



City of Cerritos

Hazard Mitigation Plan

October 2016



Prepared By:



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PLAN ADOPTION

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ES.1 Plan Requirements and Objectives

The City of Cerritos Hazard Mitigation Plan is a living document that reflects ongoing hazard mitigation activities. Hazard mitigation involves strategies to reduce short- and long-term vulnerability to identified hazards. This document serves as the framework for the ongoing identification and implementation of hazard mitigation strategies developed in the City.

The City of Cerritos adopted its original Natural Hazards Mitigation Plan in 2004. This serves as an update to the original Plan.

Background Information

In 2000, the United States Congress determined that disasters and, more importantly, lack of preparedness for disasters, were significant causes of loss of life, human suffering, loss of income, and property loss and damage. Furthermore, because disasters often disrupt the normal functioning of governments and communities and adversely affect individuals and families with great severity, special measures designed to assist the efforts of the affected States in expediting the rendering of aid, assistance, and emergency services, and the reconstruction and rehabilitation of devastated areas, were necessary. As a result, Congress passed the Disaster Mitigation Act of 2000 (DMA 2000), or Public Law 106-390, to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. This provides an opportunity for States, Tribal governments, and local jurisdictions to apply for assistance from the Federal government in carrying out their responsibilities to alleviate the suffering and damage which results from such disasters by:

- a. revising and broadening the scope of existing disaster relief programs;
- b. encouraging the development of comprehensive disaster preparedness and assistance plans, programs, capabilities, and organizations by the States and by local governments;
- c. achieving greater coordination and responsiveness of disaster preparedness and relief programs;
- d. encouraging individuals, States, and local governments to protect themselves by obtaining insurance coverage to supplement or replace governmental assistance;
- e. encouraging hazard mitigation measures to reduce losses from disasters, including development of land use and construction regulations; and

- f. providing Federal assistance programs for both public and private losses sustained in disasters.

DMA 2000 allows State, Tribal, and local jurisdictions to obtain Federal assistance through pre-disaster hazard mitigation planning. As part of the requirements for receiving Federal grants for improving a locality's resistance to disasters, each locality must determine their existing vulnerabilities and develop a plan to reduce or eliminate these vulnerabilities and must have this plan approved by the appropriate State officials. Upon approval of this plan, each locality is eligible to receive various types of disaster-related assistance through FEMA's Hazard Mitigation Assistance (HMA) Program. This includes the Pre-Disaster Mitigation (PDM) program and Hazard Mitigation Grant Program (HMGP) which releases grant funds before and after a hazard event as well as the Flood Mitigation Assistance Grant (FMA) Program which appropriates funds for projects and planning that will reduce long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP).

The PDM program provides funds for hazard mitigation planning and the implementation of mitigation actions prior to a disaster event. These grants are funded and approved through the Federal Emergency Management Agency (FEMA) on a competitive basis. The HMGP provides grants to implement long-term hazard mitigation measures after a major disaster declaration. These grants are funded by FEMA, but are distributed by the State. In California, that agency is the Governor's Office of Emergency Services (Cal OES).

FEMA has developed guidance to assist communities in developing both the vulnerability assessments and plans to reduce or eliminate their vulnerabilities to disasters. These tools, coupled with techniques from the safety and security industries were used to develop the City's Hazard Mitigation Plan. Additional information regarding the HMGP and PDM programs can be found in FEMA's "Hazard Mitigation Assistance Unified Guidance" document, located in FEMA's Hazard Mitigation Assistance portal (<http://www.fema.gov/hazard-mitigation-assistance>). Additional information including guidance and regulations can be found at the Cal OES's Local Hazard Mitigation Planning Program portal (http://hazardmitigation.calema.ca.gov/plan/local_hazard_mitigation_plan_lhmp).

In order to be eligible for certain Federal disaster assistance and mitigation funding, the City of Cerritos is required to have a Cal OES- and FEMA-approved Hazard Mitigation Plan in place. As a result, the City obtained grant funding to update this document to fulfill Cal OES and FEMA requirements and provide direction and guidance on implementing

hazard mitigation actions on a hazard-level, probability, and cost-priority basis. The overall goal of the Hazard Mitigation Plan is to reduce the potential for damage to critical assets from natural and man-made hazards. In addition, the plan describes past and current hazard mitigation activities and philosophies, and outlines future mitigation goals and strategies.

FEMA Requirements

FEMA requires that the Hazard Mitigation Plan meet certain requirements. First, the planning process must be open and public, and must allow the public to have an opportunity to comment during the drafting stage and prior to plan approval. Second, the process must allow other local jurisdictions to be involved in the planning process. Third, the Plan must incorporate, if appropriate, existing plans, studies, reports, and technical information.

FEMA expects that each Hazard Mitigation Plan have the following information:

1. Documentation of the ***planning process*** used to develop the plan
2. A ***risk assessment*** that provides a factual basis for upgrades and recommendations
3. A ***description of the natural hazards*** that can affect the jurisdiction
4. A ***description of the jurisdiction's vulnerability*** to these hazards
5. A ***description of land usage***, and an ***estimate of losses*** should a disaster occur
6. A ***mitigation strategy***
7. A plan ***maintenance process***
8. ***Documentation*** that the plan has been adopted by the jurisdiction's governing body
9. ***Review*** by the State Hazard Mitigation Officer

ES.2 Mitigation Definition

Mitigation is the ongoing effort to prevent or lessen future emergency or disaster incidents, and the impacts they might have on people, property, and the environment. Examples of mitigation activities include the following:

- Legislation, laws and regulations;
- Variances;
- Zoning and land use management;
- Engineering and building codes;
- Hazard mitigation plans & teams;
- Technical guidance & assistance;
- Financial assistance;
- Hazard Identification;
- Risk Analysis;
- Evaluation;
- Research; and
- Education.

Mitigation decreases the demand for emergency response resources, reduces the principal causes of injuries and deaths, enables a quicker lifesaving response and economic recovery because the community infrastructure remains intact, and reduces the societal impacts of the emergency because it results in less disruption to the social environment. In essence, mitigation is the foundation of sustainable community development.

ES.3 Planning Process Summary

Hazard mitigation planning is a dynamic process built on realistic assessments of past and present information that enables the City to anticipate future hazards and provide mitigation strategies to address possible impacts and identified needs. The overall approach to the Hazard Mitigation Plan included developing a baseline understanding of natural and man-made hazards, determining ways to reduce those risks, and prioritizing mitigation recommendations for implementation.

To complete these objectives, the City of Cerritos compiled a qualified team with various expertise, including risk management, public safety and health, engineering and public works, water infrastructure, and emergency response agencies to participate on a Steering Committee to guide the development of the City's comprehensive Hazard Mitigation Plan. In addition, the Steering Committee solicited public involvement throughout the planning process, including the release of a public survey through the City's newsletter and website, allowing the public to comment during the drafting stage, and making the draft Plan available to allow the public to comment on its content. Chapter 1: Planning Process, contains descriptions of the Planning process, including information on the Steering Committee and public involvement.

ES.4 Hazard Analysis

The City of Cerritos is vulnerable to a wide range of natural and man-made hazards that threaten life and property. In order to identify the hazards that the City and neighboring communities perceive as the largest threat, each member of the Steering Committee participated in the Hazard Identification Workshop during the first Steering Committee Meeting. The Steering Committee brainstormed potential hazards based on past incidents that have impacted the City and information incorporated from other studies. (Incorporated Plans and studies are described in Section 1.3 “Review and Incorporation of Existing Plans”). Each identified hazard was then qualitatively ranked based upon hazard probability/frequency, consequence/severity, and the City’s overall vulnerability using an interactive model. Section 3.2 Hazard Identification, contains detailed information regarding the hazard ranking. Table ES.1 provides a summary of the hazard ranking.

Table ES.1: City of Cerritos Hazard Ranking Summary

Hazard Rank
High
Earthquake
Moderately High
Moderate
Urban Fire
Transportation Accident/ Incident
Moderately Low
Flood/ Dam Failure
Pipeline Failure/ Hazardous Material Release
Drought
Low
Terrorism
Windstorm

Asset Inventory and Loss Estimates

In addition to the hazard profiles, the Risk Assessment contains a detailed asset inventory that lists the City's assets, such as buildings, parks, public facilities, and critical non-City assets, such as hospitals and schools. This asset inventory was used in the vulnerability assessment to estimate potential losses for each hazard. The Steering Committee reviewed each hazard and assigned a potential percentage of damage expected. This also included loss of function values for lifeline and emergency service interruptions. Section 3.17 Loss Estimates, includes a detailed breakdown of the vulnerability assessment calculations.

Table ES.2: Loss Estimate Summary

Hazard	Estimated Losses
Earthquake	\$215,942,195
Urban Fire	\$189,894,048
Transportation Accident / Incident	\$44,282,367
Flood/ Dam Failure	\$92,304,356
Pipeline Failure/ Hazardous Material Release	\$44,486,769
Drought	\$14,887,213
Terrorism	\$68,452,924
Windstorm	\$18,204,978

Note: A total value is not included since it is not expected for all hazards to occur simultaneously. Loss estimate values were determined through an in-person exercise. Supporting data can be found in Section 3.13 "Loss Estimates"

ES.5 Mitigation Strategies and Implementation Plan

Plan Goals and Objectives

As part of the development process, Plan goals and objectives were revalidated to provide a framework for mitigating hazards and proposing potential mitigation actions. The goals are consistent with the California State Hazard Mitigation Plan and the Los Angeles County Hazard Mitigation Plan and were developed by the Steering Committee. The City's overall Plan goals are to:

1. Protect Life, Property, and Commerce
2. Promote Public Awareness
3. Protect the Environment
4. Develop and Expand Partnerships and Implementation
5. Enhance Emergency Services Capabilities

In addition to the overall Plan goals, individual objectives were developed that more specifically address mitigation strategies. Section 4.1 Mitigation Goals and Objectives contains the full list of the Plan goals and objectives.

Mitigation Strategies

Mitigation strategies are administrative and/or engineering project recommendations to reduce the vulnerability to the identified hazards. The Steering Committee identified specific mitigation actions to reduce the impact or likelihood of the hazards. The specific objectives served as a starting point for developing the mitigation actions, and additional actions were taken from the Safety Element of the City's General Plan.

Implementation Plan

Following the identification of mitigation actions, a simplified Benefit-Cost Review was applied in order to prioritize the mitigation actions for implementation. The priority for implementing mitigation actions depended upon the overall cost effectiveness of the action, when taking into account monetary and non-monetary costs and benefits associated with each action. Additionally, the following questions were considered when developing the Benefit-Cost Review:

- How many people will benefit from the action?
- How large of an area is impacted?
- How critical are the facilities that benefit from the action?

- Environmentally, does it make sense to do this project for the overall community?

The Benefit-Cost Review yielded a relative priority ranking (High, Medium, or Low) for each mitigation action. Each ranking was defined as follows.

- High: Benefits are perceived to exceed costs without further study or evaluations; or the action is critical.
- Medium: Benefits are perceived to exceed costs, but may require further study or evaluation prior to implementation.
- Low: Benefits and costs require evaluation prior to implementation.

Mitigation actions identified as high-priority are typically implemented before lower ranked actions. Results from the Benefit-Cost Review are located in Chapter 4.4 Prioritization of Mitigation Recommendations. The Steering Committee considered responsible departments, funding resources, and estimated implementation timeframe when developing the implementation plan.

Chapter 4 Mitigation Strategies contains additional information regarding the mitigation strategies and implementation plan. Table ES.3 on the following pages provides a summary of each mitigation action, including the hazard(s) mitigated, responsible agency/department, and relative priority rank taken from the Benefit-Cost Review.

