

# Course Overview, Course Goal, and Objectives

Welcome to the Bridge Damage Considerations course.

The course will provide an overview of bridge considerations regarding project eligibility.

By the end of the course, State, Local, Tribal, and Territorial Applicants and Recipients will be able to describe all bridge considerations for the Public Assistance Program and project eligibility.

Upon successfully completing the course, participants will be able to:

- Describe Public Assistance policy and guidance related to bridges
- Identify the documentation requirements for bridges to receive Public Assistance grant funding
- Discuss the eligibility considerations for Emergency Work on bridges to receive Public Assistance grant funding
- Discuss the eligibility considerations for Permanent Work on bridges to receive Public Assistance grant funding

[Select this link to access the Public Assistance acronym list.](#)

## Lesson 1 Overview and Objectives

This lesson includes an overview of the course and its objectives, as well as an explanation that the information provided in this course is applicable to bridges 20 feet or longer and refers participants to the IS-1011 Roads and Culverts course for bridges that do not meet that length.

At the end of this lesson, participants will be able to:

- Identify administrative requirements of the course
- State the goals and objectives of the course
- Identify the technical expertise required to repair, replace, or rebuild bridges

## Assumptions

The content in this course applies only to bridges that are 20 feet or longer, otherwise refer to the IS-1011 Roads and Culverts course. This is because any bridge less than 20 feet long is basically a road.



## Technical Expertise

The type of technical expertise required to repair, replace, or rebuild bridges are FEMA Specialized Engineers. Throughout bridge projects, the role of the FEMA technical experts or specialized engineers are to perform damage assessments, prepare scope of work, and evaluate pre-existing condition of the bridge for compliance with safety standards.



## Lesson 1 Summary

In this lesson, you learned how to:

- Identify Administrative requirements of the course
- State the goals and objectives of the course
- Identify the technical expertise required to repair, replace, or rebuild bridges

The next lesson will discuss the processes involved in documenting the pre-disaster condition and disaster-related damages for bridges to be eligible for Public Assistance grant funding.

## Lesson 2 Overview and Objectives

This lesson provides an overview of the processes involved in documenting the pre-disaster condition and disaster-related damages for bridges to be eligible for Public Assistance grant funding.

At the end of this lesson, participants will be able to:

- Describe eligible disaster-related damages and associated documentation requirements.
- Explain the requirements for documenting pre-disaster conditions for bridges.

## Pre-Disaster Condition and Current Condition

The incident may cause minor damage to bridges or roads similar to that which may occur over time from other causes, such as the age of the bridge, traffic flow, and frequent rain. Therefore, distinguishing between pre-existing damage and damage caused by the incident is often difficult.

For the repair of this type of damage to be eligible, the Applicant must demonstrate that the damage was directly caused by the incident. The impact of the damage to the bridge's capacity and function should also be documented.



## Documenting Pre-Disaster Condition

Public Assistance funding is always based on pre-disaster size, capacity, and function. For Permanent Work, documentation is needed supporting pre-disaster condition of the facility.

For bridges over 20 feet, a bridge report must have been completed to document pre-disaster condition. This should occur at least once every two years according to the Federal Highway Administration. For bridges over 20 feet, bridge reports should occur at least once every two years according to the Federal Highway Administration.



## Bridge Eligibility Requirements

As well as reviewing the completed bridge report to verify the pre-disaster condition,

perform structural inventory and appraisal for the bridge. This should include comments and the most recent photograph of the bridge.

In addition to bridge reports, the following documents are useful for assessing the pre-disaster condition of a bridge: structural inventories, appraisals, recent pre-disaster photographs, the most recent underwater inspection, a Scour Plan of Action (if applicable), and maintenance and protection efforts.



## Bridge Preservation

Effective bridge preservation actions are intended to delay the need for costly reconstruction or replacement actions by applying preservation strategies and actions on bridges while they are still in good or fair condition and before the onset of serious deterioration. Bridge preservation encompasses preventative maintenance and rehabilitation activities.

An effective bridge preservation program:

- Employs long-term strategies and practices at the network level to preserve the condition of bridges and to extend their useful life;
- Has sustained and adequate resources and funding sources; and
- Has adequate tools and processes to ensure that the appropriate cost-effective treatments are applied at the appropriate time.

## Preventative Bridge Maintenance (1 of 2)

Preventative maintenance is a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without substantially increasing structural capacity).

Bridge owners typically apply preventative maintenance to elements or components of structures with significant remaining useful life. As a major part of bridge preservation, preservation maintenance is a strategy of extending useful life by applying cost-effective treatments to sound bridges (good or fair condition).

The concept of preventative bridge maintenance suggests that a planned strategy of cost-effective treatments should be performed to keep bridges in good condition, retard future deterioration, and avoid large expenses in bridge reconstruction or replacements.

## Preventative Bridge Maintenance (2 of 2)

Examples of preventative maintenance activities may include but are not limited to the following:

- Bridge washing and/or cleaning
- Sealing Deck Joints
- Facilitating Drainage
- Sealing Concrete
- Painting Steel
- Removing Channel Debris
- Protecting Against Scour
- Lubricating Bearings

Preventative maintenance includes cyclical (non-condition based) and condition-based activities.

## Pre-Disaster Design to its Original Design Capacity (1 of 2)

Pre-disaster design means the size or capacity of a facility as originally constructed or subsequently modified.

Pre-disaster design can be determined using as-built drawings, structural assessments, fracture-critical member reports, and load rating reports. Structural assessments usually occur every five to ten years.

Careful documentation of inspection findings is mandatory. The documented findings are useful for planning appropriate inspection cycles, evaluating the amount of deterioration that has occurred between inspections, and determining maintenance requirements. Sites of significant findings must be carefully identified to enable divers to return to the same location for further assessment. Documentation can take the form of detailed written reports, sketches, and measurements.



