

# develop a mitigation plan

## Overview

In Phase 3 you will identify mitigation actions and implementation strategies for protecting your identified historic properties and cultural resources. This process consists of four major steps:

- Step 1.** Develop mitigation goals and objectives for your preservation hierarchy.
- Step 2.** Identify, evaluate, and prioritize actions.
- Step 3.** Prepare an implementation strategy.
- Step 4.** Document the mitigation planning process completed for historic properties and cultural resources.

The steps you will take in Phase 3 for protecting your identified historic and cultural resources parallel those for creating the hazard mitigation plan to address the other assets in the community. For a more detailed review of those steps, please refer to FEMA 386-3, *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies*.



## Step 1. Develop Mitigation Goals and Objectives for Historic Properties and Cultural Resources

Before you identify mitigation actions for protecting historic properties and cultural resources in your community, your team must develop a set of goals and objectives. These will be used as the basis for developing appropriate mitigation actions.





## Goals

General guidelines that explain what you want to achieve. They are usually broad policy statements and represent long-term, global visions. The following are examples of goal statements:

- Our community will develop ways to protect significant historic properties and cultural resources from future flood events.
- Our community will use historic properties as an economic development tool for community growth.

## Objectives

Define strategies or implementation steps for attaining the identified goals. Unlike goals, objectives are specific and measurable. The following are examples of objectives:

- Protect structures in the historic downtown area from flood damage.
- Rehabilitate houses in a hurricane-prone residential historic district.

## Mitigation Actions

Specific actions that help you achieve your goals and objectives. The following are examples of mitigation actions:

- Elevate three historic structures located in the historic district.
- Replace historic windows with stronger glass; new window design will match historic design.

# Procedures and Techniques

## Task A. Review and analyze the findings from your risk assessment.

### 1. Review the findings from your risk assessment.

A review of the findings from your team's risk assessment (Phase 2) will help you formulate goals and objectives that address the vulnerability of community assets. You should review the findings from each step of the risk assessment. For additional information on reviewing the findings of your risk assessment, you are referred to pages 1-2 through 1-4 of FEMA 386-3.

You should take the following steps to complete your review of the risk assessment findings:

- Note conditions in the community that contribute to hazard effects.
- Note the hazard characteristics.
- Note which historic properties and cultural resources identified in Phase 2 are located in hazard areas. Cross reference this with your preservation hierarchy, which you developed in Step 3 of Phase 2.
- Identify building design and construction vulnerabilities of hazard-prone historic properties and cultural resources. Use the results from **Worksheet #3: Inventory Historic Property and Cultural Resource Assets** from Phase 2.
- Review the community value, the composite map of vulnerabilities, and estimated losses to identify the most vulnerable areas. Again, turn to your results from Worksheet #3, Phase 2.

### 2. Develop a list of problem statements based on these findings.

Based on your team's review of the risk assessment, you should next develop a list of problem statements for each hazard. By the time you are done, you may find that you have a long list of problem statements to address.

Several examples of problem statements are provided below:

- The historic lighthouse is threatened by erosion and coastal flooding.
- The downtown historic district is threatened by multiple hazards, including earthquakes and wind storms. Repetitive



hazard-related loss has encouraged disinvestment, and current zoning tools do not promote economic growth in the neighborhood.

- The town's oral history archives are currently stored in a basement, which is prone to flooding and is not safe from fire.
- Property owners are not aware of hazard-related threats to historic properties.

## **Task B. Formulate goals.**

### *1. Develop proposed goal statements.*

Group your problem statements and see what common theme runs through them in order to begin formulating goals. One way to formulate your goals is to turn these problem statements into positive statements of what you want to do to create a stronger community, State, or Tribe. For more information on developing goal statements please refer to pages 1-5 and 1-6 of FEMA 386-3. Remember that your goal statements should not identify specific mitigation actions, but identify the overall improvements you want to achieve. Example general goals follow:

- Enhance the ability of vulnerable historic properties and cultural resources to withstand the impact of hazards while maintaining their integrity.
- Minimize losses to areas of high economic value, including local landmarks in the downtown district.
- Encourage and support efforts to identify, evaluate, and designate historic properties and cultural resources.

### *2. Review existing plans and other policy documents to determine if your goals conflict with other plans.*

In Phase 1, your team collected existing plans (preservation plans, comprehensive plans, zoning and economic development plans, transportation plans, etc.) and other policy documents. Review these documents to ensure that their priorities do not conflict with the ones you have established for your community's historic properties and cultural resources. You do not want to spend time and energy on formulating goals, objectives, and mitigation actions for protecting your community's historic properties and cultural resources only to discover that they conflict with other community plans. This is particularly true for historic properties, which are sometimes considered as an afterthought in other planning decisions. When you encounter such conflicts you do not have to



### **Individual Structures of High Significance**

If you are focusing on a single structure of high significance, check to see if it is included in an existing Historic Structure Report, Cultural Landscape Report, or Master Plan which outlines preservation priorities. Certain cultural resource collections may also have existing conservation and care plans associated with them.



abandon a goal or the objectives and mitigation actions that stem from them, but you do need to address the conflict to develop common goals. Such goals may include protecting private property and critical public facilities, avoiding disruptions to the local economy, and sustaining local character and identity.

### **Task C. Determine objectives.**

Objectives are more specific and narrower in scope than goals. They expand on the goals and provide more detail on the ways to accomplish them. Please review page 1-7 of FEMA 386-3 for more detail on determining objectives.

The following objectives shape the strategy for implementing one of the example goals listed in Task B, “Enhance the ability of vulnerable historic properties and cultural resources to withstand the impact of hazards while maintaining their integrity.”

**Objective 1:** Assess appropriate methods to retrofit historic properties and protect cultural resources.

**Objective 2:** Promote the use of existing incentive programs such as Federal and State income tax credits and preservation easements.

**Objective 3:** Disseminate best management practices for protecting historic properties and cultural resources.

### **Task D. Gather public input.**

Once you have developed your goals and objectives you need to share them with the public and gather their input. Input from the public is important for shaping and refining your goals and objectives, and for reaching community consensus on them. Allowing community members to participate in the planning process will give them a sense of ownership about the plan that will enhance their support for the plan and its implementation. As part of this effort, it is recommended that you review pages 1-8 through 1-10 of FEMA 386-3, which provide additional information on how to gather public input at this point in your planning process.

While many in the community may agree with the proposed goals, the planning team may still encounter strong differences of opinion among some community members regarding how historic properties and cultural resources fit into the hazard mitigation plan. Ensuing debates could be emotionally charged. If at this point, despite your outreach efforts throughout the planning process, community divisions or professional differences between



members of the planning team, or among government officials, arise over historic properties, cultural resources, and hazard mitigation, your team may wish to work with a neutral arbitrator or alternative dispute resolution specialist who can objectively describe the issues, goals, and objectives of multiple interest groups, and help achieve consensus.

This is the end of Step 1 of Phase 3. You should ask yourself the following questions to determine if you have adequately developed mitigation goals and objectives for incorporating your historic properties and cultural resources into your hazard mitigation plan. These are followed by a Review Test that you should use as a learning aid to help you become familiar with the concepts of hazard mitigation.

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## Evaluate Your Community

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- Have you done a thorough job of evaluating other plans and policy documents to identify potential conflicts with your preservation goals?
- Have you gathered public input to shape and come to consensus on goals and objectives for historic properties and cultural resources?

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## Review Test (Select one answer for each question.)

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1. Goals are:
  - a. General, broad, long-term visions of what your community wants to achieve.
  - b. Implementation of strategies or steps that are measurable.
  - c. Specific measures, with a specific timeline and budget, to fix a specific problem.
  - d. All of the above.
2. Objectives are:
  - a. General, broad, long-term visions of what your community wants to achieve.
  - b. Implementation of strategies or steps that are measurable.
  - c. Specific measures, with a specific timeline and budget, to fix a specific problem.
  - d. All of the above.



3. Actions are:
  - a. General, broad, long-term visions of what your community wants to achieve.
  - b. Implementation of strategies or steps that are measurable.
  - c. Specific measures, with a specific timeline and budget, to fix a specific problem.
  - d. All of the above.

*(Answers in Appendix D – Answers to Review Tests.)*

## Step 2. Identify, Evaluate, and Prioritize Actions

In Step 2, you will identify, evaluate, and prioritize mitigation actions to address the goals and objectives you developed. As part of the evaluation process for determining which actions work for your community, State, or Tribe, your planning team will assess the levels of financial, staffing, and other resources you can devote to implementing your identified actions. The process of identifying, evaluating, and prioritizing mitigation actions is covered in more detail in FEMA 386-3, Step 2, and summarized below as it applies to integrating historic property and cultural resources into the hazard mitigation plan.

### Procedures and Techniques

#### Task A. Identify alternative mitigation actions.

In Task A, your planning team will identify specific mitigation actions to address the goals and objectives that you developed. In identifying possible mitigation actions you must evaluate a range of mitigation approaches. Such an alternatives analysis is necessary to determine the varying impacts and costs associated with each action. Additionally, the Federal government mandates that such an analysis be performed for projects that entail Federal involvement or funding (e.g., National Environmental Policy Act analyses). Many States also mandate a similar alternatives analysis for State involvement.

For this task you will use **Worksheet #6: Identify Alternative Mitigation Actions for Historic Properties and Cultural Resources** (included in Appendix C) and follow the instructions located at the end of Task A. You are also referred to **Worksheet Job Aid #1: Alternative Mitigation Actions by Hazard**, found in Appendix C.



#### NEPA

One of the most important laws to comply with is the National Environmental Policy Act (NEPA). Signed into law by President Nixon in 1969, NEPA establishes the broad national framework for protecting the environment, including historic properties. NEPA's basic policy is to ensure that all branches of government give proper consideration to the environment prior to undertaking any major Federal action that significantly affects the environment. The NEPA process subsumes the review of proposed actions under an array of other Federal laws. To achieve improved project streamlining, NEPA and NHPA requirements are sometimes combined. For more on NEPA and NHPA, see Appendix A – Glossary.