Table ES.3: Mitigation Action Summary

Action ID	Mitigation Action	Hazards Mitigated	Responsible Agency/Department	Priority
2015.HMP.01	Establish a formal role for the City of Cerritos Hazard Mitigation Steering Committee for implementing, monitoring, and evaluating citywide mitigation activities.	Multi-Hazard	Administration	High
2015.HMP.02	Develop public and private partnerships to foster hazard mitigation program coordination and collaboration in the City of Cerritos.	Multi-Hazard	Community Safety	High
2015.HMP.03	Conduct evaluations of critical facilities to develop inventories of at-risk buildings and identify areas for improvement. This includes, but is not limited to, incorporating alternative power sources and identifying vulnerabilities to fire and earthquake. Initiate mitigation projects accordingly.	Multi-Hazard	Engineering	High
2015.HMP.04	Strengthen emergency services preparedness and response by linking emergency services with hazard mitigation programs and enhancing public education on a regional scale.	Multi-Hazard	Community Safety	Medium
2015.HMP.05	Conduct annual tabletop multi-hazard disaster exercises with local law enforcement, emergency managers, town and county officials, the Local Emergency Planning Committee (LEPC) and other disaster response agencies to identify vulnerabilities in emergency services and response.	Multi-Hazard	Community Safety	High
2015.HMP.06	Retrofit traffic signals for coordination with Emergency Vehicles to decrease response time during a hazard event.	Multi-Hazard	Engineering	Low

Action ID	Mitigation Action	Hazards Mitigated	Responsible Agency/Department	Priority
2015.HMP.07	Develop a Business Continuity Planning display. The display will be designed to raise awareness of why it is important to have a Business Continuity Plan, how to develop a Plan, and will encourage businesses to make sure their Plan aligns with the County's Plan. The display will be appropriate for use at local Chamber of Commerce meetings and activities, civic group gatherings, and other business-related gatherings.	Multi-Hazard	Community Development	Medium
2015.HMP.08	Work with the U.S. Geological Survey (USGS) to verify current GIS earthquake hazard mapping data is accurate for the City of Cerritos and utilize technical analysis of earthquake hazards to identify vulnerabilities in accordance with the Safety Element of the City's General Plan (SAF-2.3).	Earthquake	GIS Division	High
2015.HMP.09	In accordance with the Safety Element of the City's General Plan (SAF-2.3), conduct new seismic strength evaluations of critical City facilities built before 1980 to identify vulnerabilities and initiate improvement projects accordingly. These evaluations should highlight potential mitigation actions that would improve public infrastructure and reinforce critical facilities to meet current seismic standards.	Earthquake	Engineering	Low
2015.HMP.10	In accordance with the Safety Element of the City's General Plan (SAF-2.1), create and distribute outreach materials that will increase public awareness and encourage the initiation of nonstructural and structural projects to minimize vulnerability to earthquakes in the local community.	Earthquake	Communications	Medium

Action ID	Mitigation Action	Hazards Mitigated	Responsible Agency/Department	Priority
2015.HMP.1 1	Provide information to new home and property buyers on earthquake, fire and multi-hazard safety and encourage the public sector to identify vulnerabilities and initiate improvement projects.	Urban Fire	Communications	High
2015.HMP.1 2	Coordinate with County and State (e.g. LEPC) representatives to maintain awareness about current trends in illegal transportation of hazardous materials within the City or potentially impacting the City.	Transportation Accident/ Hazmat Release	Community Safety	High
2015.HMP.1 3	In accordance with the Safety Element of the City's General Plan (SAF-1.4 & SAF-1.2), conduct evaluations of flood controls within the City to ensure efficient operations and identify potential storm drain improvements. Then, identify key areas to initiate improvement projects accordingly.	Flood/ Dam Failure	Public Works Department	Medium
2015.HMP.1 4	In accordance with the Safety Element of the City's General Plan (SAF-5.3), ensure current maps of underground pipelines are up-to-date and educate the public for pipeline safety (Dig Alert).	Pipeline Failure/ Hazardous Materials Release	Communications/ Community Development	High
2015.HMP.1 5	Continue to add recycled water channels to the City's water system to help conserve potable water.	Drought	Public Works	Low
2015.HMP.1 6	Continue public outreach on water conservation.	Drought	Public Works	High
2015.HMP.1 7	Continue public education regarding "See Something-Say Something" for terrorism.	Terrorism	Communications	Low

Action ID	Mitigation Action	Hazards Mitigated	Responsible Agency/Department	Priority
2015.HMP.18	Coordinate with existing high-profile, private facilities to ensure security and anti-terrorism safety features are in use.	Terrorism	Sheriff's Department	Medium
2015.HMP.19	Update the General Plan to include anti-terrorism requirements for new high-profile, private building projects. Anti-terrorism requirements should include, but are not limited to, adequate escape routes for pedestrians & motorists and built-in security systems.	Terrorism	Community Development	Low
2015.HMP.20	Continue to update the City's tree inventory and identify vulnerabilities. All trees should be maintained according to the standards in the City's Municipal Code to minimize potential hazards.	Windstorm	Public Works	High

ES.6 Monitoring, Evaluating, and Updating the Plan

The Hazard Mitigation Plan is a living document that reflects ongoing hazard mitigation activities and requires monitoring, evaluating, and updating to ensure the mitigation actions are implemented. To facilitate the Hazard Mitigation Planning process and adhere to regulatory requirements, the Plan will be reviewed annually and any major revisions will be incorporated into the five-year update. In addition, public involvement will be requested when applicable. Chapter 5: Plan Maintenance outlines the update requirements and planning mechanisms the City has in place for ongoing hazard mitigation.

1 PLANNING PROCESS

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1.1 Narrative Description of the Planning Process

§201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

§201.6(c)(1): [The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Hazard mitigation planning is a dynamic process built on realistic assessments of past and present information that engages the City of Cerritos (the City) to anticipate future hazards and provide meaningful strategies to address possible impacts and identified needs. The hazard mitigation planning process involves the following tasks.

- Organizing resources
- Assessing risks
- Developing mitigation strategies, goals, and priorities
- Adopting a plan
- Implementing the plan
- Monitoring progress
- Revising the plan as necessary



The overall approach to updating the Hazard Mitigation Plan included building off the baseline understanding of the natural hazards as defined in the original 2004 Natural Hazards Mitigation Plan, determining ways to continue reducing those risks, and

prioritizing those recommendations for implementation. The following task descriptions provide a detailed narrative of the overall project progression.

Organize Resources

Identify Stakeholders and Compile Steering Committee

Rebecca Scott, Management Analyst for the City, invited and coordinated participation for a Steering Committee from the appropriate law enforcement, emergency response, health organizations, City personnel, and local government representatives. The Steering Committee was responsible for providing essential insight into the past hazard events, current hazard vulnerability (including specific locations), critical assets, and possible mitigation projects. The following groups were invited to participate in the plan development:

- City of Cerritos Key Personnel (Finance, City Planning, Emergency Preparedness, Community Safety, Water, Administration, and Recreation)
- Los Angeles County Fire Department
- The American Red Cross
- Los Angeles County Sheriff's Department
- Disaster Management Area Personnel
- ABC Unified School District
- Los Angeles County Office of Emergency Management
- Surrounding City Personnel

Public Process

The Disaster Mitigation Act of 2000 requires an “Open and Public Process” for developing the Hazard Mitigation Plan. This process requires, at a minimum, that the public be allowed to comment on the Hazard Mitigation Plan during the drafting phase and prior to adoption. To meet this requirement, the City published a public survey to allow for the public comment during the drafting stage of the Hazard Mitigation Plan prior to submittal of the Hazard Mitigation Plan for FEMA review. The public survey was published in the January 2015 issue of the City newsletter and on the City’s website. Documentation of public outreach is provided in Appendix D.

Risk Assessment

Identify Hazards

This task was designed to identify all the natural and man-made hazards that *might* affect the City and then narrow the list to the hazards that are most likely to occur. The hazards included natural, technical, and human-caused events, with an emphasis on the effect of disasters on the City's critical facilities. In order to compile the list, the Project Team built upon the list of hazards identified in the 2004 Natural Hazards Mitigation Plan and then continued to research newspapers, historical records, and websites to determine any additional hazards. In addition, the Steering Committee reviewed a list of hazards that have affected the City in the past with specific information regarding frequency, magnitude, and associated consequences. A Hazard Identification Workshop was conducted during the first Steering Committee Meeting to identify and evaluate each selected hazard. The following hazards were included in the Hazard Mitigation Plan:

- Earthquake,
- Urban Fire,
- Transportation Accident/ Incident,
- Flood/ Dam Failure,
- Pipeline Failure/ Hazardous Material Release,
- Drought,
- Terrorism, and
- Windstorm.

This list is not all-inclusive to the hazards discussed during the Hazard Identification Workshop. Hazards not thought to pose significant risk to the City were not included. In addition, some items were captured as sub-items of the hazards listed above. For example, climate change is discussed with hazards where the impact of changes in weather patterns could act as a catalyst for those scenarios.

Profile Hazard Events

The hazard event profiles consist of either a map indicating the area impacted by each hazard or an important piece of data regarding the characteristics of hazard events within the City and surrounding area. To update the detailed hazard profiles, the Project Team researched and reviewed relevant open-source natural hazard studies and mapping projects. In addition, the City supplied any hazard studies that have been developed specifically for the City. This task determined the hazard magnitude, frequency, and

location characteristics (e.g., predicted ground acceleration values, fault locations, flood plains, etc.) that were used as the design-basis for the loss estimates and hazard ranking.

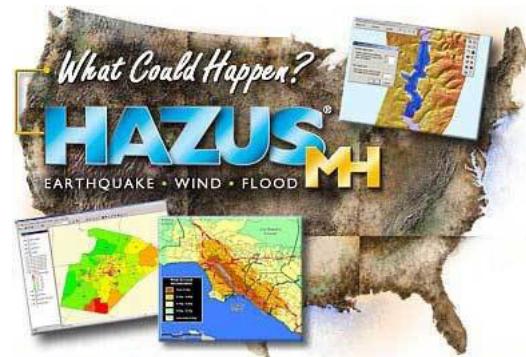
Asset Inventory

The purpose of this task was to determine the quantity of City facilities and assets that lie in the different hazard areas and what proportion of the City this represents. The asset inventory was completed by reviewing a list of City assets from the 2004 Natural Hazards Mitigation Plan during a Steering Committee meeting and including any new or recently acquired facilities.

This inventory was augmented with critical non-City assets, such as hospitals, schools, and sheriff stations, in order to capture the vulnerability of other facilities within Cerritos that may provide emergency response services. The completed asset inventory enabled the Steering Committee to estimate losses resulting from hazard events and to determine where resources should be allocated to address mitigation issues.

Loss Estimates

FEMA developed a standardized natural hazard loss estimation methodology containing models for estimating potential losses from earthquake, wind (hurricanes, thunderstorms, tornadoes, and extra-tropical cyclones), and flood (river basin and coastal) hazards. The City used HAZUS-MH, a PC-based software, which implements the FEMA-developed methodology and runs on a Geographic Information System (GIS) platform, to map and display earthquake hazard data, as well as the results of earthquake damage and economic loss estimates for buildings and infrastructure within the City.



HAZUS-MH contains baseline data such as:

- Demographic data (population, age, ethnicity, and income);
- General building stock (square footage of occupancy classes for each census tract);
- Emergency response facilities (fire, police, emergency operations centers);
- Dams;
- Hazardous materials facilities;
- Roads, airports, and other transportation facilities; and

- Electric power, oil, and gas lines and other utility facilities.

In estimating losses, HAZUS-MH takes into account various impacts of a hazard event including:

- Physical damage: damage to residential and commercial buildings, schools, critical facilities, and infrastructure;
- Economic loss: business interruptions, repair and reconstruction costs; and
- Social impacts: impacts to people, including potential loss of potable water and sanitation services.