## Pre-Disaster Design to its Original Design Capacity (2 of 2)

During each special inspection, the following information should be included as a minimum for each listed bridge:

- Type and location of the bridge
- Type and frequency of the required inspection
- The location of the members to be inspected
- Inspection procedures to be used
- Dates of previous inspections
- Special equipment required
- The findings of the last inspection
- Follow-up actions taken on findings of the last inspection

See *Revisions to the National Bridge Inspection Standards (NBIS)* for additional details.

## Changes to Pre-Disaster Design

FEMA may approve changes to the pre-disaster design if the changes are required due to access issues, site conditions, or to tie in to existing infrastructure. The changes must not impact the capacity or function of the facility.

## Pre-Disaster Function

Pre-disaster function is the function the facility was performing immediately prior to the disaster. It is the function for which the facility was originally designed or subsequently modified.



## Pre-Disaster Original Function vs. Pre-Disaster Alternative Function

If a facility was serving an alternate function at the time of the incident, but was not altered to provide that function, FEMA

provides Public Assistance funding to restore the facility either to the original pre-disaster function, or pre-disaster alternate function, whichever costs less.

Codes and standards must be appropriate to the pre-disaster use of the facility. Bridge standards are set by the American Association of State Highway Transportation Officials. FEMA determines the eligibility of code required upgrades based on the facility's pre-disaster design or actual use at the time of the disaster. The least costly of the following is eligible:

- Pre-disaster use of the facility, if serving the same function for which it was originally designed; or
- Alternate use of the facility, if serving an alternate function at the time of the incident.

## Example (1 of 3)

The following example is a code or standard that is not appropriate to the pre-disaster use of the facility.

A Bridge in Hazard City was washed out during a flash flood. The bridge was in active use at the time of the event. The bridge was a single lane wooden bridge. The applicant has requested to replace the bridge with a two-lane wooden bridge in accordance with their Codes and Standards.

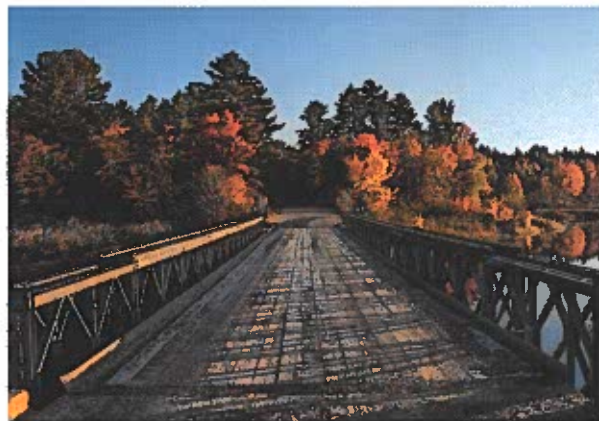
To document Codes and Standards, the Applicant was required to document compliance with the five Codes and standards criteria in accordance with FEMA Public Assistance Program and Policy Guide.

## Example (2 of 3)



Through the documentation request, the Applicant was unable to show that they formally adopted resolution that all single lane bridges be replaced with two-lane bridges and they could not document the work as a uniform practice.

As a result, the Applicant is unable to claim codes and standards as a scope and cost method for repair and the FEMA Public Assistance program is only able to support costs for replacement to pre-disaster condition.



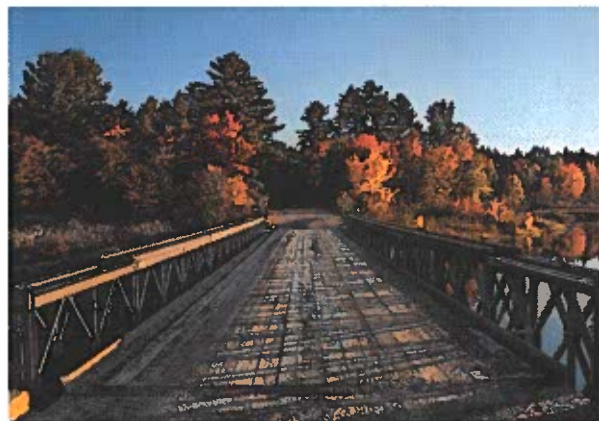
### Example (3 of 3)

The Applicant has two options moving forward:

1. Replace the bridge to its pre-disaster condition.
2. Prior to initializing work, the Applicant may request an improved project. The project cost is capped at the cost to replace to pre-disaster condition (single lane wooden bridge) and the Applicant must fund the additional costs to cover the improvements above and beyond the pre-disaster design and capacity (two-lane wooden bridge).

To request an improved project, the Applicant must submit formal written request to the Recipient defining the nature and design of the improvement. If the Recipient is in concurrence, the request is forwarded to FEMA for approval.

Improved projects are addressed through *FEMA Public Assistance Program and Policy Guide*.



## Documenting Disaster-Related Damage



The Applicant is required to identify and report all its disaster-related damage, Emergency Work activities, and debris quantities to FEMA within 60 days of the Recovery Scoping Meeting. FEMA may extend the deadline for identifying and reporting damage if the Recipient submits a request in writing with justification based on extenuating circumstances beyond the Recipient's or Applicant's control. For example, if a site is inaccessible, FEMA may extend the deadline for that site.

FEMA conducts site inspections with the Applicant to validate, quantify, and document the cause, location, and details of the reported damage and debris impacts and identify environmental and historic preservation issues and hazard mitigation opportunities within this 60-day period.

FEMA, the Recipient, and the Applicant should reach an agreement on the disaster-related damage description and dimensions, Emergency Protective Measures, and debris impacts before proceeding with scope of work development.

## For Emergency Work

For Emergency Work, FEMA may request:

- Description of the immediate threat
- Record demonstrating presence of the immediate threat (e.g., technical reports, safety inspector reports, photographs)

Additionally, for debris specifically:

- Actual debris quantities by type
- For waterway debris, documentation supporting pre- and post-incident levels, such as waterway surroundings



## For Permanent Work

The following is documentation that supports immediate threats, debris impacts, or damage for Permanent Work that FEMA may request:

- Drawings, sketches, and plans (to scale) of disaster-related damage
- Photographs of site, overall facility, and specific damage
- Detailed description of damage with specific dimensions
- Plans and specifications showing pre-disaster design of the facility
- Documentation supporting pre-disaster condition of facility (e.g., facility maintenance records, inspection/ safety reports)



## Grants Portal: Essential Elements of Information (1 of 11)

The Program Delivery Manager will work with the Applicant on the Essential Elements of Information Questionnaire in the Grants Portal. This will generate all required documents that must be submitted. After this is completed, the Program Delivery Manager will pass this along to the Applicant.