Worksheet Job Aid #1 will help you evaluate a variety of potential hazard mitigation options for historic properties and cultural resources.

A number of approaches exist for reducing hazard-related losses to historic properties and cultural resources. In some cases, one action can protect against multiple hazards; in others, a combination of actions may be needed to protect one resource. The alternatives you identify should provide some measure of structural or physical protection to historic properties and cultural resources while maintaining historic integrity and a sense of place.

The types of mitigation actions chosen will vary from jurisdiction to jurisdiction, depending on the types of historic properties and cultural resources found, and the ability to implement one potential action over another. Generally, mitigation actions for historic properties and cultural resources fall into the following five categories:

1. Prevention.
2. Property and resource protection.
3. Structural diversions.
4. Public education and awareness.
5. Natural resource protection for historic landscape features and archeological sites.

See pages 3-8 to 3-22 for an explanation of the five categories of mitigation actions you should consider in determining which actions work for your community.

## Evaluating Mitigation Actions for Cultural Resources

Certain types of cultural resources, such as artwork, archival collections, and collections of artifacts, are uniquely vulnerable to hazard-related damage. You will want to evaluate a variety of mitigation actions to protect these cultural resources and develop appropriate storage procedures.

One aspect of cultural resource protection you should take into consideration is the impact that mitigation actions applied to buildings may have on the cultural resources stored or displayed within those buildings. Another important consideration is the relationship a resource has with its setting.



### Consider All Potential Mitigation Actions

You don't want some good ideas not to be considered because of concerns over funding. At this point in the planning process all ideas should be considered and evaluated.



## Mitigation Action Category #1: Prevention

Preventive mitigation actions involve the pre-emptive reduction of hazard-related loss through specific administrative measures taken very early on in the land development process.

Preventive mitigation actions include performance standards and regulatory actions, both of which influence the ways in which land is developed and buildings are constructed. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

**Performance Standards.** Performance standards require that buildings and their components be durable enough to survive certain levels of stress from different hazard events. Ensuring compliance with performance standards will help reduce the likelihood that design elements of historic buildings and other structures located in hazard-prone areas will experience hazard-related damage. However, without careful analysis and creative design, character-defining features of these structures may be unnecessarily sacrificed in an attempt to bring them up to an enhanced code or performance standard.

In meeting performance standards, you should consider design options that attempt to maintain historic design elements while also providing enhanced strength and performance. For example, sometimes the structural systems of a building or structure may be replaced with modern materials. At other times, though, structural systems are an important, character-defining feature that should be preserved in place. In these cases, such as with a historic bridge, you may want to consider the introduction of new structural elements while

leaving old ones in place, or making repairs to the existing structural system.

Older buildings that are eligible for listing in the National Register, if stripped of their original, historic building material, may lose their eligibility and the potential historic preservation tax credits that go with it. It is important to evaluate the replacement and replication of design elements alongside planning and community goals, including the use of your hierarchy or priority list.



### Performance Standards for Historic Buildings

Many enhanced building codes and performance standards in hazard-prone areas were developed for contemporary construction. It is important to allow for flexibility in the design of retrofits and rehabilitations of historic buildings.

**Regulatory Actions.** Regulatory actions include building codes, zoning and subdivision regulations, design and site plan review, easements, floodplain buffers, and open space requirements. The introduction of regulatory measures to prevent the construction of buildings in hazard-prone areas can be a useful mitigation alternative.

Regulatory actions can provide your community with an opportunity to ensure that future growth and development avoid or minimize risk of hazard-related damage. It is important, however, that your team examine the potential impact of regulatory actions on the future of existing historic communities. For example, the introduction of setbacks in a historic community where buildings are typically set close to the lot line may result in new construction that

disrupts the unique sense of place important to many historic districts. Additionally, regulatory actions that prevent or limit growth in hazard-prone areas may lead to disinvestment in, and even abandonment of, historic areas. This is particularly important in communities with large concentrations of historic properties in the floodplain.

Thoughtful use of regulatory action can both promote economic growth and encourage disaster-resistant design. For example, in hazard-prone areas, a balanced combination of density controls or overlay zones with preservation-friendly investment incentives can foster economic growth while keeping new construction and population growth at reasonable levels. Design review and site plan review can lead to new construction that is both disaster-resistant and adheres to the scale, setting, materials, and sense of place of a particular historic district.



### State Building Codes for Historic Structures

Some States have developed building codes that are specific to the rehabilitation of historic buildings. You should check to see if your State has such a code, or consider using another existing code as a springboard for discussion about code compliance.

Representative examples of such codes are the State of Maryland's Building Rehabilitation Code (available online at <http://www.dnr.state.md.us/education/growfromhere/lesson15/mdp/smartcode/smartcode00.htm>) and the State of New Jersey's Uniform Construction Code of Rehabilitation Subcode. This code (New Jersey Administrative Code, Title 5, Chapter 23, Subchapter 6) is available online at <http://www.state.nj.us/dca/codes/rehab/index.shtml>. Both codes offer alternative codes for the repair, renovation, and reuse of buildings that otherwise would not have met existing codes without a prohibitive amount of investment.

Other codes include alternative methods of performance analysis (e.g., the ABK methodology described in Appendix A for seismic-prone buildings), regional codes (e.g., the State Historical Building Code in California) and national codes (e.g., the Universal Code for Building Conservation).



### National Flood Insurance Program (NFIP) and Historic Structures

The NFIP provides relief to historic structures by waiving new construction and substantial improvement requirements of the program. This exclusion from the new construction requirements serves as an added incentive for property owners to maintain the historic character of the designated structure.

The NFIP floodplain management requirements contain the following two provisions intended to provide relief for historic structures located in **Special Flood Hazard Areas**. Communities have the option of using either provision for addressing the unique needs of historic structures:

- In the definition of "substantial improvement" at 44 CFR 59.1, "alteration to an historic structure does not constitute a substantial improvement, provided that the alteration will not preclude the structure's continued designation as an historic structure." The same also applies to historic structures that have been "substantially damaged."

- The other provision of the NFIP floodplain management regulations that provides relief for historic structures is 44 CFR 60.6(a). This provision states "Variances may be granted for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure."

However, NFIP floodplain management requirements could apply to additions to historic structures if they are located in a **floodway**. All structures, including historic structures, must comply with the floodway encroachment provisions of Section 60.3(c)(10) and (d)(3) of the NFIP regulations. For example, any addition to a historic structure that expands the square footage of the structure beyond its existing footprint must comply with the regulatory floodway criteria. Under these regulations, any addition to a historic structure that results in a rise of the Base Flood Elevation will be prohibited.

Many contemporary building codes include standards for minimizing damage from hazard events. Code sections on retrofitting offer one such example. Frequently, these codes are intended for contemporary building materials and construction techniques, so it is important that you allow considerable flexibility in applying them to historic buildings.

You may want to bring together a building code official and a design professional to discuss possibilities for code compliance. Their discussion may yield creative design solutions that comply with the basic tenets of the building code while retaining character-defining historic features. Flexibility and willingness to compromise will be key.

## Mitigation Action Category #2: Property and Resource Protection

This category includes basic property improvements performed by the owner, including retrofitting, elevation, relocation, and acquisition.

**Basic Property Improvements.** Property owners can often undertake a variety of relatively simple improvements to reduce hazards facing their property. Although these improvements provide limited protection from hazard-related damage, they have minimal impact on character-defining design features and are relatively low in cost.

Basic property improvements include floodproofing, elevating and retrofitting utility systems, creating safe rooms, and anchoring and relocating furniture and other vulnerable contents. For example, heirlooms and other cultural resources may be removed from flood-prone basements and stored in safer locations. In turn, flood-prone basements may themselves be renovated so that they can be flooded without damage to the building or foundation.

**Retrofitting.** Retrofitting entails the replacement or rehabilitation of building and structural systems to improve their ability to withstand structural forces. Retrofitting of historic structures can be highly intrusive because of the risk of removing character-

defining design elements, or having them obscured with incompatible modern materials. It is possible, however, to design retrofitting projects in which character-defining features are preserved in place and retrofitting measures are hidden from view. In addition, reproduction of historic facades or design elements using modern materials may conform to the *Secretary of the Interior's Standards for Rehabilitation* and also maintain the National Register eligibility of a historic building.

For buildings and structures identified as vulnerable to **earthquake hazards**, structural retrofitting may be particularly useful. Seismic retrofits include the following actions:

- Introduction of sub-foundation dampers that can absorb sudden pressure.
- Reinforcement of foundation and wall connections.
- Replacement of older structural elements with modern materials.
- Reinforcement of structural connections by “sistering” old connections with new patches.
- Bracing of parapets and anchoring of nonstructural elements.



### Seismic Retrofit Publications

There are several publications that provide information on seismic retrofit, including ASCE 31, *Seismic Evaluation of Existing Buildings* and FEMA 356, *Prestandard and Commentary for the Seismic Rehabilitation of Buildings*. Additionally, FEMA's forthcoming publication on seismic retrofits provides additional guidance on decision-making for seismic-prone historic properties. This guide contains information about multiple retrofit design options. In addition, this guide contains specific information about both baseline and complex tools for understanding historic building systems. Factors which might trigger the use of more complex evaluation tools include a building with highly significant and unique historic design features, unusual geologic conditions, or a difference of opinion about the outcome of baseline evaluation results.

FEMA 312, *Homeowner's Guide to Retrofitting* and FEMA 348, *Protecting Building Utilities from Flood Damage* are two publications that provide specific information on protecting structures from flood damage.

In areas prone to **wind and coastal storm events**, retrofitting projects should pay particular attention to the following:

- The strength of roofing joists and connections.
- The strength of window glass, frames, and shutters. For example, shatter-resistant glass or storm shutters could be installed.
- The construction of the foundation, particularly in areas prone to repetitive or high-velocity flooding.

To reduce the threat of damage from **fire**, retrofitting projects should consider the following:

- Upgrading mechanical and fire-protection systems.
- Balancing the need to conform to current codes and the preservation of character-

defining features. For example, the seemingly random placement of modern pull-boxes, sprinklers, and sirens may disrupt the interior and historic ambience of an eighteenth-century house museum. Creative input from a preservation architect, however, may allow you to conceal fire-protection improvements and thus retain a historic sense of place inside the building.