In addition to the earthquake HAZUS assessments, the Project Team developed loss assessment tables for each specific hazard that identified potential damages within the City, including population at risk, critical infrastructure, and buildings. This task was critical in determining which assets are subject to the greatest potential damages and which hazard event is likely to produce the greatest potential losses. The conclusion of this step precipitated a comprehensive loss estimate (vulnerability assessment) for each identified hazard for each specific asset in terms of damages, economic loss, and the associated consequences.

Mitigation Strategy Development

Development of Mitigation Goals and Objectives

The Project Team, based upon information provided by the Steering Committee, discussed the mitigation features and resources that the City currently has in place. These mitigation features provided a framework to determine where practical improvements could be made and where sufficient improvements would be prohibitive due to cost, schedule, or impracticality of implementation.

For each of the hazard events, mitigation goals and objectives were developed with the intention of reducing or eliminating the potential hazard impacts. The mitigation goals and objectives were developed at a Steering Committee Meeting to provide the basis for determining the associated mitigation projects.

Identify and Prioritize Mitigation Actions

Mitigation strategies are administrative and/or engineering project recommendations to reduce the vulnerability to the identified hazards. It was imperative to have engineers and vital City employees involved in this phase of the Plan in order to develop strategies and projects that will mitigate the hazards cost-effectively, as well as ensure consistency with

the City's long-term mitigation goals and capital improvements. At a Steering Committee Meeting, a team-based approach was used to brainstorm mitigation projects based on the identified hazards and associated loss estimates. The evaluation and prioritization of the mitigation actions produced a list of recommended mitigation actions to incorporate into the Hazard Mitigation Plan. A separate Steering Committee meeting was held to conduct a Benefit-Cost Review for each proposed mitigation action to determine the relative priority level of the recommendation.

Implementation & Monitoring

Preparation of Implementation Strategy

The Project Team developed an action plan to detail how the mitigation recommendations will be prioritized, implemented, and administered by the City. During the Hazard Mitigation Plan creation process, the Project Team coordinated with the Steering Committee to determine the mitigation project implementation strategy (including identifying responsible departments, funding resources, and estimated implementation timeframe).

1.2 Steering Committee & Public Involvement

While the City and Risk Management Professionals had lead responsibility for the update of the City's Hazard Mitigation Plan, neighboring communities, agencies, businesses, and other interested parties were invited to participate on the Steering Committee to review the Hazard Mitigation Plan during each phase of the document development. In order to compile a list of Steering Committee participants, the Project Team assessed community support through active community leaders, built a planning Team, and engaged the public participants during the Project Initiation and Hazard Identification meeting. Each member of the Steering Committee had the opportunity to participate in all aspects of the planning process.



§201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

§201.6(c)(1): [The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

1.2.1 Steering Committee Participant Solicitation

The City solicited participation in the Hazard Mitigation Plan Steering Committee by contacting both internal and external stakeholders. Internal stakeholders included members of the various City departments. External stakeholders were comprised of representatives from local agencies and neighboring communities, including the Los Angeles County Fire and Sheriff's Departments, the Red Cross, ABC Unified School District and Disaster Area Management.

1.2.2 Steering Committee Participants

The City brought together personnel from management, finance, City planning, engineering, public safety, and recreation departments to ensure the Steering Committee included a variety of departments and provided a mechanism for receiving input from each participant. Additionally, the City compiled historical hazard data, provided relevant planning documents for incorporation into the Hazard Mitigation Plan, and coordinated participation with the public. Each draft chapter was reviewed by the Steering Committee and specific comments and input were incorporated into the plan. The multidisciplinary Steering Committee enabled the City to work together and incorporate each individual's expertise to provide for a comprehensive Hazard Mitigation Plan.

The Hazard Mitigation Plan was developed with assistance and advice from participants from the City and several neighboring agencies. Table 1.1 provides a list of the Steering Committee participants. Individuals are listed in alphabetical order by last name.

Table 1.1: Steering Committee Participants

Name	Affiliation	Title	SCM 1	SCM 2	SCM 3	SCM 4	SCM 5
Joaquin Aceves	Los Angeles County Fire Department	Fire Fighter				X	
Jonathon Alba	Los Angeles County Fire Department	Fire Fighter Specialist		X			
Albert Arteaga	City of Cerritos	Engineering Aide	X	X			X
Ryan Bray	Risk Management Professionals	Project Coordinator	X	X	X	X	X
Brenda Cabrera	City of Cerritos	Assistant City Clerk	X			X	
Tim Catlin	ABC Unified School District	Child Welfare Attendance Supervisor		X			
Bob Coffin	Los Angeles County Fire Department	Captain	X	X			
Yvette Countee	Los Angeles County Office of Emergency Management	Program Manager	X	X			
Cynthia Doss	City of Cerritos	Management Analyst	X	X	X		
Charles Emig	City of Cerritos	Water Superintendent	X	X	X	X	
Mike Guthrie	Los Angeles Sheriff's Department	Sergeant		X			X
Tom Hamilton	City of Cerritos	Technical Operations Director	X				

Name	Affiliation	Title	SCM 1	SCM 2	SCM 3	SCM 4	SCM 5
Nick Hippisley-Coxe	American Red Cross	Disaster Program Manager	X	X			
Mark Jimenez	Los Angeles County Fire Department	Fire Fighter				X	
Klaus Kreimann	Los Angeles County Office of Emergency Management	Community Development Planner		X			
Edwin Malonzo	City of Cerritos	Accountant	X	X			
Emely Merina	City of Cerritos	Community Services Supervisor	X		X		X
Scott Miller	Los Angeles County Fire Department	Captain				X	
Joe Nunez	Los Angeles County Sheriff's Department	Captain					X
Richard Ortiz	Los Angeles County Fire Department	Fire Fighter		X			
Ciro Racowschi	Los Angeles County Sheriff's Department	Operations Sergeant					X
Sharon Rutledge	City of Cerritos	Code Enforcement Officer		X			
Colin Scholtz	Risk Management Professionals	Senior Engineer	X	X	X	X	X
Rebecca Scott	City of Cerritos	Management Analyst	X	X	X	X	X
Alan Strickland	City of Cerritos	House Manager	X	X	X	X	

Name	Affiliation	Title	SCM 1	SCM 2	SCM 3	SCM 4	SCM 5
Sherré Titus	City of Cerritos	Recreation Superintendent	X	X	X	X	X
Raquel Vernola	City of Norwalk/ Area E Disaster Management	Emergency Services Manager/ Disaster Management Area Coordinator		X		X	X
Mike Warner	City of Cerritos	Building Maintenance Engineer		X	X		
Phil Wendel	American Red Cross	Volunteer Ambassador		X			
Eric Wosick	City of Norwalk	Emergency Preparedness Officer					X

The Steering Committee met five times during the course of the project to discuss project progress and obtain valuable input and information for documenting the Hazard Mitigation Plan. The meetings are detailed over the subsequent pages. Appendix D – Public Participation contains copies of the presentations used at each meeting, specific meeting handouts, and attendance records.

1.2.3 Steering Committee Meeting Descriptions

Steering Committee Meeting #1 – Project Initiation, Hazard Identification, and Information Collection

Date: July 31, 2014

During the Project Initiation, Hazard Identification, and Information Collection Meeting, Risk Management Professionals presented an overview presentation that detailed the objectives and scope of the project. After a review of the project schedule and key tasks, the Steering Committee participants' areas of expertise, resultant member responsibilities, and the community meeting process was discussed.

The Steering Committee Meeting also served as a mechanism to determine the hazards to profile in detail. To effectively characterize the City's risk and vulnerability, Risk Management Professionals facilitated a discussion of the historical hazards with the Steering

HAZARD IDENTIFICATION AND RISK RANKING			
	Hazard Rank Factors	Hazard Factor Description	Rank
Earthquake	Probability/Frequency	Probability/Frequency	0
	Vulnerability	Minimally applicable due to geographic location characteristics	0
	Risk Rank	Rare event - occurs less than once every 36 years	0
	Comments	Infrequent event - occurs between once every 9 years and once every 50 years (inclusive)	0
		Regular event - occurs between once a year and once every 7 years	0
Wildfire	Probability	Precipitous event - occurs more than once a year	0
	Vulnerability	0	0
	Consequence	0	0
	Risk Rank	Not a Hazard	0
	Comments		
Flood	Probability	0	0
	Vulnerability	0	0
	Consequence	0	0
	Risk Rank	Not a Hazard	0
	Comments		

Committee members during this meeting. This meeting also served as a forum to discuss information for the background information and asset inventory.

The Steering Committee determined the initial hazard profile ranking through a facilitated workshop using an automated interactive spreadsheet that asked specific questions on potential hazards and then assigned a relative value to each potential hazard accordingly, including numerical rankings (1-5) of the following criteria:

- **Consequence/Severity** – How widespread is the impact area?

- **Secondary Effects** – Could the event trigger another event and separate response?
- **Probability/Frequency** – Historical view of how often this type of event occurs locally and projected recurrence intervals.
- **Warning/Onset** – Advance warning of the event, or none.
- **Duration** – Length of elapsed time where response resources are active.
- **Recovery** – Length of time until lives and property return to normal.

Chapter 3: Risk Assessment outlines the methodology used for hazard rankings. Additionally, all Steering Committee participants were requested to provide existing plans and technical studies, GIS data, and identify existing mitigation features as part of a detailed information request.

Steering Committee Meeting #2 – Hazard Risk Rank Review, Mitigation Goals and Objectives

Date: October 9, 2014

The hazard risk ranking from Steering Committee Meeting #1 was reviewed, updated and validated with the Steering Committee with a review of the hazard profiles.

Additionally, the Plan's mitigation goals and objectives were updated with the intention of reducing or eliminating the potential hazard impacts, which also provided the basis for determining the associated mitigation projects. The Steering Committee reviewed the goals and objects from the City's 2004 Natural Hazards Mitigation Plan, the California State Multi-Hazard Mitigation Plan, and the Los Angeles County Hazard Mitigation Plan as a baseline for determining the City's current mitigation goals and objectives.

Steering Committee Meeting #3 – Asset Inventory and Vulnerability Assessment

Date: February 9, 2015

The asset inventory was developed to determine the quantity of buildings, facilities, and other assets in the City that lie in the different hazard areas and what proportion of the City this represents. The asset inventory included locations and specifications for general buildings: city well sites, civic buildings, parks, hospitals, schools and other facilities. The asset inventory was reviewed with the Steering Committee for completeness and assignments were given to those who could retrieve missing information.

Asset Inventory Summary – City of Cerritos								
Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
Public Buildings	Performing Arts Center	12700 Center Ct Dr S, Cerritos, CA 90703	150,000	NA	78,607,367	NA	16,425,867	\$95,033,234
Public Buildings	Libray	18025 Bloomfield Ave Cerritos, CA	88,780	NA	65,724,027	NA	10,951,708	\$76,675,735
City Property	Cerritos Park East (CPE)	13234 E 166th St, Cerritos, CA 90703	15,500	NA	7,535,821	NA	895,093	\$8,430,914
City Property	City Hall	18125 Bloomfield Ave, Cerritos, CA 90703	53,288	NA	14,522,688	NA	4,880,262	\$19,402,950
City Property	City Yard	16540 Marquardt Ave, Cerritos, CA 90703	24,257	NA	3,064,373	NA	1,345,694	\$4,410,067
Fire Building	Fire Station	13717 Artesia Boulevard, Cerritos, CA 90703	10,575	NA	3,188,956	100%	3,188,956	\$6,377,912

The asset inventory was then used to develop loss estimates for all hazard scenarios. The hazard probabilities and recurrence intervals were applied to the City assets to determine which assets were subject to the greatest potential damages and which hazard events were likely to produce the greatest potential losses.