### Essential Elements of Information Task

After logging in to the Grants Portal, go to the "My Tasks" dropdown on the left side of the screen and select "Essential Elements of Information". You will then select the magnifying glass in the row corresponding to the Essential Elements of Information you would like to enter.

[Select this link to access a full image description.](#)

**Grants Portal**

My Essential Elements of Information

Filters: All My Active and Open EEIs

EEI Type	Event	Project #	Project Title	Project Category	EEI Status	EEI Process Step
Completed Lane - Category C	4332DR-TX (4332DR)	18064	Lone Star Wooden Bridge	C - Roads and Bridges	Open	Pending Applicant Response
Direct Administrative Cost	4332DR-TX (4332DR)	18064	Lone Star Wooden Bridge	C - Roads and Bridges	Open	Pending FEMA Initial Submission
Standard Lane - Category C	4332DR-TX (4332DR)	18064	Lone Star Wooden Bridge	C - Roads and Bridges	Open	Pending FEMA Initial Submission

Showing 1 to 3 of 3 entries

## Grants Portal: Essential Elements of Information (2 of 11)

### Manage EEI Answers

After selecting the magnifying glass, you will see general information about the Essential Elements of Information that you selected. Directly below the general information is a dropdown called "Questions". Select the button "Manage EEI Answers" on the right side of that dropdown.

[Select this link to access a full image description.](#)

**Grants Portal**

General Information

**NAME** Completed Lane - Category C

**PROJECT** [18064] Lone Star Wooden Bridge

**PROJECT TYPE** Work Completed / Fully Documented

**APPLICANT** Glensville - PDMG0042 - 4332DR (4332DR - 42)

**EVENT** 4332DR-TX (4332DR)

**STATUS** Open

**PROCESS STEP** Pending Applicant Response  
As of February 17th, 2018 6:21 PM CST

Questions > **MANAGE EEI ANSWERS**

Required Documents > HELP

## Grants Portal: Essential Elements of Information (3 of 11)

### Essential Elements of Information (EEI) Answers

After selecting the "Manage EEI Answers" button you will be taken to the Project Essential Elements of Information. Answer each question as Yes or No by selecting the radio button.

[Select this link for a full image description.](#)

The screenshot shows the 'Grants Portal' interface. The main heading is 'Project EEI Manage Answers'. Below this, it says 'Completed Lane - Category C'. There are 'SAVE' and 'CANCEL' buttons. The main content area is titled 'Manage EEI Answers' and contains the following questions:

- 1 Was the work performed in a designated disaster area?
- 2 Does the Applicant have the legal responsibility to perform this work?
- 3 Was the facility damaged as a direct result of the disaster?
- 4 Was the facility regularly maintained?
- 5 Did any of the damage occur on a FHWA classified road?

Below these questions is a section for 'Does the project include the facility type:' with the question '6 Roads?'. To the right of each question are radio buttons for 'Yes' and 'No'. A yellow box highlights the 'Yes' and 'No' radio buttons for questions 1 through 5.

## Grants Portal: Essential Elements of Information (4 of 11)

### Documents are Generated

After selecting "Yes" or "No" on each question, documents are generated and a popup appears next to the question that requires documentation.

[Select this link for a full image description.](#)

Completed Lane - Category C

Manage EEI Answers

- 1 Was the work performed in a designated disaster area?  Yes  No
- 2 Does the Applicant have the legal responsibility to perform this work?  Yes  No
- 3 Was the facility damaged as a direct result of the disaster?  Yes  No
- 4 Was the facility regularly maintained? Comments required  Yes  No
- 5 Did any of the damage occur on a FHWA classified road?  Yes  No
  
- Does the project include the facility type
- 6 Roads?  Yes  No
- 7 Culverts?  Yes  No

## Grants Portal: Essential Elements of Information (5 of 11)

### Bridge Questions

After the documents are generated, scroll down to notice questions related specifically to Bridges.

[Select this link for a full image description.](#)

Bridges? 2 documents required  Yes  No

How many bridges were damaged?

Were the components of the damaged bridges:

- 9.1 Superstructures?  Yes  No
- 9.2 Substructures?  Yes  No
- 9.3 Deckings?  Yes  No
- 9.4 Abutments / Supporting Elements?  Yes  No

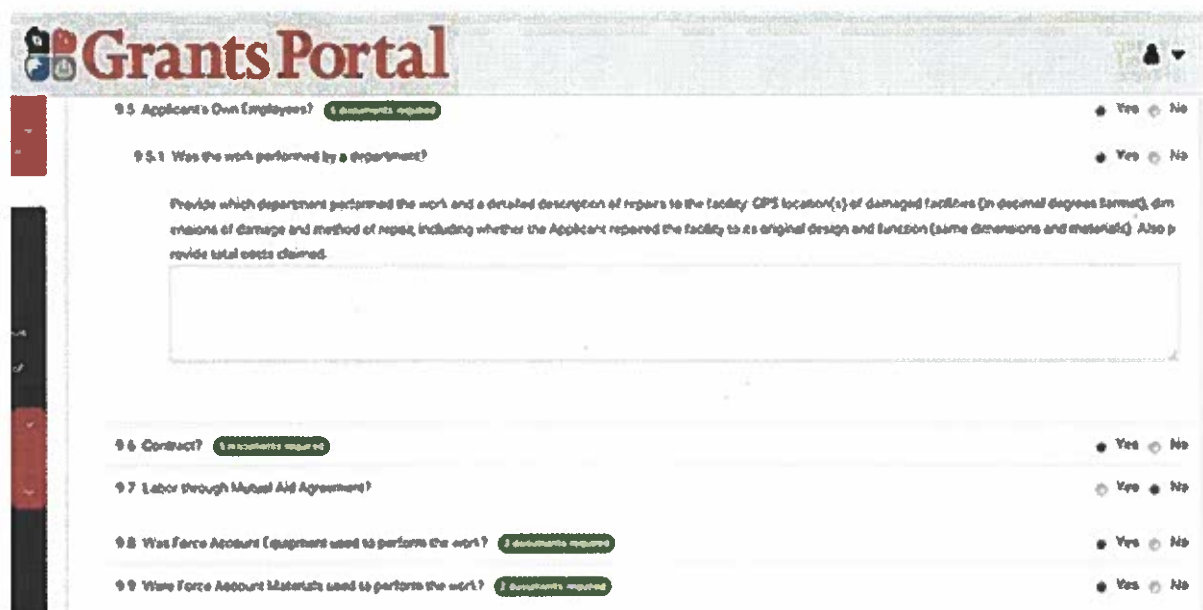
Please describe the abutments / supporting elements for the bridge(s) damaged