To address vulnerability to **manmade hazards**, such as terrorism, the following retrofitting measures should be considered:

- **Access control:** Access can be controlled by retrofitting certain physical aspects of a building, structure, or site, or by enhancing security at points of potential entry:
- **Security measures:** Security measures include screening visitors and limiting or prohibiting access. Although limiting public access may reduce the significance of certain historic properties and cultural resources, use of alternative public interpretation programs can still allow public involvement. For significant public spaces, work with curators and building managers to explore ways to control rather than prohibit access.
- **Site planning and landscape design:** Although historic landscape features often contribute to the character of a site, they may not work well for controlling access. In these cases, you should ask an experienced landscape architect to design new site elements that restrict ingress while still complementing and retaining historic landscape features. For specific advice on how to design new site features for

historic properties, refer to the *Secretary of the Interior's Standards*.

- **Architectural and interior space planning:** Although interior spaces—particularly those with a high amount of human traffic, such as lobbies—can be retrofitted to serve as control points, in many historic buildings, these spaces are themselves character-defining features. To find creative solutions for adding architectural design features that control access but also preserve important features, try consulting an experienced preservation architect.
- **Blast resistance:** In addition to controlling access, ensuring a certain level of blast resistance may be important in retrofitting a historic structure. When recommending blast-resistant walls or window systems, you should see that their design does not conflict with existing character-defining exterior elements. Many historic buildings are significant because of exterior design qualities, while structures such as bridges are notable for exposed structural elements.
- **Lighting improvements:** Improved lighting may also enhance the security of a historic



## Balancing Historic Preservation and the Nation's Security

Shortly after the terrorist attacks of September 11, 2001, concrete Jersey barriers were placed around the famous monuments and buildings of Washington, DC, and access to many monuments was restricted or prohibited altogether. Although the barriers provided immediate security, they were visually incompatible with DC's famous historic architecture. Moreover, access restrictions gave the perception that cultural sites were off limits. This perception, combined with the general perception that the nation's capital was a terrorist target, led to a decline in tourist activity and, consequently, tourist revenue.

In an attempt to strike an appropriate balance between increasing security and retaining the city's unique urban design, the National Capital Planning Commission formed an Interagency Task Force, whose work resulted in *Designing for Security in the Nation's Capital* (October 2001), which grew into *The National Capital Urban Design and Security Plan* (October 2002). The Plan provides specific guidance for design improvements that enhance the city's traditional open, pedestrian environment while still providing enhanced security. For example, the Plan calls for the use of hardened benches, landscaping elements such as vegetation, discrete bollards, and concrete planters to serve as security features for Federal facilities, monuments, and museums. While these improvements are clearly contemporary, they use forms and materials that are compatible with their nineteenth and early twentieth century monumental settings. The urban design features recommended by the Plan not only enhance protection and security, but also fit the city's traditional sense of place. The Plan is available on line at [http://www.ncpc.gov/publications\\_press/publications.html](http://www.ncpc.gov/publications_press/publications.html).



## Integrating Modern Materials into Historic Structures

Working with a highly experienced preservation architect, you can develop structural interventions that do not obscure historic design elements of a historic structure, but rather introduce modern and aesthetically rich elements that help to protect the property. For example, during a mechanical renovation of the Library of Congress in Washington, DC, new fire protection systems were integrated into the existing historic design. Sprinklers were placed in the middle of decorative floral rosettes. This illustrates how modern elements can be successfully integrated into historic fabric.

When recommending retrofitting as a mitigation action, you should ensure that new designs and new materials not obscure existing significant historic features, and retrofitting should reference important historic design elements. New hazard mitigation measures for historic properties can provide an opportunity to enhance your community's architecture while highlighting the past. More information about the appropriate design of additions to historic properties is available from your SHPO and NPS at [http://www2.cr.nps.gov/tps/standguide/rehab/rehab\\_newadd.htm](http://www2.cr.nps.gov/tps/standguide/rehab/rehab_newadd.htm).

property or cultural resource. Before altering the lighting in and around a historic resource, however, you must consider the potential impact that interior and exterior lighting systems may have on historic elements. In highly significant interior spaces, lower lighting may be an important historic feature.

**Elevation.** One of the most common methods of protecting flood-prone buildings, elevation involves raising a building so that its lowest floor is above the Base Flood Elevation (BFE), or the 100-year flood zone. Where less intrusive elevation is desired, historic buildings can be elevated to below the BFE while integrating other property protection measures to reduce vulnerability to hazard-related damage.



### A Local Success Story in South Carolina



*113 Calhoun at inception of project.*

113 Calhoun Street is a 125-year-old, three-story house that stands in the heart of the downtown historic district of Charleston, South Carolina. Charleston, vulnerable to damage from multiple hazards (including coastal storms, earthquakes, and flooding), has one of the nation's oldest local historic district ordinances. Built between 1875 and 1880, the house is an example of the regional "single house" style. Already abandoned for several



*113 Calhoun today.*

Photos courtesy of 113 Calhoun Street Foundation

years by the time Hurricane Hugo struck in 1989, 113 Calhoun Street was in serious danger of collapse by 1997. Instead of demolishing the building, though, the City of Charleston donated it to the 113 Calhoun Street Foundation, a non-profit partnership formed between the South Carolina Sea Grant Consortium, Clemson University, and the City.

Using creative design solutions the 113 Calhoun Street Foundation transformed the derelict building into an educational center demonstrating low-impact, sustainable-living design concepts. Primary funding for the initial construction was provided by FEMA, while additional support, including the donation of products and services, came from the private sector.

It was determined that an elevation above the BFE would not have been appropriate for 113 Calhoun Street. Such an elevation would have raised the building more than 5 feet, which would not have been in keeping with the surrounding streetscape and character of the historic district. Instead, the organization elevated the house only one foot, undertaking a variety of other types of interior and exterior improvements to protect against hazards.

Even though it was elevated below the BFE, the house is still protected from minor flooding events and suffers less damage in major flooding events. Improvements to the house included the following:

- Placing HVAC ductwork at ceiling level and returns above the BFE.
- Placing electrical, telephone, and computer outlets above the BFE, with no splices or connections below the BFE.
- Installing interior decorative wainscoting to the BFE. This wainscoting consisted of water-resistant material, and could be removed to dry after a flood event.
- Designing interior structural elements so that a “continuous load path” was created that minimized weak links in the building’s structural system.
- Tying hurricane clips on the roof to metal connectors that ran down three floors and were bolted to the concrete foundation. The structural improvements did not compromise any exterior or interior historic features.

- Installing traditional wood colonial shutters on the first floor, and heavy duty aluminum shutters, which offered greater protection against coastal storms, on the second and third stories.
- Replacing the existing roof with a standing seam metal roof in keeping with the district’s historic character.
- Developing a special fastener system, in which screws supplemented nails, to give the roof a greater ability to withstand hurricane winds.
- Replacing the building’s deteriorated original foundation of unreinforced masonry brick with a new foundation consisting of concrete footings with steel ties. This new system allowed new timber members to be bolted to the foundation, protecting against the twisting movements and other movements caused by seismic and wind forces. Brick from the original foundation was re-used as a veneer on the new foundation.

Care was taken to ensure that improvements did not compromise the exterior or interior historic features of the house, and that these features could be retained where possible. For example, almost all the building’s original cypress siding was still intact and, despite years of neglect, was retained.

When construction was completed in 2000, the 113 Calhoun Street Foundation received multiple national awards for its work from organizations such as the Association of State Floodplain Managers (ASFPM) and the National Trust for Historic Preservation.

Additional information about the 113 Calhoun improvement project, including detailed plan drawings and a video tour of the house, are available online at <http://www.113calhoun.org>.

An advantage of elevation is that it can bring a structure into compliance with floodplain regulations and reduce flood insurance premiums for the owner. The building has to either be raised above the BFE, or raised to a lower level but combined with other property protection actions. Flood insurance can be a great benefit to owners of historic structures. If the structure is kept in compliance with NFIP regulations and is damaged in a flood, the structure has a greater likelihood of being

properly repaired because the owner can afford the repairs thanks to the insurance.

Elevation is often relatively cost-effective, with a number of qualified contractors available to perform the work. Before elevating a property, however, owners must ensure that a contractor has the experience and qualifications required to elevate historic structures. Your SHPO may be able to offer you additional advice on elevating buildings.



### Publications on Elevating Flood-Prone Structures

FEMA has developed two publications that provide information on elevating flood-prone structures: FEMA 312, *Homeowner's Guide to Retrofitting* and FEMA 348, *Protecting Building Utilities from Flood Damage*. These can be ordered free of charge from the FEMA Publications Warehouse.

Because elevation may alter the appearance and scale of a historic building and redefine its relationship to its setting, it may have a negative impact on a building's character-defining features. Every effort should be made to replicate or approximate the original scale and setting of the building when elevating it. If the building is raised only several feet, elevation should not severely alter scale (see top figure on the right). Additionally, you can recommend the manipulation of certain landscape features to reduce the visual impact of a slight elevation. By adhering to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* and by minimizing elevation, a building's original historic setting, scale, and distinctive features may be preserved.