Additionally, each Steering Committee participant was given a Mitigation Activity Identification worksheet to document potential projects to be discussed during Steering Committee Meeting #4.

Steering Committee Meeting #4 – Mitigation Action Identification

Date: May 7, 2015

The purpose of this meeting was to identify potential mitigation actions and projects that will reduce the impact of identified hazards. First, the mitigation goals and objectives from Steering Committee Meeting #2 were reviewed and validated. Then, during the meeting, the Steering Committee participants brainstormed possible projects and actions to mitigate the effects of the identified hazards. This was done using the hazard profiles, hazard-specific objectives, and asset-specific loss estimates as starting points. In addition, the Capital Improvement Plan was reviewed as necessary to assess if any capital improvement projects considered hazard mitigation.

As the mitigation projects were identified, the Steering Committee discussed the mitigation action implementation plan according to the following characteristics:

- Mitigation Action Category – Prevention, Property Protection, Public Education and Awareness, Natural Resource Protection, Emergency Services, and Structural Projects
- Corresponding Goals and Objectives

- Responsible Department – Building and Safety, Engineering, Administration, Community Development, Public Works, etc.
- Resources – General Fund, Grant Programs, Staff Time, Capital Improvements, etc.
- Implementation Timeframe – Ongoing, Short-Term (within two years), Medium-term (between three and ten years), and Long-Term (greater than ten years)
- Whether or not the project protects new or future buildings

Steering Committee Meeting #5 – Mitigation Action Benefit-Cost Review

Date: September 3, 2015

During the fifth Steering Committee Meeting, the identified mitigation actions from Steering Committee Meeting #4 were reviewed and validated with the Steering Committee. The Steering Committee then performed a high-level Benefit-Cost Review on each of the identified mitigation actions. The review consisted of identifying all benefits and costs associated with implementing each mitigation action. Typical benefits include:

- Avoided physical damages (e.g., to buildings, infrastructure, and equipment)
- Avoided loss of function costs (e.g., loss of utilities and lifelines)
- Avoided casualties
- Avoided emergency management costs (e.g., emergency operations center costs, evacuation/rescue costs, and other management costs)

Actions	Benefits (Pros)	Costs (Cons)	Priority
Floodproof 10 businesses in the downtown area	<ul style="list-style-type: none"> - Avoidance of 1 loss of life every 20 years (casualties reduced by half) - Saving of \$90,000 in private damages and \$5,000 in public cost - Loss of use of 10 downtown businesses completely eliminated - Community's problem of business interruption solved - Federal grants like FMA and PDM can be applied for to implement the proposed floodproofing - Will help improve CRS rating in the long term (so entire community's flood insurance premium will be reduced) - More than half the members of the City Council are opposed to buy-outs; it might be easier to get their support for an alternative to buy-outs 	<ul style="list-style-type: none"> - Floodproofing cost = \$10,000 X 10 = \$100,000 - Need at least 3 people to administer (after obtaining technical assistance from the State) - Need a year to implement 	High (Priority no. 1)
Build safe rooms for a neighborhood of 50 homes without basements	<ul style="list-style-type: none"> - Avoidance of 5 lives lost every 20 years (casualties reduced by half) - Public and political support for mitigating this hazard exists (due to regular recurrence of tornadoes) 	<ul style="list-style-type: none"> - City will share 50% of the cost per existing home = \$2,000 X 50 = \$100,000 - Administrative cost per home = \$1,000 X 50 = \$50,000 - Need 3 years to complete - Tornadoes are unpredictable; they may never strike this exact area again 	Medium (Priority no. 2)
Broadcast educational video on local channel on hazard mitigation	<ul style="list-style-type: none"> - Local channel might be willing to broadcast free of cost - Publicity would spread awareness about mitigation methods as well as what to do in an emergency 	<ul style="list-style-type: none"> - Cost of preparing video = \$5,000 - Only 5% of population might notice the broadcast - Only 5% of that 5% might actually consider acting on individual mitigation methods 	Low (Priority no. 3)

Once the benefits and costs were estimated, a relative priority was assigned for each action based upon the evaluation. More detailed information can be found in Section 4.4 “Prioritization of Mitigation recommendations.”

1.2.4 Public Meetings & Outreach

The City of Cerritos actively solicited public involvement through several advertisements and other media. The City published an article in the January 2015 issue of the City newsletter inviting the public to participate in a survey on the City's website. The survey assessed the community's level of concern with various hazards and the steps each respondent had taken to prepare for a disaster. Members of the public were also able to provide direct input for Hazard Mitigation Plan development and attend a City Council Meeting in order to review the Hazard Mitigation Plan during the drafting stage and provide comments. The Draft Hazard Mitigation Plan was provided on the City website two weeks prior to the City Council meeting to allow the public to review the document before providing comments. Additional documentation regarding public involvement is provided in Appendix D.

The public provided feedback on the Draft Plan at a City Council Meeting on Month day, 2016. Copies of the Draft Hazard Mitigation Plan were provided to interested members of the public and a presentation was prepared to provide an overview of the planning process and the results of the analyses. In addition, the draft Plan was posted on the City's website for two weeks prior to the date of the meeting.

2/16/2016

City of Cerritos | Local Hazard Mitigation Plan draft available for review

The logo for the City of Cerritos features a white water tower on the left side. To its right, the words "City of Cerritos" are written in a large, white, cursive script font. The background of the logo is a colorful illustration of green hills and blue sky.

Local Hazard Mitigation Plan draft available for review

February 1, 2016

The City of Cerritos has updated its Local Hazard Mitigation Plan (LHMP) as mandated by the Federal Emergency Management Agency. A current LHMP allows the City to reduce the costs associated with disaster response and recovery by implementing hazard mitigation strategies.

Beginning Friday, February 12, a final draft of the LHMP will be available for review at the Public Works counter at City Hall and on the City's website at cerritos.us. The City Council will conduct a public hearing to discuss the draft at the February 25 City Council meeting.

Table 1.2: City Council Meeting Attendees

Name	Affiliation	Title
Rebecca Scott	City of Cerritos	Management Analyst
Ryan Bray	Risk Management Professionals	Project Coordinator
Jim Edwards	City of Cerritos	Council Agency Member
Mark Pulido	City of Cerritos	Council Agency Member
Naresh Solanki	City of Cerritos	Council Agency Member
George Ray	City of Cerritos	Mayor Pro Tem
Carol Chen	City of Cerritos	Mayor
Dr. Mark Chung	Citizen	Citizen

Additional information on the City Council Meeting, including the attendance log and presentation, can be found in Appendix D.

1.3 Review and Incorporation of Existing Plans

§201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:

- (3)Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

While developing the City of Cerritos' Hazard Mitigation Plan, the Project Team reviewed existing plans (detailed below) and incorporated relevant information into the planning efforts.

City of Cerritos 2004 Natural Hazards Mitigation Plan

The City of Cerritos 2004 Natural Hazards Mitigation Plan is crucial in comparing the previous mitigation ideas and attitudes to the City's current needs and concerns. The project team referred to this plan constantly throughout the updating process. The Natural Hazards Mitigation Plan provides insight into hazard ranking, hazard history, previously proposed mitigation projects, etc.

City of Cerritos General Plan

The City of Cerritos General Plan 2004 contains guidelines and policies that serve as the City's vision for future planning and development. Mitigation projects defined in the Hazard Mitigation Plan will be required to align with the objectives outlined in the Safety Element of the General Plan. Proposed mitigation actions are found in Chapter 4 of this document.

Cerritos 2010 Urban Water Management Plan

The City of Cerritos 2010 Urban Water Management Plan is updated every five years to monitor water supply issues and mitigate drought situations. As part of Urban Water Management Plan updates, the City will review the drought hazard profile in the Hazard Mitigation Plan and incorporate the drought mitigation actions identified in the plan.

City of Cerritos Emergency Operations Plan

The City of Cerritos periodically updates the Emergency Operations Plan (EOP). The EOP, last updated in 2000, includes specific response procedures for earthquake, hazardous material incident, flooding, etc. In order to ensure the plan includes an appropriate response, the City will incorporate the Risk Assessment element of the Hazard Mitigation Plan into the EOP update, as appropriate.

State of California Multi-Hazard Mitigation Plan (2013)

The Multi-Hazard Mitigation Plan was reviewed to ensure consistency between the State and City Plan, with respect to identified hazards and vulnerability, goals and objectives, and mitigation actions. The State goals served as the basis for developing the goals at the City level. City goals and objectives are outlined in Chapter 4.

County of Los Angeles 2014 All-Hazard Mitigation Plan

Los Angeles County's All-Hazard Mitigation Plan was reviewed to ensure consistency between the County and City Plan. The County Plan, updated in 2014, outlines the County's approach to hazard mitigation, focusing on natural hazards, human-caused events, and technological emergencies.

California Earthquake Loss Reduction Plan

California's Seismic Safety Commission developed the Earthquake Loss Reduction Plan to identify actions to mitigate seismic hazards. This plan was reviewed for an overall seismic hazard evaluation for the Risk Assessment found in Chapter 3, as well as the identification of potential seismic mitigation actions.

California Fire Plan

The State Board of Forestry and the California Department of Forestry and Fire Protection have developed the Fire Plan for wildland fire protection in California. The plan defines a level of service measurement, considers assets at risk, incorporates the cooperative interdependent relationships of wildland fire protection providers, provides for public stakeholder involvement, and creates a fiscal framework for policy analysis. This information was used when developing the Urban Fire hazard profile.

California Water Plan

The state updated the California Water Plan in 2013 in order to address drought hazard mitigation over the long term. This Plan outlines the state's approach to integrated water management and sustainability. This information was used when developing the drought hazard profile.

California Adaptation Planning Guide 2012

FEMA, CalOES, and the California Natural Resources Agency developed the California Adaptation Planning Guide to assist municipalities in recognizing local climate change and to provide guidance addressing potential vulnerabilities. The information was used to develop potential hazards and to provide background information that allowed the Steering

Committee to make educated decisions regarding mitigation actions designed to alleviate the effects of climate change.

2

PLANNING AREA PROFILE

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2.1 Region Description

The City of Cerritos is a municipality characterized by a combination of residential, industrial and commercial developments. Cerritos is located in the southern part of Los Angeles County, California, about 21 miles southeast of the City of Los Angeles, and is positioned on the border of the Los Angeles and Orange County line. The City is bordered by Buena Park and La Mirada to the west; Santa Fe Springs, Norwalk, and Artesia to the north; and Bellflower and Lakewood to the east and south. Cerritos is located near three major Los Angeles County freeways, including Interstates 5 and 605 and California State Route 91. Additionally, the City is in close proximity to Los Angeles International Airport, Long Beach Municipal Airport, the ports of Los Angeles and Long Beach, and is about 18 miles east of the Pacific Ocean. Cerritos has a total area of 8.86 square miles.

The climate of Cerritos is consistent with coastal Southern California and is generally characterized by warm summers and cool winters. Average temperatures range from the mid-70's in the summer to the high-50's in the winter. Precipitation occurs mainly in the winter months with an average annual rainfall of 10 to 15 inches according to the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service. In 2014, NOAA's Fullerton Municipal Airport Weather Station recorded May as the wettest month for the region with 6.32 inches of rainfall.

Cerritos was incorporated on April 24, 1956 as the City of Dairy Valley due to the prominence of dairy farms in the area. However, by 1967, the focus of the community changed from agriculture to residential. On January 10th of that year, the City's name was officially changed to Cerritos. By the 1970s, Cerritos was one of the fastest growing communities in California. Guided by the Cerritos General Plan, the City has become a state-of-the-art municipal city valued at over 8 billion dollars. Figure 2.1, below, provides an overview map of the City of Cerritos.