## Grants Portal: Essential Elements of Information (6 of 11)

### Bridge Questions

After answering the visible Bridge questions, continue scrolling down to find more questions related to bridges.

[Select this link for a full image description.](#)



The screenshot displays the Grants Portal interface. At the top, the logo "Grants Portal" is visible. Below the header, there are several questions with radio button options for "Yes" and "No".

- 9.5 Applicant's Own Employees?** (Documents required) Yes No
- 9.5.1 Was the work performed by a department?** Yes No
- 9.6 Contract?** (Documents required) Yes No
- 9.7 Labor through Mutual Aid Agreement?** Yes No
- 9.8 Was Force Account (equipment used to perform the work)?** (Documents required) Yes No
- 9.9 Was Force Account Materials used to perform the work?** (Documents required) Yes No

Question 9.5.1 includes a text input field with the following instructions: "Provide which department performed the work and a detailed description of repairs to the facility (GPS location(s) of damaged facilities (in decimal degrees format), dimensions of damage and method of repair, including whether the Applicant repaired the facility to its original design and function (same dimensions and materials). Also provide total costs claimed."

## Grants Portal: Essential Elements of Information (7 of 11)

### Insurance Questions

After answering all the bridge questions, scroll down and answer insurance questions that are presented.

[Select this link for a full image description.](#)

Grants Portal

revise total costs claimed

9.6 Contract? 3 documents required  Yes  No

9.7 Labor through Mutual Aid Agreement?  Yes  No

9.8 Was Force Account Equipment used to perform the work? 3 documents required  Yes  No

9.9 Were Force Account Materials used to perform the work? 7 documents required  Yes  No

10 Do the assigned damages have insurance?  Yes  No

10.1 Do you confirm the applicant does not possess any insurance policies that could potentially cover assigned damages?  Yes  No

## Grants Portal: Essential Elements of Information (8 of 11)

### Documents are Generated

After answering all bridge and insurance questions with "Yes" or "No", all required documents are generated. Select the blue "Save" button at the top right of the screen.

[Select this link for a full image description.](#)

Grants Portal

Project EEI Manage Answers Save CANCEL

Completed Lane - Category C

Manage EEI Answers

1 Was the work performed in a designated disaster area?  Yes  No

2 Does the Applicant have the legal responsibility to perform this work?  Yes  No

3 Was the facility damaged as a direct result of the disaster?  Yes  No

4 Was the facility regularly maintained? 1 document required  Yes  No

5 Did any of the damage occur on a FHWA classified road?  Yes  No

Does the project include the facility type

6 Roads?  Yes  No

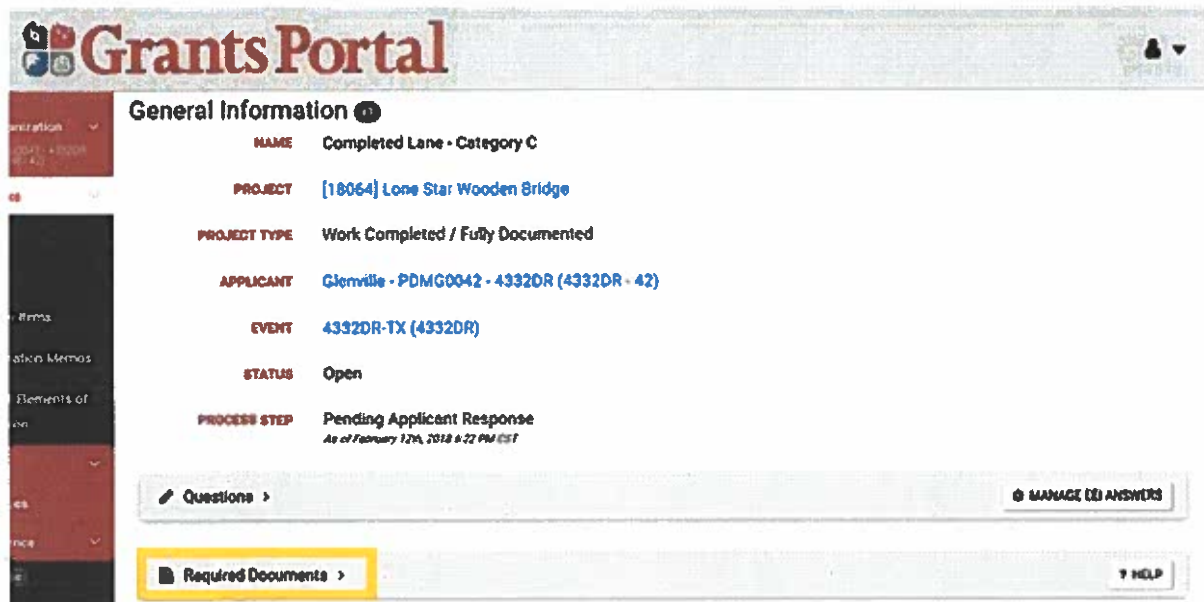
7 Culverts?  Yes  No

## Grants Portal: Essential Elements of Information (9 of 11)

### Manage EEI Answers

After saving your answers, you will return to the "General Information" screen for Essential Elements of Information. Under "General Information" you will see the previously accessed dropdown labeled "Questions" as well as a dropdown below that labeled "Required Documents". Select "Required Documents" to expand that menu.