Trying to retain original scale and setting is particularly important when employing another method of elevation, i.e., regrading the site and placing fill beneath the building in an attempt to maintain the original distance between building and grade. Special care should be taken when elevating a building set within a consistent street wall. For example, if the front doors of a block of houses in a historic district open directly onto the sidewalk, elevating the building may necessitate a stairway, which in turn would necessitate a setback further from the sidewalk (see bottom figure on the right). This would disrupt the building's relationship to surrounding buildings. A preservation-sensitive

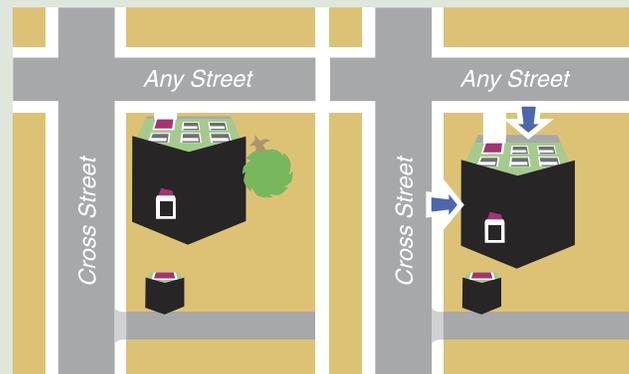


### Effective Elevation

Elevation can be an effective mitigation action if designed and constructed appropriately to withstand flood forces. Elevation is a practical solution for flooding problems, but the flooding conditions and other hazards at the site must be examined so that the most suitable technique can be determined. At a minimum, the foundation of the elevated structure must be able to withstand the expected loads from hydrostatic pressure, hydrodynamic pressure, and debris impact resulting from a flood. The foundation must also be able to resist undermining by any expected erosion and scour.



*Regrading of elevated building.*



*Elevation can affect setback from the street.*

Source: *Looking to the Future: Alternatives for Reducing Flood-related Damages in Historic Communities*, Milton, Pennsylvania, June 2002

alternative would be the elevation of floors within the building, particularly feasible in historic commercial structures with tall ceilings, or elevating a neighborhood of structures rather than a single building.



## Offsetting Mitigation Actions

To offset the impacts of mitigation measures involving ground disturbance—such as foundation work during an elevation project—partial excavation might be considered when an archeological site is identified. This type of excavation would allow professional archeologists to conduct a data recovery excavation of artifacts potentially buried in the surrounding ground. The cultural artifacts recovered during these meticulous excavations would then be studied and curated in an archive.

Another offsetting measure would be the development of community-based histories. These documentary projects could include any of the following:

- A recording of oral histories;
- A compilation of written memories;
- The production of a historical documentary on video or for posting on the Internet;
- The conservation of historic artifacts, documents, home movies, and historic photographs as part of a documented archival collection; and
- Museum exhibits that document and explain the importance of local historic events to regional and national history.



## A Local Success Story in North Carolina

The town of Belhaven, North Carolina, along the Pungo River, is subject to repeated flooding. In its last flood event, over 60% of the town's buildings were damaged, including most of the buildings in the National Register-listed Belhaven Historic District. In an effort to retain the town's historic and economic link to the waterfront, the decision was made to elevate 379 properties in place rather than relocate them to higher ground or demolish and rebuild them.

With assistance from the North Carolina SHPO office, plans were developed for an elevation project that would best preserve the historic character of the district. In the plans, frame buildings were raised onto concrete block foundations faced with brick veneer. Brick buildings were elevated onto continuous concrete block foundations, which were also faced with brick veneer. A projecting brick course was used to demarcate where the original house ended and the new foundation began. Additional guidance was drafted for preserving porches, railings, balusters, and steps, and for replacing old materials with appropriate new materials where necessary.

To prepare for the elevation project, large-format archival photographs were taken of each building that would be affected by the project. These photos provided a permanent record of the historic appearance of the district. Due to all these extra planning efforts for preserving its



*Frame building elevated on concrete block foundation faced with brick veneer. Belhaven, North Carolina.*

Photo by Mark Wolfe/FEMA News Photo

historic properties, the Belhaven Historic District was able to maintain its National Register status.

By the time the next flood struck Belhaven, 32 of the planned 379 houses had been elevated. It is estimated that elevation of these 32 properties alone saved the town over \$1.3 million in direct and indirect damages.

**Relocation.** Relocation means moving historic properties and cultural resources out of harm’s way. Your SHPO/THPO may maintain a list of qualified building movers in your jurisdiction, or may be able to refer you to other projects in which historic properties were moved.

Relocation of buildings generally involves raising the building and placing it on a wheeled vehicle, usually a large flatbed trailer. The building is then transported to the new site and lowered onto a new foundation. The easiest buildings to move are one-story frame structures. Multi-story and solid masonry buildings are more difficult because of their

greater weight and size; even so, large buildings such as theaters have been successfully moved. Masonry buildings, buildings with stone or brick veneer, and buildings with chimneys may require extensive bracing to prevent cracking or structural failure.

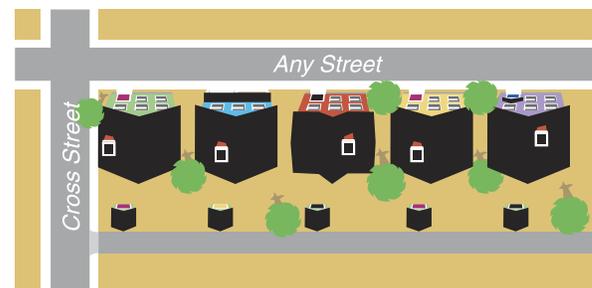
One drawback to relocation is that it can be costly if the owner of the building needs to purchase a new lot on which to relocate the building. There is also the expense of preparing the new site. Moreover, permits for this site preparation may be required by local government, highway departments, and utility companies.



### Demolition

Removal of structures from the areas of risk is the most permanent form of hazard mitigation. While this may be the most practical solution for buildings subject to repetitive hazard events and that have sustained extensive structural damage, demolition of individual historic buildings or multiple buildings within historic districts has serious ramifications. When a historic building is demolished it is gone forever. Above all, indiscriminate demolition of historic buildings should be **avoided** because it can create a patchwork of remaining buildings in historic districts. Finally, if enough historic buildings are demolished in a district that is eligible for listing in the National Register, the remaining buildings may not possess sufficient significance or integrity for the district to retain its eligibility. Therefore, where technically feasible, other options besides acquisition and demolition should be considered for historic structures. Alternative options may make use of acquisition, but instead of demolishing the property, convert it to a different use. A community could acquire a historic mill in a floodplain and convert it into a public picnic area. Although structural improvements and basic exterior maintenance might be undertaken, the mill would not be occupied. Structural improvements could include modifying the foundation to increase flow-through of floodwater during a flood event.

Historic buildings often share important features such as landscaping, outbuildings, alleyways, orientation, and setback—the distance between the buildings and the street. These contributing features often help to define a neighborhood’s historic significance (see top figure on right). Relocation should be carried out with extreme care



to ensure that the relationship between individual historic buildings within a neighborhood is maintained. If important contributing features are neglected when historic buildings are relocated, historic neighborhoods may lose their sense of cohesiveness (see figure above).

*Source: Looking to the Future, Alternatives for Reducing Flood-Related Damages in Historic Communities, Milton, Pennsylvania, June 2002*



## Historic Emergency Response Facilities

The facilities in your community involved in first response to hazard events are sometimes historic properties requiring protection from hazards. These include hospitals, police or fire stations, schools, or emergency shelters. Because these facilities are often on the front lines of post-disaster response, their level of life-safety design is important in ensuring the safety of those who work within them or are brought there for treatment, shelter, and other types of emergency service. You will want to make sure that these first responders are located in buildings with a high degree of structural stability. Therefore, your team may need to evaluate if the level of life-safety design required by these buildings can be achieved without a negative impact on their character-defining historic features. If you do find conflicts between these two design considerations, try working with an experienced design professional to identify ways to retain important historic design features while allowing for first responder functionality.

In the event that the high level of life safety design required by a critical response facility seriously conflicts with its character-defining historic features, you should

evaluate other uses for the building. For those buildings whose historic features are significant enough to warrant preservation, the critical response function could be moved to a new or existing facility more appropriate to serving this function. The original building could be evaluated for new uses that would affect its historic elements to a lesser degree, as well as for the possibility of rehabilitation. It is important that the community not simply abandon a historic facility because it cannot support its current use. One creative solution for funding the construction costs of the new facility could be commercial redevelopment of the original historic facility. In this way the building is converted to a new, more preservation-sensitive use, while still maintaining—perhaps increasing—its ability to generate revenue.

In addition to emergency response facilities, other structures, such as flood control systems or shelters, may be significant to your community's past. Some of these structures may represent important advances in the history of civil engineering and community planning. If they have outlived their usefulness you should work with an experienced architect to identify and evaluate solutions that would retain their important character-defining design features.

The relocation of several buildings out of a historic district can have a great impact on it; removing a house from among its neighbors may leave an inappropriate “gap-toothed” opening in the traditional streetscape. If too many structures are removed from their original locations, the character of a historic district may be seriously compromised. You must also

consider whether the new neighborhood will be compatible with the period design of the building, and whether the building itself will be compatible with its new neighborhood. One option is to relocate historic buildings in groups to new neighborhoods that are likewise historically and aesthetically compatible (see figures on previous page).

## Mitigation Action Category #3: Structural Diversions

Structural diversions are physical barriers that hold back floodwater, mud, and other debris resulting from hazard events such as floods and landslides. With their ability to protect whole neighborhoods, they offer the advantage of minimizing the need for retrofitting individual structures against hazards. Floodwalls and levees are two common types of structural diversions.

Other examples include seawalls and landslide protection obstructions.

Levees are embankments of compacted soil built to protect an area against floodwaters from rising waterways. If built alongside a waterway they have the potential to protect an entire community. Due to their massive size, however, levees can disrupt a



### Invisible Flood Control Wall



One technological innovation does away with the wall part of the floodwall altogether, until a flood is imminent. Trademarked as the “Invisible Flood Control Wall,” the aluminum planks that comprise the wall are stored offsite until they are needed. They are attached to the reinforced concrete foundation and metal sill plate, which are the only elements of the flood wall that are permanently installed along the floodway.

*Invisible flood control wall in Louisville, Kentucky.*

Photo courtesy of Flood Control America  
<http://www.floodcontrolam.com>



### Community Beautification Project—Decorative Floodwalls



A solution for unsightly floodwalls is to decorate them. Paducah, Kentucky, turned its huge concrete flood wall into an artistic amenity by covering it with a series of murals showing the history of the town.

*The Strawberry Festival*



*Railroads and Railways*



See more of the murals on the Web at <http://www.kentuckylake.com/gallery/ontheroad/The%20Wall/080802wall.htm>.