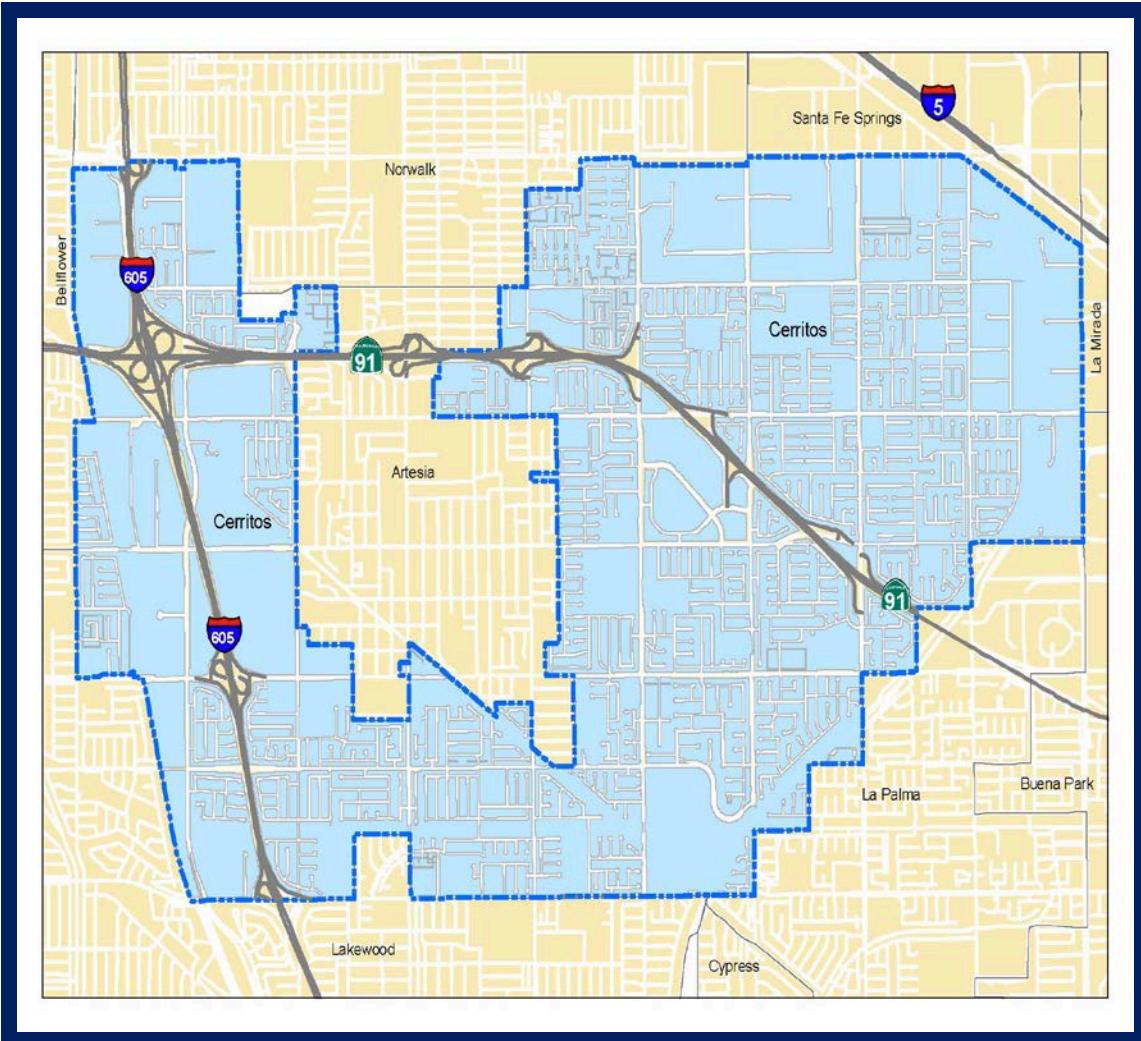


Figure 2.1: City of Cerritos Overview Map

2.2 Development Trends

§201.6(c)(2)(ii)(C): [The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

The City of Cerritos is 8.86 square miles. The Land Use Element of the City's General Plan provides a guide for land use, future growth, and development within the City. Since the 2004 Natural Hazard Mitigation Plan, there have been no major changes in development that have greatly affected the City's vulnerability to the identified hazards.

The following describes land use designations for Cerritos. These descriptions were excerpted from the City of Cerritos General Plan 2004 in an attempt to designate the proposed general distribution and intensity of uses of the land for housing, business, industry, open space, public facilities, and other categories of public and private uses.

Residential Land Uses

Low Density Residential Development

Land uses within this designation are characterized by single-family residential. This type of development accounts for 33 percent of the City's land. Generally, housing in this class was built in the 1960s as the City converted the agricultural land to residential. Today, new low density residential developments are occurring on vacant or underdeveloped parcels which account for about 0.5 percent of City land.

Medium Density Residential Development

This land use designation consists of multi-family housing stock typically comprised of townhomes and condominiums. As of August 2001, 3.6 percent of the City's total acreage was categorized under this type of residential classification. The majority of medium density housing stock was built post-1970 due to a rise in the demand for housing. Recent development projects in this area were completed to comply with State affordable housing mandates.

Commercial & Industrial Land Uses

Office- Professional Commercial

Land designated under this category is intended for office and professional employment and services. Included in this category are medical, professional, financial, administrative, religious, and private school establishments. This land use designation accounts for 0.3 percent of the overall land area of the City.

Community Commercial

This land use designation applies to a wide range of land uses involved in retail sales and services. Development included in this land use designation are concentrated in centers as opposed to “strip” or “ribbon” commercial centers which are discouraged by the City. This class of development accounts for 1.7 percent of the overall land area of the City.

Regional Commercial

Making up 6.6 percent of the overall land use, this designation applies to several major regional commercial centers with the City. Including the Los Cerritos Center, the Cerritos Auto Square, and the Cerritos Towne Center, developments under this designation provide a significant volume of employment opportunities and revenue for the City.

Industrial/Commercial

The industrial classification includes those land uses involved in manufacturing, processing, and warehousing activities. Light Industrial areas and locations used for educational use are subcategories that make up 12.5 percent and 7 percent of the city land area respectively. With an additional .5 percent labeled only as industrial/commercial, this designation accounts for more than 13 percent of overall City land area.

Parks and Open Space

The Parks and Open Space designation includes twenty (20) City operated parks. The combined land mass for these parks is 187 acres. Additionally, the City is home to a 22.1 acre golf course that provides recreational opportunities to residents including, but limited to, playing courts, athletic fields, picnic shelters and meeting rooms. This designation accounts for 4.9 percent of the City's overall land area.

Public and Quasi-Public

This designation includes publicly owned lands and properties for quasi-public institutions containing existing or proposed support uses for local community-wide or regional support facilities. Examples of land uses include, but are not limited to, schools, parks, power line easements, flood control facilities, churches, and similar uses that are ancillary to quasi-public uses. This land designation make up .4 percent of the overall City land area.

Vacant and Underutilized Land

Making up 0.5 percent of the overall City land area, vacant and underutilized land represents the portion of the City that has no development or that fails to meet the potential use or capacity of the location. While vacant land is undeveloped, underutilized land might include land with a high percent of vacant structures, a location with dilapidated buildings, areas with obsolete structures, or large areas with non-building uses such as excessive parking or outdoor storage areas.

Table 2.1 provides a summary of the land use designations described in the sections above.

Table 2.1: Land Use Designations

Land Use Designation	Dwelling Units (DU) or Square Feet (SF)	Area (acres)	%
Low Density Residential	13,023 DU	1,880.25	33.0
Medium Density Residential	2,596 DU	208.82	3.6
Office-Professional Commercial	241,053 SF	14.18	0.3
Community Commercial	1,517,878 SF	100.88	1.7
Regional Commercial	6,179,283 SF 72 DU	380.93	6.6
Industrial/ Commercial	536,076 SF	28.83	0.5
Light Industrial	11,343,771 SF	697.85	12.5
Educational Use	186,100 SF	403.49	7.0
Public/Quasi Public	137,666 SF	21.80	0.4

Land Use Designation	Dwelling Units (DU) or Square Feet (SF)	Area (acres)	%
Parks and Open Space	42,975 SF 1 DU	247.12	4.9
Utility & Flood Control Right-Of-Way	41,600 SF	274.71	4.3
Railroad Right-Of-Way	NA	43.75	0.7
Road Right-of-Way	NA	.87	0.0
Private Road	NA	18.24	0.3
Not a Part	NA	9.31	0.2
Freeways/ Public Street	NA	1,338.4 5	23. 4
Vacant	NA	26.26	0.5
Total	15,692 DU 20,366,222 SF	5,696	100

Source: City of Cerritos Land Use Element (2004)

Figures 2.2 and 2.3 illustrate the City's zoning and land use designations, respectfully, and were extracted from the 2004 revision of the General Plan. As mentioned above, the City's designations have not changed since the previous planning period.