[Select this link for a full image description.](#)



## Grants Portal: Essential Elements of Information (10 of 11)

### Required Documents for Bridges

After expanding the "Required Documents" tab you will see the questions previously answered that required documents. Each question is labeled with subsections requiring attention with a red exclamation mark. On the right of each subsection are blue buttons that allow you to add documentation. Select each "Add" button to add the required documentation.

[Select this link for a full image description.](#)





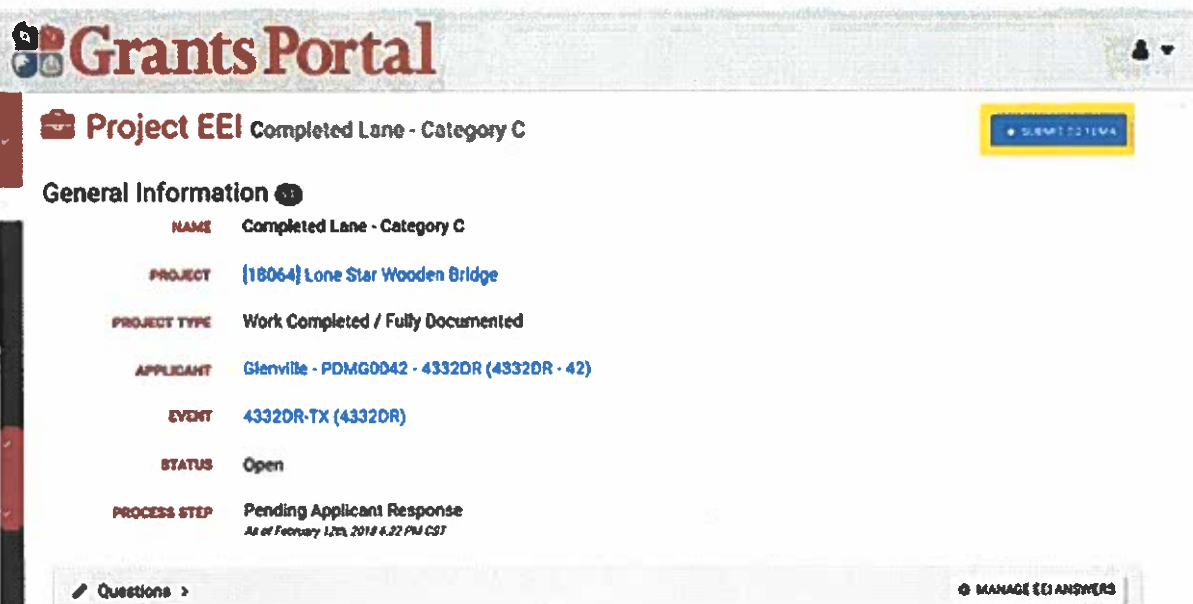
## Grants Portal: Essential Elements of Information (11 of 11)

### Attach Documents and Submit Back to FEMA

After adding all required documentation, scroll back up to the top of the screen and select the blue button labeled "Submit to FEMA".

This completes the Essential Elements of Information for Bridges in the Grants Portal.

[Select this link for a full image description.](#)



## Lesson 2 Summary

In this lesson, you learned how to:

- Describe eligible disaster-related damages and associated documentation requirements.
- Explain the requirements for documenting pre-disaster conditions for bridges.

The next lesson will provide an overview of the Permanent Work eligibility considerations for bridges for Public Assistance grant funding.

## Lesson 4 Overview and Objectives

This lesson provides an overview of the Permanent Work eligibility considerations for bridges for Public Assistance grant funding.

At the end of this lesson, participants will be able to:

- Identify the eligibility considerations for Permanent Work on disaster-damaged bridges
- Describe appropriate funding options for Permanent Work on disaster-damaged bridges

## Restoration, Permanent Work

To facilitate the processing of Public Assistance funding, FEMA separates Emergency Work into two categories and Permanent Work into five categories based on general types of facilities.

In this lesson, we will be focusing on:

- Pre-disaster design
- Changes to pre-disaster design
- Pre-disaster function/alternate function
- Codes and standards
- 50% rule
- Improved Projects

## Changes to Pre-Disaster Design or Construction Method

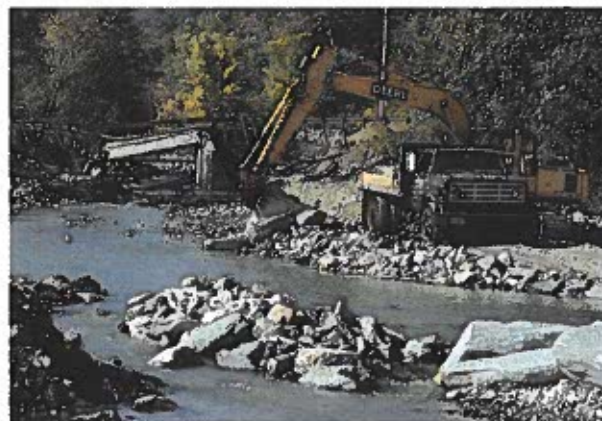
FEMA may approve changes to the pre-disaster design or construction method

(including materials) if the changes are required due to:

- Access issues
- Site conditions, or
- To tie in to existing infrastructure

The changes must not impact the capacity or function of the facility.

The Applicant must show that the changes are reasonable based on the type and extent of restoration and are consistent with the Applicant's general construction practices.



## Example of Restoring to Pre-Disaster Design (1 of 3)

The following is an example of restoring a bridge to pre-disaster design.