Photos courtesy of Dafford Murals  
<http://www.daffordmurals.com>

*The Broadway Scene*



*The Paducah Flood*

community's relationship to the waterway, be extremely costly to construct and maintain, and require a large amount of land for their construction.

More practical than levees for protecting individual structures, floodwalls are typically reinforced concrete and masonry structures that protect small lots and tight spaces from floodwaters of a few feet. They can be used to protect windows, doors, or bulkheads. For this

reason, floodwalls are often used in conjunction with other flood protection methods.

By significantly reducing the risk to a structure and its contents, structural diversions may make it possible to continue occupying a building during a hazard event. Another advantage they offer is that they may be built sufficiently distant from historic buildings as to be completely unobtrusive. Some flood-prone communities have considered the use of removable

floodwalls, which are constructed shortly before an anticipated flood event.

While floodwalls can sometimes be small in scale, it can be difficult to design permanent floodwalls that blend into the unique setting of a historic district. Much success in the design depends on the height of the diversion structures and their distance from historic buildings. Levees and floodwalls may not only affect the visual character of a historic community, they can restrict access to the

commercial and recreational uses of the waterway.

Another drawback to structural diversions is that they often create a false sense of security when floodwaters are higher than expected. Floodwalls and levees that are overtopped during a flood offer little or no protection at all. A failing levee or floodwall can be dangerous, producing high-velocity water flows that can cause massive structural damage to properties.

## Mitigation Action Category #4: Public Education and Awareness

Mitigation actions involving public education and awareness include outreach projects, real estate disclosure, hazard information centers, and both school-based and adult education programs.

A public education campaign can build on the public involvement tools used earlier in the planning process. Public education is often not enough to protect all your community's historic properties, but it can be effectively combined with other hazard mitigation actions. In the case of certain cultural resources, such as personal

photographs and family collections, public education and awareness can be one of your most powerful tools.

As you explore public education as a possible mitigation alternative you may find that historic preservation organizations are sponsoring ongoing outreach efforts in the area. If so, consider ways in which public education about hazard-prone historic properties and cultural resources can be linked to existing outreach campaigns.

## Mitigation Action Category #5: Natural Resource Protection for Historic Landscape Features and Archeological Sites

In addition to mitigation actions that protect historic buildings and other historic features of the built environment, your team may also want to consider mitigation actions that protect natural features that played an important role in past human activities. These natural features may either be historic properties themselves,

or contribute to an understanding of historic properties. They might include the gardens and designed landscapes of historic properties, rivers, or bays that served as transportation routes, wetlands that were used for farming, or traditional cultural properties.



## Natural Resource Protection Actions for Historic Landscape Features

Actions that, in addition to minimizing hazards, also preserve or restore the functions of natural systems. Some natural resources either are historic properties in themselves or contribute to an understanding of historic properties. Such types of mitigation actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

Some of these natural features may also possess economic value for your community, especially if they are visitor destinations or recreational sites. You will want to carefully consider actions that would protect the most important features of these sites, such as topography and vegetation, from natural hazards.

Be aware, however, that some of these natural features, such as forested and riverine areas, may actually also comprise some of the natural hazards that threaten your community.

Mitigation actions can serve to both mitigate natural hazards and preserve the natural resources that give rise to those hazards. For example, stream corridor restoration and erosion control, watershed management, and wetland restoration can protect against flooding while still preserving the integrity of these natural resources. Likewise, forest and vegetation management can protect against the threat of wildfire while still preserving a wildlife refuge.

You will also want to evaluate mitigation alternatives for protecting locations known to contain or likely to contain buried archeological sites and artifacts. In situ archeological sites and features (which have not yet been excavated) are particularly vulnerable to exposure and disturbance by erosion, flooding, and landslides. One alternative for preserving these sites for study by future generations is to cover them over with earthen fill, which will offer some protection against hazard exposure.

While some resources, such as artwork displayed in a museum, may not have an important relationship to its setting, other resources, such as a mural located within a school, may have a very important historic relationship to its surrounding.

In selecting mitigation actions for cultural resources that have an important relationship to their surroundings, you should consider actions that maintain that relationship as much as possible. For these resources, you will want to explore options for safer storage or display before considering relocation offsite (e.g., use of water-proof containers or removal to an upper floor of the same building). Your team should also consider ways in which ongoing maintenance of the resource might reduce further deterioration, or ways to better secure the resource to its base or storage mechanism. These strategies also apply to resources that must remain onsite, or whose relocation would be infeasible.



For those cultural resources that do not have a significant relationship to their setting—often called moveable resources—relocation can be an easy way to ensure their protection. For example, an archive of historic photographs found in a flood-prone library can be relocated to the local preservation society’s office located outside of the floodplain.

To protect cultural resources against tornadoes and wind-related hazard events, you should consider storing them in a safe room. A safe room is a room designed to a higher level of life-safety. These rooms are often constructed with the purpose of providing a secure location for valuables, as well as a safe refuge for people. For more information about safe rooms, please see *Protecting Yourself from Tornadoes: Safe Rooms*, available from FEMA at <http://www.fema.gov/mit/saferoom>.

Mitigation actions for cultural resources should also take into account the physical placement of these resources in relation to hazards. For example, to protect against wind events and earthquakes, resources should be kept far away from heavy objects and windows that might be broken or knocked about during a hazard event. Particularly in earthquake-prone areas, resources should be placed on secured, reinforced shelving in such a manner as to prevent their breakage during an earthquake. As discussed above, relocation of resources to a safer elevation or alternate location can offer protection against flood events.

To protect against fire, the placement of fire alarms and sprinklers should be evaluated to ensure they are appropriately placed in relation to storage or exhibit spaces. The materials and design used to construct those spaces should also be examined for their fire resistance. Some highly significant collections will need to be stored in locations with greater fire resistance (e.g., a storage area protected by a rated firewall).

Likewise, the construction and type of material used in display cases and storage areas should be examined for their resistance to water. In addition, the locations of pipes and roof leaks should be assessed, since cultural resources might inadvertently be kept in locations that are vulnerable to leaking water.

### ***Instructions for Worksheet #6***

Use Worksheet #6 to record the alternative mitigation actions you identify for protecting the historic properties and cultural resources included in your preservation hierarchy. For each of the objectives you developed in Step 1, Task C, you should make



a copy of Worksheet #6 and record that objective at the top of the worksheet, along with its corresponding goal. You will next begin the process of identifying appropriate alternative mitigation actions for addressing that objective. Once you have identified a set of alternative actions, you should list them in the Alternative Actions column of the worksheet. Additionally, at the bottom of each copy of Worksheet #6, check off the mitigation action categories that apply to the objective you wrote down at the top of the Worksheet.

As you research possible mitigation action alternatives, you will likely consult a variety of sources to learn more about each. Please see pages 2-2 through 2-6 of FEMA 386-3 for more information on reviewing existing literature and success stories, and on soliciting public opinion and input.

Once you have identified useful sources of information for each alternative mitigation action you identify, record that source in the Sources of Information column of Worksheet #6.

Now that you have identified possible mitigation alternatives, your next step is to start evaluating them for eventual selection and prioritization.

### **Task B. Identify and analyze State and local mitigation capabilities.**

One of your first steps in evaluating the mitigation action alternatives your planning team has identified is to determine the levels of resources your community, State, or Tribe can devote to these preservation strategies. To accomplish this you should review your Tribal capability assessment or your State and local capability assessments.

For more information on conducting such a review, please refer to pages 2-7 through 2-11 of FEMA 386-3. Upon completion of your review, your team should have a fairly good idea of the types of technical assistance and funding that Tribal, State, and local governments can provide toward mitigation actions for historic properties and cultural resources.

### **Task C. Evaluate, select, and prioritize specific mitigation actions.**

#### ***1. Evaluate alternative mitigation actions.***

Now that the planning team has completed Worksheet #6 and reviewed the applicable capability assessments, it must evaluate whether the alternative mitigation actions fulfill your objectives and if they are appropriate for your historic

and cultural resources. There are several ways to develop and apply evaluation criteria. This guide discusses three methods for evaluating mitigation actions. The first is using your preservation hierarchy; the second is the **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental (STAPLEE) criteria analysis; and the third is the Benefit-Cost Analysis (BCA); they are explained in the following sections.

Your preservation hierarchy and areas of highest risk will help identify historic properties and cultural resources that should be treated with the most preservation-sensitive mitigation measures, those with the least possible negative impacts to character-defining features. The STAPLEE criteria (see page 3-27) will help your team evaluate mitigation alternatives in the context of multiple community-identified goals. The BCA will help you determine which mitigation projects are the most cost-effective for your community. By cross-referencing your results from these three methods you should be able to select the mitigation actions most appropriate to your community.

**a. *Evaluate alternative mitigation actions based on your preservation hierarchy and areas of highest risk.***

The list of preservation priorities you developed earlier will give your planning team an idea of the types of mitigation actions that are appropriate for certain historic properties and cultural resources. Generally, the least intrusive options should be considered and carefully evaluated for use on the most significant historic properties and cultural resources, while more intrusive options are considered for less significant properties and resources. With careful planning, you can help to ensure that your community faces reduced harm from hazards while retaining its unique sense of place.

In summary, you will want to strike a balance between implementing cost-effective, possibly intrusive mitigation actions for less historically significant properties and cultural resources, and implementing more expensive, less intrusive measures for the most important historic properties and cultural resources in your community.

**b. *Evaluate alternative mitigation actions using the STAPLEE criteria.***

Pages 2-12 through 2-21 of FEMA 386-3 present the STAPLEE opportunities and constraints of implementing a particular mitigation action in your community. These are



called the STAPLEE evaluation criteria, and your answers to the questions they generate will help your team narrow down its list of potential mitigation actions.



## San Francisco City Hall Seismic Retrofit



*San Francisco City Hall.*

Source: FEMA News Photo

The City Hall of San Francisco, California, completed in 1915, is one of the finest examples of Beaux-Arts Classical architecture in the United States. The building is a four-story-plus-basement office block of about 516,500 square feet; it covers two city blocks, and its dome is about 300 feet tall. The City Hall is a National Historic Landmark (NHL) and is located in a NHL District. The building value is estimated at approximately \$430 million with an additional \$40 million in contents; and holds an average 1,460 weekday occupants.