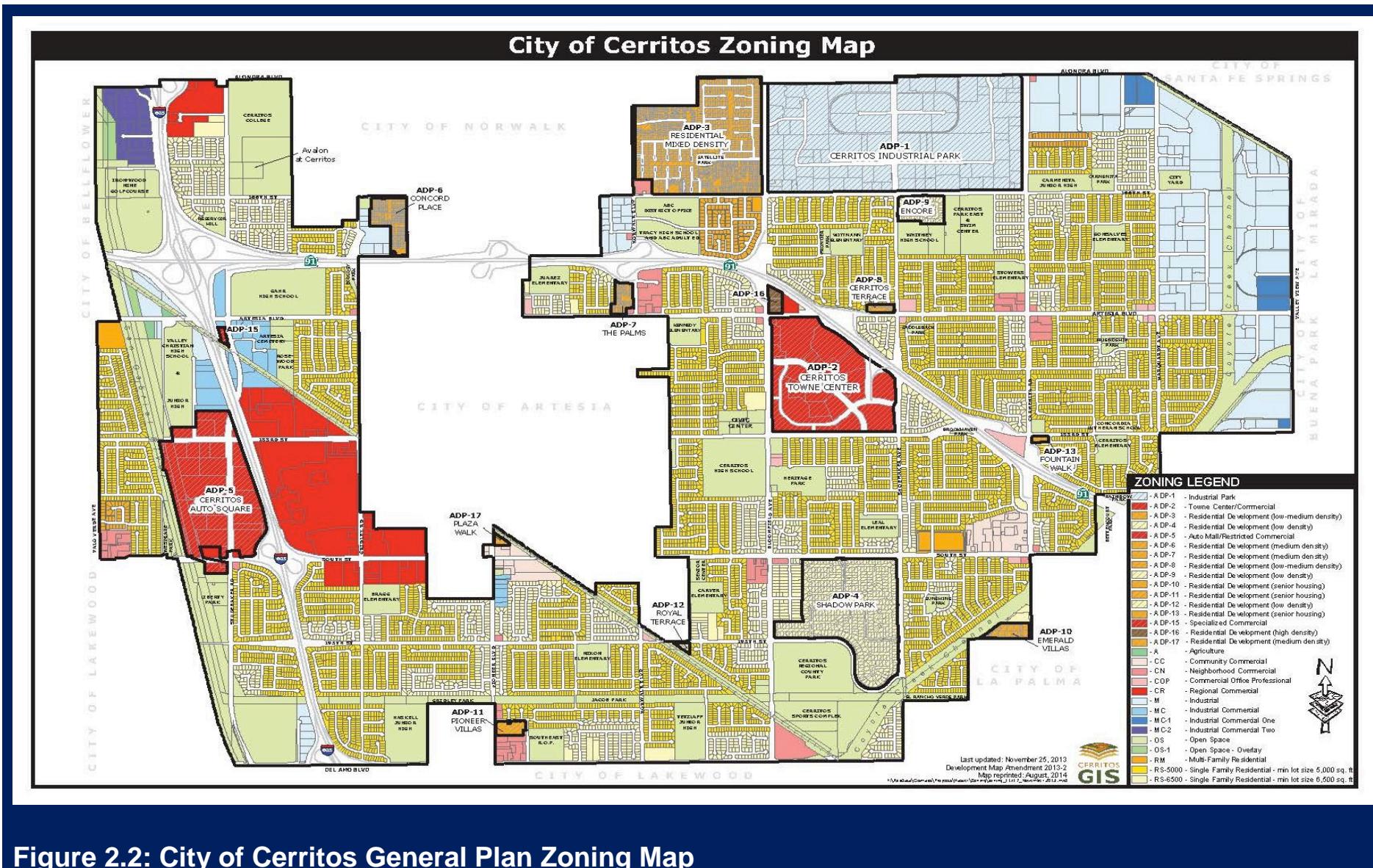


Figure 2.2: City of Cerritos General Plan Zoning Map

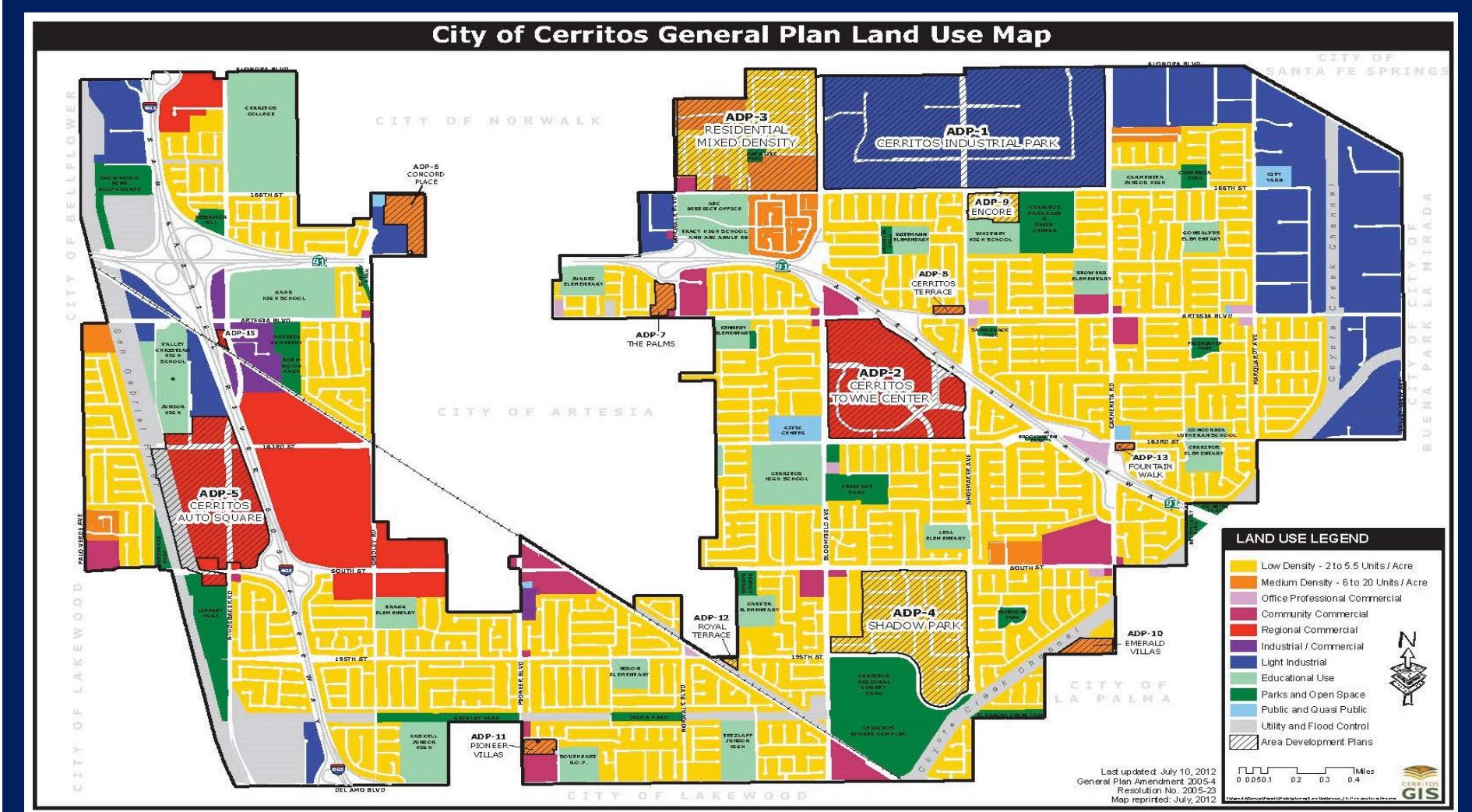


Figure 2.3: City of Cerritos Land Use Map

2.3 Population

Since its incorporation in 1956, the City's population has increased from 3,439 residents to 49,707, according to the United States Census Bureau (2013). The City's population rapidly increased from 16,000 to over 38,000 between 1970 and 1972. Conversely, future population growth is expected to grow slowly as development opportunities become increasingly limited and the City reaches its potential for building out. Table 2.2 provides the City's projected population growth through 2030.

Table 2.2: Projected Growth for the City of Cerritos

Year	2015	2020	2025	2030
Population	55,270	55,438	55,591	55,731

Source: California Department of Finance E-4 Population Estimates (Revised 11/9/2012)

3 RISK ASSESSMENT

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3.1 Risk Assessment

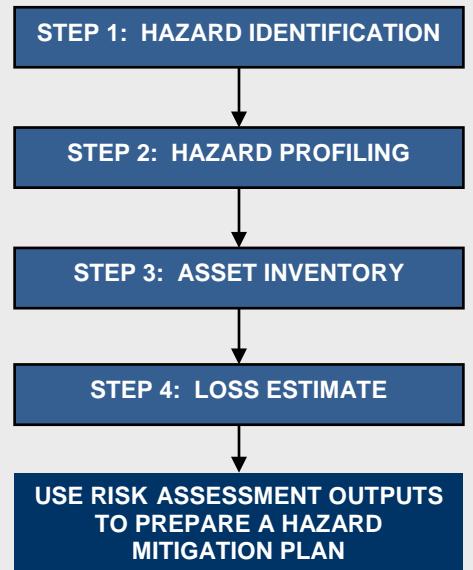
The Risk Assessment consists of four steps: Hazard Identification, Hazard Profiling, Asset Inventory, and Loss Estimates. This chapter includes the Hazard Identification and Hazard Profiling steps to evaluate the hazards of primary concern to local decision-makers to provide a basis for loss estimates which is also included within this chapter. Additionally, the Risk Assessment provides a foundation for the evaluation of mitigation measures that can help reduce the impacts of a potential hazard event.

Step 1: Identify Hazards

This step identified all the natural and man-made hazards that might affect the City and then narrowed the list to the hazards that are most likely to occur. These hazards included natural, technical, and human-caused events with an emphasis on the effect of natural disasters on critical facilities, services, and roadways (e.g., government buildings, schools, and public services including police and fire). The Steering Committee participated in a Hazard Identification Workshop during the first Steering Committee Meeting to identify and rank the potential hazards within the City of Cerritos.

Step 2: Profile Hazard Events

The hazard event profiles consist of either a map indicating the area impacted by each hazard or key information regarding the characteristics of hazard events within the planning area. To develop detailed hazard profiles, relevant open-source hazard studies and mapping projects were reviewed and documented within this report. In addition, the City of Cerritos supplied historical accounts of man-made hazard events (e.g. transportation incidents, etc.) that included specific hazard and emergency information. This planning step also determined the magnitude, frequency, and location characteristics of relevant natural hazards (urban fire, fault locations, flood plains, etc.) that were utilized as the design-basis for the loss estimates.



Step 3: Inventory Assets

The purpose of this step is to determine the quantity of buildings, people, and assets in the City of Cerritos that lie in the different hazard areas and what proportion of the City this represents. The asset inventory was completed utilizing spatial Geographic information Systems (GIS) asset locations and specifications for the following assets:

- General Buildings: City well sites, Civic Buildings, Parks, etc.
- Critical Facilities: Hazmat Facilities, Schools, etc.

The development of the comprehensive inventory facilitated the development of loss estimates for all hazard scenarios.

Step 4: Loss Estimates

The loss estimate step relied on detailed information regarding the hazard probability and maps that were completed as part of the hazard profiles. This information was utilized to apply the hazard probabilities and recurrence intervals to the City's assets and inventory (buildings and infrastructure). This step was critical in determining which assets were subject to the greatest potential damages and which hazard event was likely to produce the greatest potential losses.

The HAZUS-MH software package, which implements the FEMA-developed methodology and runs on a GIS platform, was utilized to map and display earthquake hazard data, as well as the results of damage and economic loss estimates for buildings and infrastructure within the City. To estimate potential losses for the remaining hazards, detailed spreadsheets, including the asset inventory and potential hazards, were used to find the monetary impact of each hazard to the City of Cerritos.

In estimating losses, HAZUS-MH and the spreadsheets take into account various impacts of a hazard event such as:

- Physical damage: damage to public buildings, schools, critical facilities, and infrastructure;
- Economic loss: lost jobs, business interruptions, repair and reconstruction costs; and
- Social impacts: impacts to people, including requirements for shelters and medical aid.

The conclusion of this step precipitated a comprehensive loss estimate (vulnerability assessment) for each identified hazard for each specific asset in terms of damages, economic loss, and the associated consequences for the City of Cerritos.

3.2 Hazard Identification and Profiling

§201.6(c)(2)(i): [The risk assessment **shall** include a] description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

§201.6(c)(2)(ii): [The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.

§201.6(c)(2)(ii): [The risk assessment] **must** also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.

§201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The hazard identification and ranking was obtained from the Hazard Identification Workshop. Each hazard profile includes a summary of the Hazard Identification Workshop identified risk factors and overall rank for each hazard, in addition to the detailed hazard description, historical occurrences, and projected future probability, magnitude, and frequency.

The Hazard Identification Workshop was conducted as a participatory Steering Committee workshop to identify the potential hazards within the City of Cerritos. The Hazard Identification Workshop was facilitated utilizing an interactive spreadsheet program that asks specific questions on potential hazards and then rated them accordingly. These questions guide the team in the correct facilitation and application of the program. Table 3.1 summarizes the Hazard Identification Workshop risk factors, lists the descriptions of each factor, provides the specific descriptor choices for each risk factor and description, and summarizes the risk ranking associated with each hazard:

Table 3.1: Risk Factors for Hazard Identification

Risk Factor	Description	Descriptors	Value
Probability/ Frequency	Prediction of how often a hazard will occur in the future	Infeasible event - not applicable due to geographic location characteristics	0
		Rare event - occurs less than once every 50 years	1
		Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
		Regular event - occurs between once a year and once every 7 years	3
		Frequent event - occurs more than once a year	4
Consequence/ Severity	Physical Damage - structures and lifelines Economic Impact – loss of function for power, water, sanitation, roads, etc.	No damage	1
		Minor/slight damage to buildings and structures, no loss of lifelines	2
		Moderate building damage, minor loss of lifelines (less than 12 hours)	3
		Moderate building damage, lifeline loss (less than 24 hours)	4
		Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	5
Vulnerability	Impact Area - area impacted by a hazard event Secondary Impacts - Capability of triggering additional hazards Onset - Period of time between initial recognition of an approaching hazard and when the hazard begins to impact the community	No physical damage, no secondary impacts	1
		Localized damage area	2
		Localized damage area, minor secondary impacts, delayed hazard onset	3
		Moderate damage area, moderate secondary impacts, moderate warning time	4
		Widespread damage area, significant secondary impacts, no warning time	5

Each profile also includes a ranking of the hazard (ranging from low hazard to high hazard). Table 3.2 illustrates the matrix for how each hazard was ranked according to all of the previously mentioned factors. Table 3.3 provides the value determinations for each ranking. The Steering Committee determined this initial profile ranking based on all of the hazard identification, profile research, group discussion, and evaluation of all of the data.