A Bridge in Hazard City was washed out during a flash flood. The bridge was in active use at the time of the event. The bridge was a single lane wooden bridge. The applicant has requested to replace the bridge with a concrete pier and deck bridge.

The bridge design is not the same as the pre-existing condition.



## Example of Restoring to Pre-Disaster Design (2 of 3)

The Applicant has three options moving forward:

1. Replace the bridge to its pre-disaster condition.
2. Prior to initializing work, the Sub-recipient could propose and request Hazard Mitigation grants opportunities as defined in *FEMA Public Assistance Program and Policy Guide, January 2018, Page 99-101*.



3. Prior to initializing work, the Applicant may request an improved project. The project cost is capped at the cost to replace to pre-disaster condition (single lane wooden bridge) and the Applicant must fund the additional costs to cover the improvements above and beyond the pre-disaster design and capacity (concrete pier and deck bridge).

Applicants can also utilize Public Assistance Alternative Procedures for Permanent Work to have a capped grant that may cover the proposed bridge. See Independent Study course IS-1005 Public Assistance Alternative Procedures for more information.

## Example of Restoring to Pre-Disaster Design (3 of 3)

To request an improved project, the Sub-recipient must submit formal written request to the recipient defining the nature and design of the improvement. If the recipient is in concurrence, the request is forwarded to FEMA for approval. Reference *FEMA Public Assistance Program and Policy Guide, January 2018 PP 107-110*.



## Maintenance

When evaluating eligibility of reported damage, in addition to evaluating how the incident caused the damage, FEMA reviews maintenance records or documentation establishing that the Applicant has a routine maintenance program.

In the absence of maintenance records, FEMA reviews material purchase invoices, activity logs, and inspects other sections of the Applicant's road system to confirm the



performance of normal maintenance activities.

Normal maintenance is not eligible. Work to repair potholes or fatigue cracking is generally ineligible as this type of damage is rarely caused directly by one incident.

A written maintenance plan and/or activity logs should be kept to document regular intervals of activity. Applicant logs documenting clearance of blockages in response to resident complaints are not sufficient to substantiate a regular maintenance schedule.

## **Compliance with Environmental and Historic Preservation**

The Applicant needs to make every effort to afford FEMA the opportunity to perform Environmental and Historic Preservation reviews prior to the start of construction for any Permanent Work project.

Proceeding with Permanent Work before FEMA completes Environmental and Historic Preservation reviews jeopardizes Public Assistance funding.

When Environmental and Historic Preservation laws, regulations, or Executive Orders require actions to mitigate adverse effects, the Applicant is responsible for all costs associated with performing the required mitigation measures, unless such actions are directly related to the restoration of disaster-related damage.



## **Codes and Standards (1 of 2)**

If required by a code or standard FEMA may fund upgrades.

All Codes and Standards must meet FEMA's five criteria standards:

- Applies to the type of restoration required;
- Is appropriate to the pre-disaster use of the facility;
- Is reasonable, in writing, formally adopted by the State, Territorial, Tribal, or local government, and implemented by the Applicant on or before the declaration date, OR is a legal Federal requirement;
- Applies uniformly; and
- Was enforced during the time it was in effect



When rebuilding to American Association of State Highway Transportation Officials or State Department of Transportation standards, it is not automatically considered an eligible code and standard, and using these standards may be considered an improved/alternate project.

For more information about Codes and Standards, see the Independent Study course IS-1019 Codes and Standards.

## Codes and Standards (2 of 2)

Codes and Standards must apply to the type of restoration required. Codes and standards for new construction are often different than codes and standards for repair work. The triggers should clearly differentiate between repair and new construction.

If FEMA determines a facility is eligible for replacement, compliance with current codes and standards for new construction is eligible. If FEMA determines a facility is not eligible for replacement, only code-required upgrades applicable to repair are eligible.



A code or standard may include a trigger that requires:

- Upgrades to all structural components;  
or
- In addition to upgrading all structural components, bringing the non-structural components into conformance with current codes or standards for new construction.

## Conditional Eligibility

In cases where ineligible damages, such as a pre-existing condition, if not repaired, may compromise repair of eligible damage, FEMA may make Public Assistance funding for repair of the eligible damage contingent upon the Applicant repairing the ineligible damage.



## Example of Conditional Eligibility

FEMA may determine that repairs to a damaged bridge deck are eligible. However, the deck cannot be repaired unless the Applicant replaces rotting timbers that support the deck.



## The 50% Rule: Repair vs. Replacement

When evaluating whether a damaged facility is eligible for replacement, FEMA compares the eligible repair cost with the eligible replacement cost and evaluates the feasibility of repairing the facility.

A facility is considered repairable when:

- The cost to repair the disaster-related damage does not exceed 50% of the cost to replace the facility based on its pre-disaster design, capacity, and function; and
- It is feasible to repair the facility so that it can perform the pre-disaster function as well as it did prior to the incident.

## Repair Costs

The repair costs (numerator) is the cost of repairing disaster-related damage only and includes costs related to compliance with codes and standards that apply to the repair of the damaged elements only. This includes federally required codes and standards.

## Replacement Costs

The replacement costs (denominator) is the cost of replacing the facility on the basis of its pre-disaster design (size and capacity) and function in accordance with applicable codes or standards.

## The 50% Rule

To determine if a facility is eligible for repair costs or replacement costs FEMA uses the 50% rule. The 50% rule is a calculation to compare the eligible repair cost to the eligible replacement cost results in a fraction that expresses repair as a percentage of replacement. The percentage is calculated with the repair cost as the numerator and replacement costs as the denominator. FEMA refers to this calculation as the "50% Rule".

Bridges are examples of facilities of which FEMA applies the 50% Rule to the entire facility.



## The 50% Rule: Ineligible Costs

Not all costs are eligible for inclusion in the 50% Rule. Although certain costs are not included in the 50% Rule calculation to determine whether the facility is eligible for replacement, the costs may be eligible for Public Assistance funding subject to all other eligibility requirements.



