for Surface Transportation Audits

Protecting our Nation’s highway infrastructure is a priority for the Department and the Federal Highway Administration (FHWA). As described in the draft fiscal year 2018-2022 Department of Transportation (DOT) Strategic Plan, the Department is committed to increasing its effectiveness in ensuring that infrastructure is resilient enough to withstand extreme weather events that could otherwise disrupt the transportation network and require major reconstruction. Specifically, the DOT expects recipients of Federal funds to incorporate future operations and maintenance costs associated with a project’s life-cycle into the planning and preparation of a project.

Federal regulations allow the use of Emergency Relief (ER) funds for the repair and reconstruction to current design and construction standards, which are continuously updated to reflect improvements and efficiencies in design and construction practices, thereby improving highway infrastructure resilience. Although resilience is not a Federal requirement of the ER program, FHWA ensures that resilience is broadly integrated into planning, operations, policies, and programs through its oversight of the Federal-aid highway program (FAHP). In its stewardship role under the FAHP, for example, FHWA provides technical assistance at national and project levels for funding recipients to conduct vulnerability assessments of assets, and to incorporate resilience into engineering design processes. In its oversight role under the FAHP, FHWA ensures implementation of the requirements by funding recipients for their integration of resilience into transportation system planning and asset management planning, among other examples. In addition, FHWA:

- Required States, in its Asset Management Plans final rule, to develop and use risk-based asset management plans that consider, among other factors, the potential for and impact of risks associated with extreme weather, climate, and seismic events for those assets covered by the plan;
- Implemented, in its Statewide and Nonmetropolitan Transportation Planning and Metropolitan Transportation Planning final rule, the requirement for resilience as a planning factor that must be addressed in statewide and nonmetropolitan and metropolitan transportation plans;
- Promulgated a final rule for Periodic Evaluations of Facilities Repeatedly Requiring Repair and Reconstruction Due to Emergency Events; and
- Established a performance measure as part of the FHWA Strategic Implementation Plan for Performance Years 16/17, resulting in 95 (above the target of 82) States, large Metropolitan Planning Offices, and Federal Land Management Agencies completing vulnerability assessments of their highway systems to climate change and/or extreme weather.

The DOT and FHWA respond timely, effectively, and efficiently to emergencies and natural disasters, providing critical aid and support to States and the American people. Following the recent catastrophic hurricanes of Harvey, Irma, and Maria, FHWA provided \$133 million via quick release ER allocations to the affected States and Territories. In addition, we deployed FHWA staff to the devastated areas to assist local and other Federal personnel with critical actions, such as reopening roads and restoring infrastructure. For example, approximately 40 FHWA staff have been sent to Puerto Rico and the U.S. Virgin Islands (USVI) on mission assignments to support Division staff and Territorial governments in the response and recovery to the Hurricane Irma-Maria emergency. FHWA staff are also providing support to the Puerto Rico Highway and Transportation Authority and the USVI Department of Public Works in conducting preliminary engineering and construction contract administration activities, to support administering and delivering the ER program and projects.

Based on our review of the draft report, we concur with recommendations 1 and 2 as written and plan to complete the necessary actions by December 31, 2018. We partially concur with recommendation 3. We intend to develop a process to track the consideration of resilience improvements in ER projects. However, we do not support the tracking of associated costs due to the challenges associated with implementing such a metric. It would be impractical to extract the resilience portion of the total ER project costs because resilience is fundamentally incorporated into design and construction standards. Also, as noted in the Office of Inspector General's (OIG) draft report, there is no specific law or regulation requiring FHWA to track data on resilience in the ER program. The ER program accounts for less than 0.25 percent of the \$40 billion annual investment in the FAHP. We plan to complete the necessary actions to track the consideration of resilience improvements for ER projects by December 31, 2018.

We appreciate the opportunity to review the OIG draft report. Please contact Thomas D. Everett, Associate Administrator for Infrastructure, at (202) 366-0371 with any questions.

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