Table 3.2 Risk Ranking Matrix

Probability/Frequency Description		Risk Ranking Matrix					
Rare Event: Occurs less than once every 50 years	Vulnerability	Probability/Frequency	Consequence/Severity				
		Value	1	2	3	4	5
		1	1	2	3	4	5
		2	2	4	6	8	10
		3	3	6	9	12	15
		4	4	8	12	16	20
Infrequent Event: Occurs between once every 8 years and once every 50 years (inclusive)	Vulnerability	Probability/Frequency	Consequence/Severity				
		Value	1	2	3	4	5
		1	2	4	6	8	10
		2	4	8	12	16	20
		3	6	12	18	24	30
		4	8	16	24	32	40
Regular Event: Occurs between once a year and once every 7 years	Vulnerability	Probability/Frequency	Consequence/Severity				
		Value	1	2	3	4	5
		1	3	6	9	12	15
		2	6	12	18	24	30
		3	9	18	27	36	45
		4	12	24	36	48	60
Frequent Event: Occurs more than once a year	Vulnerability	Probability/Frequency	Consequence/Severity				
		Value	1	2	3	4	5
		1	4	8	12	16	20
		2	8	16	24	32	40
		3	12	24	36	48	60
		4	16	32	48	64	80
		5	20	40	60	80	100

Table 3.3: Risk Rank Categorization

High Hazard	50 to 100
Moderately High Hazard	25 to 49
Moderate Hazard	15 to 24
Moderately Low Hazard	5 to 14
Low Hazard	1 to 4

3.2.1 Hazard Profiling

This section presents additional information regarding the hazards of concern (detailed below) as hazard profiles. Hazard profiles are designed to assist communities in evaluating and comparing the hazards that can impact their community by comparing a number of hazard factors. Each type of hazard has unique characteristics and the impact associated with a specific hazard can vary depending on the magnitude and location of each event (a hazard event is a specific, uninterrupted occurrence of a particular type of hazard). Furthermore, the probability of occurrence of a hazard in a given location impacts the priority assigned to that hazard. Finally, each hazard will impact different communities in different ways, based on geography, local development, population distribution, age of buildings, and mitigation measures already implemented.

Additional Hazard Scenarios

It should be noted the 2004 Natural Hazards Mitigation Plan focused only on a few natural hazards, namely earthquake, flood, and windstorm. During this plan revision, the Steering Committee determined it would be appropriate to include additional natural and man-made hazards to make the Plan more robust. The Steering Committee took ideas from the City of Paramount and City of Norwalk's Hazard Mitigation Plan as well as the State and County Plans in order to brainstorm what additional hazards should be included in the new Plan revision. While the priorities of the original hazards didn't change overall, new scenarios were included in between as part of the hazard ranking process. Table 3.4 provides the hazard ranking summary for the City of Cerritos including the additional natural and man-made scenarios.

Table 3.4: Hazard Ranking Summary

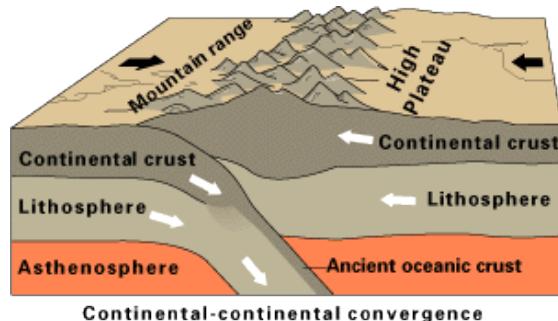
Hazard Rank	Score
High	
Earthquake	50
Moderately High	
Moderate	
Urban Fire	18
Transportation Accident	16
Moderately Low	
Flood/ Dam Failure	12
Pipeline Failure/ Hazardous Materials Release	12
Drought	12
Low	
Terrorism	4
Windstorm	4

3.3 Earthquake Hazard Profile

Earthquake Risk Assessment Summary						
Risk Rank: High						
Probability/ Frequency:	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)					
Consequence/ Severity:	Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life					
Vulnerability:	Widespread damage area, significant secondary impacts, no warning time					
Hazard Risk Rank Score:	50					
 <p>PROFILE RANK</p> <table border="1"><tr><td>HIGH</td></tr><tr><td>Moderately High</td></tr><tr><td>Moderate</td></tr><tr><td>Moderately Low</td></tr><tr><td>Low</td></tr></table>		HIGH	Moderately High	Moderate	Moderately Low	Low
HIGH						
Moderately High						
Moderate						
Moderately Low						
Low						

3.3.1 Earthquake Hazard Information and Background

Plate tectonics is a starting point for understanding the forces within the Earth that cause earthquakes. Plates are thick slabs of rock that make up the outermost 100 kilometers of the Earth. The term "tectonics" describes the deformation of the Earth's crust, the forces producing such deformation, and the geologic and structural features that result. The constant motion of the plates causes stress in the brittle upper crust of the Earth. These tectonic stresses build as the rocks are gradually deformed. The rock deformation, or strain, is stored in the rocks as elastic strain energy. When the strength of the rock is exceeded, ruptures occur along a fault. The rocks on



opposite sides of the fault slide past each other as they spring back into a relaxed position. The strain energy is released partly as heat and partly as elastic waves called seismic waves. The passage of these seismic waves produces the ground shaking in earthquakes.

Faults are more likely to produce future earthquakes if they have rapid rates of movement, have had recent earthquakes along them, experience greater total displacements, and are aligned so that movement can relieve the accumulating tectonic stresses. Geologists classify faults by their relative hazards. “Active” faults, which represent the highest hazard, are those that have ruptured to the ground surface during the Holocene period (about the last 11,000 years). In contrast, “potentially active” faults are those that displaced layers of rock from the Quaternary period (the last 1,800,000 years). Determining if a fault is “active” or “potentially active” depends on geologic evidence, which may not be available for every fault.

Shaking

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake’s magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter scale, developed in 1932 by Dr. Charles F. Richter of the California Institute of Technology. The most commonly used scale today is the Moment Magnitude (Mw) Scale. Moment magnitude is related to the total area of the fault that ruptured and the amount of offset (displacement) across the fault. It is a more uniform measure of the energy released during an earthquake.

The other commonly used measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. In general, it decreases with distance from the source of an earthquake, but it may be increased or decreased by a number of factors.

The Modified Mercalli Intensity Scale and Corresponding Richter Scale Magnitudes

Shaking intensity is often described using the Modified Mercalli Intensity Scale which rates an earthquake’s effects based on human observation. While an earthquake has only one magnitude, it may have many intensity values which will generally decrease with distance from the epicenter. Table 3.5 lists the Mercalli Scale’s various intensity levels and corresponding Richter scale magnitudes.

Table 3.5: Modified Mercalli Intensity Scale

Mercalli Intensity		Description	Richter Scale Magnitude
I	Instrumental	Detected only by a seismograph	
II	Feeble	Noticed by sensitive people	0.1 to 3.4
III	Slight	Like the vibrations due to a passing truck	3.5 to 4.2
IV	Moderate	Felt by people while walking; rocking of loose objects, including standing vehicles	4.3 to 4.8
V	Rather Strong	Felt generally; most sleepers are awakened and bells ring	
VI	Strong	Trees sway and all suspended objects swing; damage by over-turning and falling of loose objects	4.9 to 5.4
VII	Very Strong	General alarm; walls crack; plaster falls	
VIII	Destructive	Car drivers seriously disturbed; masonry fissured; chimneys fall; poorly constructed buildings damaged	5.5 to 6.1
IX	Ruinous	Some houses collapse where ground begins to crack, and pipes break	6.2 to 6.9
X	Disastrous	Ground cracks badly; many buildings destroyed and railway lines bent; landslides on steep slopes	7.0 to 7.3
XI	Very disastrous	Few buildings remain standing; bridges destroyed; all services (railway, pipes, and cables) out of action; great landslides and floods	7.4 to 8.1
XII	Catastrophic	Total Destruction; objects thrown into air; ground rises and falls in waves	8.1 +

Amplification of Seismic Shaking

Although seismic waves radiate from their source like ripples on a pond, the radiation is not uniform due to the complex nature of an earthquake rupture, the different paths the waves follow through the earth, and the different rock and soil layers near the earth's surface. Large earthquakes begin to rupture at their hypocenter deep in the earth and the fault ruptures outward from that point. Because the speed of an earthquake rupture on a

fault is similar to the speed of seismic waves, waves closer to the epicenter can be compounded by waves from farther along the rupture, creating a pulse of very strong seismic waves that moves along the fault in the direction of the fault rupture. Seismic waves may also be modified as they travel through the earth's crust.

As seismic waves approach the ground surface, they commonly enter areas of loose soils where the waves travel more slowly. As the waves slow down, their amplitude increases, resulting in larger waves with frequencies that are more likely to damage structures. Waves can also be trapped within soft sediments between the ground surface and deep, hard basement rocks, their destructive energy multiplying as they bounce back and forth, producing much greater shaking at the ground surface.

Ground Failure

Fissuring, settlement, and permanent horizontal and vertical shifting of the ground often accompanies large earthquakes. Although not as pervasive or as costly as the shaking itself, these ground failures can significantly increase damage and, under certain circumstances, can be the dominant cause of damage. The following is a list of different ground failure scenarios.

Fault Rupture

The sudden sliding of one part of the earth's crust past another releases the vast store of elastic energy in the rocks as an earthquake. The resulting fracture is known as a fault, while the sliding movement of earth on either side of a fault is called fault rupture. Fault rupture begins below the ground surface at the earthquake hypocenter, typically between three and ten miles below the ground surface in California. If an earthquake is large enough, the fault rupture will actually travel all the way to the ground surface, severely damaging structures built across its path.

Liquefaction

In addition to the primary fault rupture that occurs right along a fault during an earthquake, the ground many miles away can also fail during the intense shaking. One common type of failure occurs when soft, water-saturated soil settles, causing the water to eject sediment particles as it works its way to the ground surface. This phenomenon, known as liquefaction, turns the soil into a fluid, causing it to lose the ability to support buildings and other structures. Areas susceptible to liquefaction include places where sandy sediments have been deposited by rivers along their course or by wave action along beaches.

Landslides

Landslides are the result of the down-slope movement of unstable hillside materials under the influence of weathering and gravity over time. Strength of rock and soil, steepness of slope, and weight of the hillside material all play an important role in the stability of hillside areas. Weathering and absorption of water can weaken slopes, while the added weight of saturated materials or overlying construction can increase the chances of slope failure. Sudden failure can be triggered by heavy rainfall, excavation of weak slopes, and earthquake shaking, among other factors.