After being moderately damaged by the Loma Prieta Earthquake of 1989, FEMA funded temporary and permanent repairs to the building, and the City and County of San Francisco (CCSF) used this opportunity to request additional mitigation funding for the seismic retrofit of the entire City Hall.

The structure was originally designed with a “flexible” first story, intended to dissipate ground movement from an earthquake before it reached the upper floors and dome. Now this type of building is recognized as having a “soft” first story, which is an extreme earthquake hazard.

Because of this, CCSF elected to construct a base isolation system for the seismic retrofit, which was estimated at \$180 million.

Initially, several seismic retrofit schemes were proposed for the City Hall but some of them would have resulted in significant impact to the historic fabric and/or were extremely expensive. It was decided that due to the building’s type of construction, the costs of the project, and the long-term implications for the City Hall building, a base isolation system would be the best way to protect the building and its inhabitants.

The completed base isolation design features 550 isolator bearings under all steel columns, isolators under new concrete shear walls on all sides of the light wells, and steel bracing at the dome, drum, and rotunda below. In addition to the base isolation system, the completed scope of work included asbestos removal, improved handicapped accessibility, HVAC upgrades, new telephone/telecommunications systems, and fire life safety system upgrades. City Hall staff and functions were relocated for about three years. FEMA funding for repairs and retrofit totaled approximately \$121 million.

The City Hall of San Francisco is now protected by the most advanced seismic retrofit solution known today—a solution that protects both the occupants and historic architecture of this unique structure.



*San Francisco City Hall Base Isolation System.*

Source: FEMA News Photo

## The STAPLEE Criteria for Historic Properties and Cultural Resources

**Social:** The public must support the specific mitigation actions and the overall implementation strategy. Therefore, the actions will have to be evaluated in terms of community acceptance by asking questions such as:

- If you avoid mitigation actions that affect historic properties and cultural resources, will those properties and resources be at risk to hazard-related damage?
- Will the action have a negative impact on certain historic properties and cultural resources? What is the community value and relative preservation priority of those resources?
- Does the action achieve other important community goals, such as economic revitalization?

Your SHPO/THPO, community development staff, and planning team are key team members who can help you answer these questions. Another important resource will be your findings from the risk assessment you conducted in Phase 2.

**Technical:** It is important to determine if the proposed action is technically feasible, has minimal secondary impacts, and will help to reduce losses in the long term while preserving the important features of historic properties and cultural resources. In evaluating technical feasibility, your team can draw upon information about historic properties and cultural resources you gathered earlier, such as the preservation priority and performance evaluation. In evaluating the technical aspects

of a mitigation action for historic properties and cultural resources, you will determine what kind of solution the action would present—a whole solution, a partial one, or none. To accomplish this, you should ask the following questions:

- Is the action technically feasible?
- Are character-defining historic features affected? Are secondary impacts minimal?
- Does the action address multiple hazards?
- Does the action solve a problem, or only a symptom of a problem?
- Will other nearby historic properties and cultural resources be harmed by the mitigation action? What are the preservation priorities and community values of these resources, relative to each other?

Key team members who can help answer these questions include a qualified preservation architect and building department staff.

**Administrative:** Under this part of the evaluation criteria, you will examine the anticipated staffing, funding, and maintenance requirements for the mitigation action. The results of your examination should determine if your community has capabilities necessary for implementing the action or whether outside help will be necessary.

In evaluating the administrative aspect of a proposed mitigation action you should ask the following questions:

- Does the action require the input of specialized historic preservation professionals? If so, what access do you have to these professionals? Can you hire a consultant or use a volunteer or educator? What are the budgetary implications?

- If you anticipate that some actions may have substantial negative effects on historic properties and cultural resources, does your jurisdiction's staff have the time and training to understand these issues? If your community is short on staff, what delays might be anticipated?

**Political:** Understanding how your current community and State political leadership feels about historic preservation issues will provide valuable insight into the level of political support you will have for a mitigation action. Proposed mitigation actions sometimes fail because of a lack of political acceptability, particularly when the proposal of these actions exposes divisions among leaders about the resources in question. Identifying preservation hot spots before you have selected an action alternative will help you identify the feasibility of implementation.

To gauge the likely level of political support for your mitigation action, ask yourself the following questions:

- Are there political divisions on the subject of historic properties? Do the disagreements center on the evaluation of historic properties or on perceptions about the meaning or extent of designation?
- Have political leaders participated in the mitigation planning process for historic properties to date? Are they properly informed about the important role that historic properties can play in the community?
- Is there a local champion willing to help see the action through to completion? Does that local champion have a copy of this how-to guide and an adequate understanding of historic property and

cultural resource considerations for mitigation planning?

- Are preservation and other community interests represented in the stakeholder group? Have all stakeholders been offered an opportunity to participate in the planning process? Are they aware of the degree to which your committee has evaluated preservation-sensitive mitigation alternatives?

**Legal:** Without the appropriate legal authority, a proposed mitigation action for a historic property or cultural resource cannot lawfully be undertaken. When considering this criterion, you will determine whether your community has the legal authority at the local, State, or Tribal level to implement the action, or whether the jurisdiction must pass new laws or regulations. Each level of government operates under a specific source of delegated authority. As a general rule, most local governments operate under enabling legislation that gives them the power to engage in different activities.

You should identify the unit of government undertaking the mitigation action, and include an analysis of the interrelationships between local, regional, State, Tribal, and Federal governments. Your SHPO/THPO and local or regional planning authority can help you understand the differences between these laws and regulations regarding historic resources. In addition, the SHPO/THPO must be consulted about certain federally sponsored projects involving historic properties.

Below are some questions you should ask in evaluating the legal aspects of your proposed mitigation actions:

- Which unit of government would undertake the mitigation action? What is

the extent of Federal involvement (e.g., funding and permitting)?

- Does the proposed action follow all applicable preservation laws and ordinances?
- Does the proposed action follow other State or Federal governmental agency requirements for which permits may be required?
- Does the proposed action follow other applicable zoning, floodplain management, land use ordinances, and building code requirements?
- Will the community be liable for the action itself or for failing to undertake action?
- Is the action likely to be legally challenged by stakeholders who take issue with the negative impacts the action might have? If so, has your community developed a dialogue with those stakeholders and evaluated all potential ways to offset the negative impacts? If significant disagreement exists, has formal mediation or alternative dispute resolution been considered?

Your SHPO/THPO, local or regional planning authority, and your community's legal counsel can help you make the above determinations.

**Economic:** Every local, State, and Tribal government experiences budget constraints. In evaluating the economic aspect of a mitigation action for historic properties and cultural resources you must consider both the present economic base and projected growth. You will want to closely evaluate mitigation actions that encourage economic revitalization by preserving historic properties.

Cost-effective mitigation actions that can be funded in current or upcoming budget cycles are much more likely to be implemented than mitigation actions requiring general obligation bonds or other instruments that would incur long-term debt for a community. States and local communities with limited budgets or budget shortfalls may be willing to undertake a mitigation initiative if it can be funded, at least in part, by external sources. This is why “big ticket” mitigation actions, such as large-scale acquisition and relocation, are often considered for implementation in a post-disaster scenario when additional Federal and State funding for mitigation becomes available.

In evaluating the economic criterion of STAPLEE, you should ask the following questions about your mitigation action:

- Will the action require outside funding? Can this funding be combined with existing funds for historic properties and cultural resources?
- Does the action help achieve other community economic goals, such as capital improvements or economic development? Do those economic goals also encourage preservation of historic properties?
- Has your community considered the potential economic impact if no action is taken? Will hazard-related damage discourage economic rehabilitation projects for historic areas?
- Can existing programs such as “Main Street” downtown revitalization efforts, be re-focused to relieve the budgetary burden of the action?

**Environmental:** The environmental impact of your proposed mitigation action is an important consideration because of public

desire for sustainable and environmentally healthy communities and the many statutory considerations (e.g., NEPA and NHPA). Some of your alternative actions may harm historic properties or cultural resources. Examples include regulatory measures that limit growth of hazard-prone areas but encourage abandonment of historic properties, and measures such as elevation projects that involve significant ground disturbance, which may damage archeological sites.

The decision to implement a mitigation action that would adversely affect historic properties should be made only after a thorough analysis of other mitigation options and consultation with a variety of parties, including your SHPO/THPO, members of the community, your planning team, and other interested groups. When such actions must be taken, you should consider additional measures to offset, or compensate, the loss or alteration of the resource. If there is Federal or State

involvement in the mitigation project, you may be required to evaluate the use of preservation-sensitive options. This is especially true when the affected historic property is listed or eligible for listing in the National Register (see Phase 4, Consideration 2 for more information on this requirement).

In evaluating the environmental aspect of a mitigation action you should ask the following questions:

- Will the action threaten land, water, wetlands, endangered species, historic properties eligible for listing in the National Register, cultural resources, or other environmental assets?
- Are there mitigation action alternatives that preserve environmental resources (including historic properties and cultural resources) while also encouraging economic growth?

### *Instructions for Worksheet #7*

**Worksheet #7: Evaluate Alternative Mitigation Actions for Historic Properties and Cultural Resources** (see Appendix C for blank worksheet) will guide you through your STAPLEE alternatives analysis. Before you begin the analysis, you should make a copy of this worksheet for each objective you identified in Step 1. Write this objective and its corresponding goal at the top of the worksheet, and then copy all the alternative actions you identified for that objective from the first column of Worksheet #6 into the first column of Worksheet #7. You are now ready to begin your STAPLEE analysis.

This guide covers the STAPLEE criteria as they relate specifically to historic properties and cultural resources. For more information on the general considerations of the STAPLEE criteria see FEMA 386-3.