## **The numerator does not include costs associated with:**

- Upgrades of non-damaged elements even if required by codes or standards (e.g., elevation of an entire facility triggered by repair)
- Demolition beyond that which is essential to repair the damaged elements
- Site work
- Soft costs
- Contents
- Hazard mitigation measures
- Emergency Work

## **The denominator does not include costs associated with:**

- Demolition
- Site work
- Soft costs
- Contents
- Hazard mitigation measures
- Emergency Work

## **Improved/Alternate Projects**

FEMA provides three options that provide flexibility for the Applicant to use Public Assistance funding differently than restoring the pre-disaster design and function of the facility. For these options, FEMA caps the amount of Public Assistance funding based on the estimated amount to restore the damaged facility to its pre-disaster design and function, including applicable and federally required codes and standards.

Improved Projects and Alternate Projects are two of these capped project options. For more information about capped grants, see Independent Study course IS-1005 Public Assistance Alternative Procedures and IS-1000 Public Assistance Program and Eligibility.

## **Improved Projects**

An Improved Project is a project that restores the pre-disaster function, and at least the same capacity, of the damaged facility and incorporates improvements or changes to its pre-disaster design that is not required by eligible codes or standards.

For Improved Projects, the Applicant must obtain approval from the Recipient. If the Improved Project significantly changes the pre-disaster configuration of the facility, the Recipient must forward the request to FEMA to ensure that the Improved Project complies with appropriate Environmental and Historic Preservation laws, regulations, and Executive Orders.



An Alternate Project is the use of funds toward a project that does not restore the pre-disaster function of the damaged facility. If the Applicant determines the public welfare would not be best served by restoring a damaged facility or its function, it may use the funds toward a different facility (or facilities) that benefit the same community.

## Improved Projects: Funding

Federal funding for an Improved Project is limited to the lesser of the following:

- The Federal share of the approved estimated cost to restore the damaged facility to its pre-disaster design and function; or
- The Federal share of the actual costs of completing the Improved Project.

FEMA only increases eligible funding for an Improved Project if the Applicant identifies an error or omission in the original scope of work or cost estimate related to restoring the facility to its pre-disaster design and function.



## Code and Standards Requirements

If a Federal, State, Territorial, Tribal, or local government permitting agency requires additional work based on a code or standard that does not meet eligibility criteria, then the

cost of the additional work is only eligible if the work:

- Applies to the type of restoration required;
- Is appropriate to the pre-disaster use of the facility;
- Is reasonable, in writing, formally adopted by the State, Territorial, Tribal or local government, and implemented by the Applicant on or before the declaration date **OR** is a legal Federal requirement;
- Applies uniformly; and
- Was enforced during the time it was in effect.



## Hazard Mitigation

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazard and their effects. FEMA has authority to provide Public Assistance funding for cost-effective hazard mitigation measures for facilities damaged by the incident.

For more information about Mitigation, see Independent Study course IS-1014 Integrating 406 Mitigation Considerations into Your Public Assistance Grant.

## Reasonable and Cost Effective Mitigation Measures (1 of 2)

Mitigation measures must be reasonable. When determining reasonableness, FEMA:

- Examines the general reasonableness of the code and standard and the trigger for application of the code or standard;
- Determines whether the upgrade and trigger relate to the type of restoration required by the damage and whether the upgrade and trigger are justified based on the extent of the damage;



- Considers whether the upgrade and the trigger are technically defensible from an engineering perspective; and
- Determines whether the cost of the upgrade is reasonable.

FEMA may determine a very large upgrade based on a very low trigger to be unreasonable.

## Reasonable and Cost Effective Mitigation Measures (2 of 2)

Mitigation measures must be cost-effective. FEMA considers mitigation measures to be cost-effective if any of the following criteria are met:

- The cost for the mitigation measure is within 15% of the total eligible repair cost (prior to any insurance reductions) of the facility or facilities for which the mitigation measure applies
- The mitigation measure is specifically listed in *Public Assistance Program and Policy Guide Appendix J: Cost-Effective Hazard Mitigation Measures*, AND the cost of the mitigation measures does not exceed 100% of the eligible repair cost (prior to any insurance reductions) of the facility or facilities for which the mitigation measure applies
- The Recipient or Applicant demonstration through an acceptable benefit-cost analysis methodology that the measure is cost-effective. FEMA's benefit-cost analysis software provides appropriate benefit-cost analysis methodologies



Many mitigation measures that do not meet the first two requirements above prove to be

cost-effective based on a benefit-cost analysis. If the mitigation measure is not cost-effective based on the first two criteria, FEMA, Recipient, and Applicant will work together to develop a benefit-cost analysis to determine whether it is cost-effective.

## Benefit-Cost Analysis

A Benefit-Cost Analysis is based on a comparison of the total eligible cost for the mitigation measure to the total value of expected benefits. Benefits include reductions in:

- Damage to the facility and its contents
- The need for emergency protective measures
- The need for temporary facilities
- Loss of function
- Casualties (typically included only for earthquake, tornado, and wildlife mitigation)

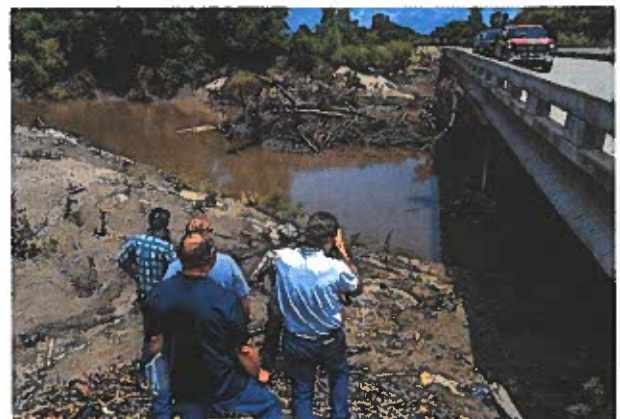


## Bridge Mitigation

Permanent Work to restore bridges is eligible unless restoration is under the specific authority of another Federal Agency such as the Federal Highway Administration.