As you determine the answers to each set of questions/ considerations you develop for each STAPLEE criterion, you should score each mitigation alternative based on your answers. You will use Worksheet #7 to accomplish this scoring. On this worksheet, indicate a plus (+) if the consideration is favorable, or a minus (-) if the consideration is not favorable. For considerations that do not apply to the action, fill in N/A for not applicable. Leave a blank only if you do not know an answer.

For those considerations left blank, make a note in the Comments column of the source you should consult to help you evaluate the consideration.

**c. Evaluate alternative mitigation actions using benefit-cost analysis (BCA)**

BCA is the last type of evaluation addressed in this guide. For a detailed explanation of how to carry out a BCA, you are referred to the Mitigation BCA Toolkit CD. This CD includes all FEMA BCA software, technical manuals, training courses, and other supporting documentation to enable you to perform a BCA. For a qualitative benefit review assessment of mitigation actions, in cases where you do not have sufficient data to perform a BCA, see FEMA 386-5, *Using Benefit-Cost Review in Mitigation Planning*.

By performing a BCA, you will bring into your alternatives analysis the important consideration of cost-effectiveness. You will attempt to answer the following questions: How cost-effective is a particular mitigation action or project? How does the cost of implementation compare to the amount of damage it would prevent?

To answer these questions, you must have an idea of the level of risk facing the historic resources for which an action or project would be implemented, the replacement value of those resources, and the cost of the action or project. You have already collected much of this information during the risk assessment you conducted in Phase 2. Other cost considerations to remember include the potential loss of local tax base resulting from alternatives such as the demolition or relocation of properties.

The end product of your BCA will be a Benefit-Cost Ratio for each mitigation alternative you have identified. A Benefit-Cost Ratio of 1.0 or higher indicates that a



### Mitigation BCA Toolkit

This CD is available free directly through the BC Helpline: [bchelp@hhs.gov](mailto:bchelp@hhs.gov) or 866- 222-3580 (Toll-Free).



### Emphasize Costs and Benefits

DMA 2000 requires that every community submitting a plan prioritize its alternative mitigation actions with an emphasis on costs and benefits. A formal benefit-cost analysis is not mandatory, but an explanation of the analysis undertaken and why some actions were chosen above others is required. If detailed cost information is not available, a qualitative analysis will suffice.





## Seeking a Proper Balance

In selecting your mitigation alternatives you will want to evaluate a variety of mitigation actions, including a balance of cost-effective mitigation actions for properties with a lower preservation priority, and less intrusive actions for properties with a higher preservation priority, which could be more expensive. The resulting balance will be a cost-effective project that preserves important community resources while providing increased protection from hazard-related damage. To find this balance you will need to take into account the overall cost-effectiveness of all the mitigation actions proposed for your community. You may want to combine multiple Benefit-Cost Ratios to provide an overall average Benefit-Cost Ratio for the community.

mitigation option is considered cost effective by FEMA (i.e., the benefits of preventing hazard-related damage to the resource are worth the costs of investing in the action).

As you determine the cost-effectiveness of each of your mitigation options, you should remember that cost-effectiveness is only one consideration among many that go into your alternatives analysis. Although BCA is an effective tool for aiding the alternatives selection process, it should not be the sole determinant for selecting an alternative. BCA offers a quantitative way to compare different alternatives. Less quantifiable factors also need to be considered as you select the most appropriate actions from among your many alternatives. These include the more subjective measure of community value and the various considerations generated by the STAPLEE analysis.

By carefully considering the three methods described in this document for evaluating mitigation alternatives you can develop your own decision-making process for selecting mitigation projects. You have several indicators to balance: the relative preservation priority, the most relevant questions from the STAPLEE criteria, and the Benefit-Cost Ratio of the hazard mitigation actions.



## Evaluating Flood Mitigation Alternatives: The Milton, Pennsylvania Experience

In Milton, Pennsylvania, the community identified planning goals as part of the process for selecting mitigation actions. Foremost among these goals was to avoid demolition or relocation of historic properties. In addition, the community identified the revitalization and retention of the historic commercial downtown neighborhood as a high-priority objective. Since most of the buildings extended to the lot line and shared party walls, elevation would be difficult. Therefore various flood-proofing measures, even the elevation of interior floors, were considered the most appropriate alternative.

For Milton the BCA for flood mitigation alternatives yielded several interesting results. For individual structures the cost-effectiveness of different hazard mitigation alternatives varied little, indicating that the difference between the cost-effectiveness of acquisition and demolition, and that of relocation or elevation would be fairly small. Therefore, future flood-related damage could be mitigated without widespread demolition of historic structures. The BCA revealed that construction of a structural floodwall/levee would also be cost-effective. Although they tend to increase the effects of a flood downstream and cannot absolutely prevent flood damage, they help protect local industry and infrastructure from flooding. When the community had previously considered a floodwall, they found it was too expensive.

Stream channel modifications, such as dredging or the removal of central islands, were not found to be cost-effective. In addition to environmental impacts and high cost, they would reduce flood levels by no more than 6 inches.

The community decided that more intrusive, highly cost-effective projects (such as an elevation project with a Benefit-Cost Ratio of 1.5) would be evaluated for Milton's less historically significant structures. Less structure-altering alternatives (such as a flood-proofing project with a Benefit-Cost Ratio of 0.5) would be used for its highly significant historic properties. This project balances out some individual structures with very high Benefit-Cost Ratios for more intrusive projects, such as elevation, with individual structures that have a lower Benefit-Cost Ratio for a less intrusive project, such as flood-proofing. The more intrusive (and more cost effective) hazard mitigation alternative was employed for a historic resource that ranked lower on the preservation hierarchy; the less intrusive project (and less cost-effective) was employed for a historic resource that ranked higher on the preservation hierarchy.

Although BCA revealed which hazard mitigation options were the most cost-effective for each property, it was not the sole factor in creating multiple-property hazard mitigation actions in historic Milton.

More information about Milton's planning process for historic flood-prone properties is online at <http://www.fema.gov/ehp/milton.shtm>.



## A Local Success Story in Wisconsin

Flooding is an ongoing part of life in the rural riverside town of Darlington, Wisconsin, having caused millions of dollars in property damage over the past decade. Following the devastating damage from the 1993 floods, the town could follow one of three routes: do nothing and continue to suffer the periodic rise of the river; move the central business district out of the floodplain and upset the local economy and sense of community; or... do something innovative.

Darlington chose innovation. It found creative solutions to retain the historic charm of its nineteenth century business district while eliminating the threat of future flood devastation.

The town took advantage of the very high ceilings common to many of the older buildings in Darlington; their height allowed first floors to be elevated out of flood danger with minimal impact to other historic features. Basements were filled with sand and gravel, floodproofing that portion of the building most vulnerable to flooding, and all utilities were upgraded and raised.

All these measures were implemented without altering the exteriors or disrupting the basic historic integrity of these older buildings. Additionally, the residential area surrounding the downtown was relocated and the resulting space redeveloped as a recreational area, including a campground, a paved walking trail, and a portion of a regional multi-use trail.

These innovative techniques resulted in the successful floodproofing of the historic central business district against the 100-year flood event, as well as the revitalization of Darlington's local economy.

The successful integration of historic preservation and hazard mitigation earned Darlington a Preservation Achievement Award from the State Historical Society of Wisconsin. More information is available at [http://www.fema.gov/regions/v/ss/r5\\_n16.shtm](http://www.fema.gov/regions/v/ss/r5_n16.shtm).



*Top: Restored and retrofitted building.  
Middle: To provide additional protection against floodwater, removable watertight floodgates were incorporated into the buildings.  
Bottom: Floodproofing in action in Darlington, Wisconsin.*

Photos courtesy of Vierbiecher Associates



Remember that you and your team are continuously balancing multiple community planning goals in your work.

### ***2. Select mitigation actions.***

After evaluating the alternative mitigation actions, select those that are most appropriate for your community. One way to do this is by reviewing your notes on each action from Worksheets #6 and #7. Review the comment notes or expand upon them to explain any special circumstances that must be kept in mind in the next step. For example, if you found that one action is more effective when undertaken in conjunction with another, note this fact. See FEMA 386-3, page 2-25, for more information on selecting mitigation actions.

### ***3. Prioritize selected mitigation actions.***

**Worksheet #8: Prioritize Alternative Mitigation Actions for Historic Properties and Cultural Resources** in Appendix C provides a way to organize your mitigation actions. In this worksheet you will list the alternative mitigation actions in order of priority, as well as the goals and objectives they address, and any other relevant information you might add to your hazard mitigation plan.

You can find detailed information about prioritizing mitigation actions in FEMA 386-3, pages 2-25 through 2-28. In brief, the following should be considered before you prioritize the selected actions:

- Ease of implementation.
- Ability to achieve multiple objectives.
- The time needed for implementation.
- The possibility of being funded and implemented in a post-disaster scenario.

See FEMA 386-3, pages 2-23 through 2-25, for more information.

You can use one of two common methods to prioritize actions. In multi-voting, every team member is given a total number of votes equal to half the number of total potential actions. If a team member feels strongly about a particular action, he or she could vote for it more than once. The action that garners the most votes becomes the top priority. Another useful prioritizing technique is numerical ranking. Team members assign a ranking to each action, with the lowest number being the highest rank. You then add the ranks given to each action, and the one with the lowest number is the highest priority. Public input into the planning process can



be increased by opening up the prioritization process to a greater number of participants.

This is the end of Step 2 of Phase 3. Following are questions you should ask yourself to determine if you have adequately identified and prioritized mitigation actions that address historic and cultural resources for incorporation into your community's hazard mitigation plan. These are followed by a Review Test that you should use as a learning aid to help you become more comfortable in discussing the relative merits of various hazard mitigation actions.

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## Evaluate Your Community

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- Does your community's draft mitigation plan contain any actions that would have a negative impact on historic properties or cultural resources?
- Have you identified and analyzed State and local mitigation capabilities?

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## Review Test (Select one answer for each question.)