Work to repair scour or erosion damage to a channel or stream bank is eligible if the repair is necessary to restore the structural integrity of an eligible road, culvert, or bridge.

Hydrologic and hydraulic studies, used to evaluate upstream and downstream impacts, impacts, may be necessary if replacing culverts or bridges with larger culverts or bridges.



## Examples of Bridge Mitigation Measures

FEMA considers the following bridge mitigation measures to be cost-effective if the measures do not exceed 100% of the eligible repair cost (prior to any insurance reductions).

1. Where traffic counts are low, replace with low-water crossings.
2. Install cables to restrain a bridge from being knocked off piers or abutments during floods or earthquakes.
3. Install girder and deck uplift tie-downs to prevent their displacement from the substructure.
4. Install Longitudinal Peaked Stone Toe Protection with nature planting, upstream of a failed abutment, to provide a stable floodplain bench for the protection of the abutment and the adjoining bridge approach. Consider other relevant bio-engineering applications such as engineered log jams, log vanes, or log bendway weirs.
5. Various scour countermeasures to protect and/or improve flow through the bridge crossing such as those found in the Hydraulic Engineering Circular.
6. In bridges that are damaged by widening of the channel at the bridge location, consider impacts of increasing the length of the bridge with jump spans against returning to pre-disaster length and incorporating river training structures adjacent to the bridge opening.

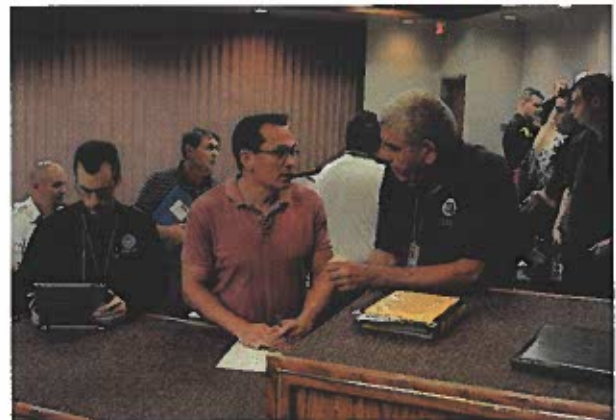
## Duplication of Benefits (1 of 2)

Applicants that receive Public Assistance funding for Permanent Work to replace, repair, reconstruct, or construct a facility must obtain and maintain insurance to protect the facility against future loss.

If the Applicant does not maintain the required insurance from a previous disaster, then the facility is not eligible for Public Assistance funding in a subsequent disaster, regardless of the hazard(s) that caused the damage.

When the Applicant receives Public Assistance funding for a facility damaged by the same hazard in a subsequent disaster, FEMA reduces funding in this subsequent disaster by the amount of insurance required from the previous disaster.

If FEMA or the State Insurance Commissioner certification modified the



Applicant's insurance requirement, FEMA reduces funding by the modified insurance amount. If the Applicant's anticipated or actual insurance proceeds are higher than the amount of insurance required in the previous disaster, FEMA reduces funding by the anticipated or actual amount of insurance proceeds to avoid a duplication of benefits.

## Duplication of Benefits (2 of 2)

Funding duplication issues can stem through other aid programs like:

- National Resource Conservation Service
- Federal Highway Administration (BRO funds)
- Bureau of Indian Affairs funds

The Federal Highway Administration has authority to assist with the restoration of transportation facilities under the Emergency Relief for Federally Owned Roads Program.

FEMA is legally prohibited from duplicating benefits from other sources. If the Applicant receives funding from another source for the same work that FEMA funded, FEMA reduces eligible cost or de-obligates funding to prevent a duplication of benefits.



## Lesson 4 Summary

In this lesson, you learned how to:

- Identify the eligibility considerations for Permanent Work on disaster-damaged bridges.
- Describe appropriate funding options for Permanent Work on disaster-damaged bridges.

The next lesson will review the course objectives. Participants will take a Post-Course Assessment and complete the Course Evaluation Form.

## **Lesson 5 Overview and Objectives**

This lesson will review the course objectives. Participants will take a Post-Course Assessment at its conclusion

At the end of this lesson, participants will be able to summarize the content of the course.

## **Course Objectives**

In this course, you learned how to:

- Describe Public Assistance policy and guidance related to bridges
- Identify the documentation requirements for bridges to receive Public Assistance grant funding
- Discuss the eligibility considerations for Emergency Work on bridges to receive Public Assistance grant funding
- Discuss the eligibility considerations for Permanent Work on bridges to receive Public Assistance grant funding

## **Lesson 1 Objectives**

Lesson 1 provided a high-level overview of the course and its objectives, as well as an explanation about the course being applicable to bridges 20 feet or longer and the technical expertise that is related.

You should now be able to:

- Identify the technical expertise required to repair, replace, or rebuild bridges

## **Lesson 2 Objectives**

Lesson 2 provided a high-level overview of the processes involved in documenting the pre-disaster condition and disaster-related damages for bridges to be eligible for Public Assistance grant funding.

You should now be able to:

- Describe eligible disaster-related damages and associated documentation requirements
- Identify the requirements for documenting pre-disaster conditions for bridges

## **Lesson 3 Objectives**



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Lesson 3 discussed the Emergency Work eligibility considerations for bridges for Public Assistance grant funding. It went into detail about debris removal and disposal to eliminate an immediate threat and emergency protective measures.

You should now be able to:

- Describe Emergency Work eligibility considerations related to disaster-damaged bridges

## **Lesson 4 Objectives**

Lesson 4 discussed the Permanent Work eligibility considerations for bridges for Public Assistance grant funding.

You should now be able to:

- Identify the eligibility considerations for Permanent Work on disaster-damaged bridges
- Describe appropriate funding options for Permanent Work on disaster-damaged bridges

## **Course Summary**

Congratulations! This course is complete.

This course provided you with an overview of bridge considerations for the Public Assistance Program and project eligibility.

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