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1. STAPLEE criteria are:
  - a. Standards for disaster-resistant additions to historic buildings.
  - b. A checklist to use when disaster-proofing historic buildings.
  - c. A method of evaluating mitigation actions to ensure that they fulfill your objectives and are appropriate for your community.
  - d. None of the above.
2. A Benefit-Cost Ratio greater than one indicates that:
  - a. The cost of a mitigation action is less than the cost of damage that would occur without the action (i.e., the action is cost effective).
  - b. The action should automatically be undertaken.
  - c. The action should automatically be discarded.
  - d. None of the above.
3. Section 106 is:
  - a. A portion of the tax code governing the repair of historic properties and cultural resources.



- b. The section of the National Historic Preservation Act requiring the evaluation of ways to avoid, minimize, or offset negative impacts to historic properties from projects in which the Federal government is involved (through funding, permitting, etc.).
- c. A standard way of designating the original rooms of historic properties from modern additions.
- d. None of the above.

*(Answers in Appendix D – Answers to Review Tests.)*

## Step 3. Prepare an Implementation Strategy

In Step 3, you will develop the strategies for implementing the mitigation actions you selected in Step 2. The implementation strategy identifies who is responsible for which actions, what funding mechanisms (e.g., grants, capital budget, and/or in-kind donations) and other resources are available, and the time frame for project completion. It is particularly important to focus on the coordination between the various stakeholders involved in the efforts, including your SHPO/THPO and other historic preservationists.

The process is thoroughly addressed in FEMA 386-3, pages 3-1 through 3-10, and summarized below as it applies to historic properties and cultural resources.

## Procedures and Techniques

### **Task A. Identify how mitigation actions will be implemented.**

#### *1. Identify parties, define responsibilities, and confirm partners.*

As you move toward implementing mitigation strategies for historic properties and cultural resources you will want to stay in close contact with stakeholders who have helped you throughout the planning process. They will likely have had an important voice earlier (in the identification of important historic properties and cultural resources, and the evaluation of various mitigation options) and you should give these groups and individuals an opportunity to help decide how these actions will take place.



Additionally you will want to identify resources that will help you implement your actions. You can call upon resources within local, regional, State, or Tribal government agencies, the Federal government, private sector organizations and businesses, and academic institutions. Remember to include people who have expertise in historic properties and cultural resources, including your SHPO/THPO. Together, your planning group can develop a realistic schedule for implementing prioritized actions.

## ***2. Identify resources to implement the actions.***

**Funding Sources.** A well-structured hazard mitigation project for historic properties and cultural resources will take advantage of funding sources that target not only hazard mitigation projects, but also a wide variety of other preservation and land-use initiatives. Please see Appendix B – Library of this guide for a listing of potential funding sources for your mitigation projects.

Carefully evaluate your prioritized list of actions and identify projects whose goals address multiple community needs at once (e.g., affordable housing, recreation, and economic revitalization). If your hazard mitigation projects address multiple community planning goals, you may be able to pursue—and combine—several funding sources. For example, the rehabilitation of a hazard-prone historic apartment building that includes low-income rental units may be eligible for funding from a variety of sources, including:

- Hazard mitigation funding;
- Tax credits for affordable housing;
- Tax credits for rehabilitation of income-producing historic buildings;
- Tax credits for elderly housing;
- Grants or other incentive programs for commercial downtown revitalization;
- Low-interest revolving loans or grants for the rehabilitation of historic buildings;
- Facade easements;
- Americans with Disabilities Act (ADA) credits and deductions available to businesses; and
- Local planning and zoning incentives.

Other types of historic properties might be eligible for assistance from other financial programs:



- Grants for historic property surveys and historic preservation planning;
- Grants for conservation and curation of cultural resources (such as artifacts and archival collections); and
- Transportation-related funding for historic buildings (e.g., Transportation Equity Act [TEA-21] enhancement program).

In evaluating funding vehicles for your mitigation projects, you should seek out incentives and partnerships that minimize financial or administrative burdens. For example, States and communities can provide tax rebates for code upgrades, offer reduced property taxes and insurance premiums to citizens and businesses taking steps to lower their exposure to hazards, offer tax incentives for rehabilitation projects, or provide lower rates for retrofit projects.

**State Cooperation.** Local governments often underestimate the wealth of resources that their States can provide. States are excellent sources of funding, support, and technical assistance. State geological surveys, water resources agencies, and departments of planning or natural resources often have useful data related to hazard identification and risk assessments. States may also have a GIS department that can provide data and support. Your SHPO may provide excellent information and technical expertise. If agency staff has the time, consider holding an interagency meeting or conference call early in your project.

Additionally, regional or statewide historic preservation and urban planning conferences (as well as broad public events, such as regional fairs) can be excellent opportunities to provide publicity for your planning efforts.

**In-Kind Resources.** Federal or State grants for historic properties and cultural resources often require in-kind matching funds from local or regional partners. Some grant programs may allow local communities to provide a match using “in-kind” resources in lieu of a local financial commitment; this in-kind match may include volunteer time and/or the donation of materials and services from local professionals. When analyzing the feasibility of in-kind matches, carefully evaluate how reliable and effective your volunteers will be in implementing your project.

### *3. Define the time frame for implementing the actions.*

#### **Task B. Document the implementation strategy.**

There are many ways to present the implementation strategy; one example is contained in the adjacent sidebar.



#### **A Sample Format for an Implementation Strategy Form**

**Action:** (From your list of selected actions).

**Goal(s) and Objective(s) Addressed:** (Sometimes the action will address more than one goal and objective).

**Lead Agency:** (Provide the name and a brief description of the agency).

**Support Agency or Agencies:** (Provide the name and a brief description of each support agency).

**Budget:** (Provide the dollar amount or an estimate, if known; put TBD—to be determined—if not known; and/or indicate staff time if applicable).

**Funding Source(s):** (List the funding sources—e.g., operating budget, capital improvement budget, XYZ grant, and/or XYZ foundation).

**Start and End Date:** (Indicate start and end dates; short-term, long-term, or ongoing; and milestones for longer term projects).



### **Task C. Obtain the consensus of the planning team.**

The planning team should look at the Tribal, State, or local capability assessment (whichever is applicable) to identify resources to implement the mitigation actions. The team should also examine resources from all levels of government, private sector organizations, and universities to explore many sources of assistance.

Once the implementation strategy in this step is completed, it will serve as a roadmap for making the historic properties and cultural resources of your Tribe, State, or community more disaster resistant. With the strategy clearly laid out, your planning team has all the essential elements completed and is ready for the next step.

If your planning team has difficulty agreeing on specific mitigation actions for historic properties and cultural resources, work together to retrace your planning process. Examine earlier documents and notes and try to understand when disagreements started to arise. Next try to define specific points of disagreement. Start by identifying controversial issues or actions (such as disagreement about the demolition of a historic building, or the failure to recognize a specific historic property or cultural resource as highly significant), then move toward the larger project goals, objectives, and problem statements connected to those specific issues.

Your goal should be to find common ground. When you are able to return to the specific controversial issues or actions, revisit your preservation hierarchy and examine the feasibility of other mitigation actions that could also accomplish your shared goals and objectives. All parties should be willing to compromise in order to reach consensus. If needed, remind them that the failure to achieve a consensus will jeopardize the implementation of your plan and will likely expose your community's historic properties and cultural resources to substantial hazard-related damage.

This is the end of Step 3 of Phase 3. Following are questions you should ask yourself to determine if you have developed an adequate implementation strategy for incorporation into your hazard mitigation plan.

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## Evaluate Your Community

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- Have you identified which person, office, agency, etc., will implement each mitigation action?
- Have you created timelines and budgets for each action?



- Have you located funding sources for the mitigation actions?

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## Review Test (Select one answer for each question.)

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1. Examples of sources of funding to implement your mitigation actions are:
  - a. Hazard mitigation grants from the government and preservation grants from foundations.
  - b. Tax credits and low interest revolving loans.
  - c. Economic development loans/grants and housing loans/grants.
  - d. All of the above.
2. In-kind resources are:
  - a. Non-monetary donations such as volunteer time, materials, and professional services.
  - b. Encouraging words offered by passersby when you are working on a project.
  - c. Stone, concrete, steel, and other heavy construction materials that have to be handled by machine.
  - d. None of the above.
3. If the planning team is having trouble reaching consensus on specific mitigation actions, you as a team member can:
  - a. Define specific points of disagreement.
  - b. Hold fast to your own views even in the face of opposition from other team members.
  - c. Find common ground.
  - d. a and c.

*(Answers in Appendix D – Answers to Review Tests.)*

## Step 4. Incorporate Historic Property and Cultural Resource Protection Efforts into the Hazard Mitigation Plan

You and the team have worked very hard up to this point; now is the time to pull all the pieces together that pertain to historic properties and cultural resources and integrate them into the appropriate sections of the hazard mitigation plan. The importance of protecting



historic properties and cultural resources should be clearly written following the format, terminology, and organization of the hazard mitigation plan. You should prepare the following sections:

- A summary of the planning process itself, including the sequence of actions taken and a list of team members and stakeholders who participated;
- The results of the risk assessment and loss estimation;
- Mitigation goals and objectives aimed at reducing or avoiding the effects of natural and manmade hazards;
- Mitigation actions that will help the Tribe, State, region, or community accomplish the established goals and objectives; and
- Implementation strategies that detail how the mitigation actions will be implemented and administered.

Your hazard mitigation plan should be written so that anyone who reads it can easily gain an understanding of the risks facing historic properties and cultural resources in the community, as well as the community's intended strategies for mitigating those risks.

Detailed guidance for assembling your document is contained in pages 4-1 through 4-6 of FEMA 386-3.

This is the end of the last step of Phase 3.

## Summary

Planning is a continuous process. As you implement the plan you will be evaluating your progress, learning which actions succeeded and which did not—and why—and keeping track of changes in your community that may affect the relevance of your plan. Should a hazard event strike your community, some parts of your plan implementation may be suspended while post-disaster actions take priority. Also note that DMA 2000 regulations require the update and reapproval of local hazard mitigation plans every 5 years to be eligible for most FEMA funding. (States and Tribes applying as grantees must submit their plans for reapproval every 3 years.) These considerations, and others, are discussed in Phase 4.





phase 4