3.3.2 Earthquake History

To indicate the potential for an earthquake event, Table 3.6 lists significant recorded earthquakes in Southern California and the associated magnitudes (excerpted from the Southern California Earthquake Data Center):

Table 3.6 Southern California Historical Earthquakes

Magnitude	Year	Earthquake Name
■ Under Magnitude 4.5		
■ Magnitude 4.5 - 5.4		
■ Magnitude 5.5 - 6.4		
■ Magnitude 6.5 to 7.4		
■ Magnitude > 7.5		
■ Magnitude 5.5 - 6.4	1796	LA Basin Earthquake
■ Magnitude 6.5 to 7.4	1800	San Diego Earthquake
■ Magnitude 6.5 to 7.4	1812	Wrightwood (or San Juan Capistrano) Earthquake
■ Magnitude 6.5 to 7.4	1812	Santa Barbara Earthquake
■ Magnitude 6.5 to 7.4	1852	Volcano Lake Earthquake
■ Magnitude 5.5 - 6.4	1855	Los Angeles Region Earthquake
■ Magnitude > 7.5	1857	Fort Tejon Earthquake
■ Magnitude 5.5 - 6.4	1858	San Bernardino Earthquake
■ Magnitude 5.5 - 6.4	1862	San Diego Earthquake
■ Magnitude > 7.5	1872	Owens Valley Earthquake
■ Magnitude 5.5 - 6.4	1881	Parkfield Earthquake
■ Magnitude 5.5 - 6.4	1883	Santa Barbara Channel Earthquake
■ Magnitude 6.5 to 7.4	1890	San Jacinto or Elsinore Fault Region Earthquake

█ Under Magnitude 4.5	█ Magnitude 4.5 - 5.4	█ Magnitude 5.5 - 6.4
█ Magnitude 6.5 to 7.4	█ Magnitude > 7.5	
Magnitude	Year	Earthquake Name
█ Magnitude 6.5 to 7.4	1892	San Jacinto or Elsinore Fault Region Earthquake
█ Magnitude 6.5 to 7.4	1892	Laguna Salada Earthquake
█ Magnitude > 7.5	1892	Imperial Valley Earthquake
█ Magnitude 5.5 - 6.4	1899	Cajon Pass Earthquake
█ Magnitude 6.5 to 7.4	1899	San Jacinto Earthquake
█ Magnitude 5.5 - 6.4	1901	Parkfield Earthquake
█ Magnitude 5.5 - 6.4	1906	Imperial Valley Earthquake
█ Magnitude 5.5 - 6.4	1908	Death Valley Region Earthquake
█ Magnitude 5.5 - 6.4	1910	Elsinore Earthquake
█ Magnitude 5.5 - 6.4	1915	Imperial Valley Earthquake
█ Magnitude 5.5 - 6.4	1916	South of Death Valley Earthquake
█ Magnitude 6.5 to 7.4	1918	San Jacinto Earthquake
█ Magnitude 5.5 - 6.4	1922	Parkfield Earthquake
█ Magnitude 5.5 - 6.4	1923	North San Jacinto Fault Earthquake
█ Magnitude 5.5 - 6.4	1925	Santa Barbara Earthquake
█ Magnitude 6.5 to 7.4	1927	Lompoc Earthquake
█ Magnitude 5.5 - 6.4	1933	Long Beach Earthquake
█ Magnitude 5.5 - 6.4	1934	Parkfield Earthquake
█ Magnitude 5.5 - 6.4	1937	San Jacinto Fault ("Terwilliger Valley") Earthquake
█ Magnitude 6.5 to 7.4	1940	Imperial Valley Earthquake
█ Magnitude 5.5 - 6.4	1941	Santa Barbara Earthquake
█ Magnitude 4.5 - 5.4	1941	Torrance-Gardena Earthquakes
█ Magnitude 6.5 to 7.4	1942	Fish Creek Mountains Earthquake
█ Magnitude 5.5 - 6.4	1946	Walker Pass Earthquake
█ Magnitude 6.5 to 7.4	1947	Manix Earthquake
█ Magnitude 5.5 - 6.4	1948	Desert Hot Springs Earthquake

█ Under Magnitude 4.5	█ Magnitude 4.5 - 5.4	█ Magnitude 5.5 - 6.4
█ Magnitude 6.5 to 7.4	█ Magnitude > 7.5	
Magnitude	Year	Earthquake Name
█ Magnitude > 7.5	1952	Kern County Earthquake
█ Magnitude 5.5 - 6.4	1952	Bakersfield Earthquake
█ Magnitude 5.5 - 6.4	1954	San Jacinto Fault Earthquake
█ Under magnitude 4.5	1966	Imperial Fault Earthquake
█ Magnitude 5.5 - 6.4	1966	Parkfield Earthquake
█ Magnitude 6.5 to 7.4	1968	Borrego Mountain Earthquake
█ Magnitude 4.5 - 5.4	1970	Lytle Creek Earthquake
█ Magnitude 6.5 to 7.4	1971	San Fernando (Sylmar) Earthquake
█ Magnitude 4.5 - 5.4	1973	Point Mugu Earthquake
█ Magnitude 4.5 - 5.4	1975	Galway Lake Earthquake
█ Magnitude 4.5 - 5.4	1978	Santa Barbara Earthquake
█ Magnitude 4.5 - 5.4	1979	Malibu Earthquake
█ Magnitude 5.5 - 6.4	1979	Imperial Valley Earthquake
█ Magnitude 5.5 - 6.4	1980	White Wash Earthquake
█ Magnitude 4.5 - 5.4	1982	"Anza Gap" Earthquake
█ Magnitude 5.5 - 6.4	1986	North Palm Springs Earthquake
█ Magnitude 4.5 - 5.4	1986	Oceanside Earthquake
█ Magnitude 6.5 to 7.4	1987	Elmore Ranch/Superstition Hills Earthquakes
█ Magnitude 5.5 - 6.4	1987	Whittier Narrows Earthquake
█ Magnitude 4.5 - 5.4	1988	Tejon Ranch Earthquake
█ Magnitude 4.5 - 5.4	1988	Upland Earthquake
█ Magnitude 4.5 - 5.4	1988	Pasadena Earthquake
█ Magnitude 4.5 - 5.4	1989	Malibu Earthquake
█ Magnitude 4.5 - 5.4	1989	Newport Beach Earthquake
█ Magnitude 4.5 - 5.4	1989	Montebello Earthquake
█ Magnitude 4.5 - 5.4	1990	Upland Earthquake

■ Under Magnitude 4.5	■ Magnitude 4.5 - 5.4	■ Magnitude 5.5 - 6.4
■ Magnitude 6.5 to 7.4	■ Magnitude > 7.5	
Magnitude	Year	Earthquake Name
■ Magnitude 5.5 - 6.4	1991	Sierra Madre Earthquake
■ Magnitude 5.5 - 6.4	1992	Joshua Tree Earthquake
■ Magnitude 6.5 to 7.4	1992	Landers Earthquake
■ Magnitude 5.5 - 6.4	1992	Big Bear Earthquake
■ Magnitude 5.5 - 6.4	1992	Mojave (Garlock) Earthquake
■ Magnitude 4.5 - 5.4	1993	Wheeler Ridge Earthquake
■ Magnitude 6.5 to 7.4	1994	Northridge Earthquake
■ Magnitude 5.5 - 6.4	1995	Ridgecrest Earthquakes
■ Magnitude 4.5 - 5.4	1996	Coso Earthquake
■ Magnitude 4.5 - 5.4	1997	Calico Earthquake
■ Magnitude 4.5 - 5.4	1998	Coso Earthquake
■ Magnitude 4.5 - 5.4	1998	Crafton Hills (Redlands) Earthquake
■ Magnitude 4.5 - 5.4	1998	San Bernardino Earthquake
■ Magnitude 4.5 - 5.4	1998	Whiskey Springs (Big Bear City) Earthquake
■ Magnitude 6.5 to 7.4	1999	Hector Mine Earthquake
■ Under magnitude 4.5	2001	West Hollywood Earthquake
■ Magnitude 4.5 - 5.4	2001	Anza Earthquake
■ Magnitude 5.5 - 6.4	2002	Laguna Salada Earthquake
■ Magnitude 6.5 to 7.4	2003	San Simeon Earthquake
■ Magnitude 4.5 - 5.4	2005	Mettler Earthquake
■ Magnitude 4.5 - 5.4	2008	Chino Hills Earthquake
■ Magnitude 4.5 - 5.4	2009	Inglewood Earthquake
■ Magnitude 5.5 - 6.4	2009	Baja California Earthquake
■ Magnitude 6.5 to 7.4	2010	Sierra El Mayor Earthquake
■ Magnitude 4.5 - 5.4	2011	Calexico Earthquake
■ Magnitude 4.5 - 5.4	2012	Brawley Earthquake

Under Magnitude 4.5	Magnitude 4.5 - 5.4	Magnitude 5.5 - 6.4
Magnitude 6.5 to 7.4	Magnitude > 7.5	
Magnitude	Year	Earthquake Name
Magnitude 4.5 - 5.4	2012	Westmoreland Earthquake
Magnitude 4.5 - 5.4	2013	Isla Vista Earthquake
Magnitude 4.5 - 5.4	2014	Brea Earthquake
Magnitude 4.5 - 5.4	2015	Stovepipe Wells Earthquake

Southern California Historic Earthquakes

One of the best indicators of earthquake potential is learning the earthquake history of the area. The following is a discussion on large earthquakes that affected the City of Cerritos and Southern California in general, which were also included in Table 3.6.

1857 Fort Tejon Earthquake

On January 9, 1857, one of the greatest recorded earthquakes in the United States occurred. The Fort Tejon earthquake measured 7.9 on the Richter scale and left a surface rupture scare of over 350 kilometers along the San Andreas Fault. Strong shaking was said to have lasted for over a minute, and water from the Los Angeles River was reportedly thrown out of its bed. Damage was not nearly as serious as it would be today since Southern California was sparsely populated at the time. Were the Fort Tejon earthquake to occur today, the damage would easily run into billions of dollars, and the loss of life would be substantial. The present-day communities of Wrightwood and Palmdale lie upon or near the 1857 rupture area.

1933 Long Beach Earthquake

In 1933, the Long Beach 6.4 magnitude earthquake struck the Los Angeles Basin on March 10. The earthquake occurred on the Newport-Inglewood Fault, causing serious damage in Long Beach and other communities. The earthquake resulted in 120 deaths and over \$50 million in property damage. Most of the damaged buildings were of unreinforced masonry construction. The following images of the damage were taken from the Southern California Earthquake Data Center website.



Damage resulting from the 1933 Long Beach Earthquake

1971 Sylmar Earthquake (San Fernando)



On February 9, 1971, the Los Angeles basin shook for over one minute. There were 65 deaths and a financial cost of over \$500 million. The earthquake resulted in a crack in the Van Norman Dam where an 80-square mile area had to be evacuated due to fear the dam would break. Numerous people were trapped in buildings and fires were started from natural gas line breaks. Two hospitals collapsed killing nine people. The Veterans Administration Hospital had seven deaths (photos left) and the Olive View Hospital had two deaths. Following this earthquake the Alquist Hospital Seismic Act was passed establishing structural and non-structure classifications for hospital building seismic –safety levels.

1987 Whittier Narrows Earthquake

In October 1987, the Whittier Narrows Earthquake struck the Los Angeles area with a 5.9 magnitude earthquake. This earthquake occurred on a fault system not previously known for seismic activity. There were 8 deaths and 200 injuries. The earthquake damage was estimated at \$358 million.



1994 Northridge Earthquake



On January 17, 1994, the Northridge Earthquake struck at a 6.7 magnitude in the Los Angeles area. There were 57 deaths and over 1,500 people were injured. The earthquake caused billions of dollars in damage and disrupted the lives of thousands of residents, schools and businesses in Southern California.

For days afterward, thousands of homes and businesses were without electricity; tens of thousands had no gas; and nearly 50,000 had little or no water. Approximately 15,000 structures were moderately to severely damaged, which left thousands of people temporarily homeless. Over 66,500 buildings were inspected, and nearly 4,000 were severely damaged and over 11,000 were moderately damaged. Several collapsed bridges and overpasses created commuter havoc on the freeway system. Ground shaking caused extensive damage, but the earthquake triggered liquefaction and dozens of fires also caused additional severe damage.



However, the earthquake occurred early in the morning on a holiday. This circumstance considerably reduced the potential effects. Many collapsed buildings were unoccupied, and most businesses were not yet open. The direct and indirect economic losses ran into the tens of billions.

When comparing the greatest recorded earthquakes in American history and the level of population and development today against that which existed at the time of the event, the scale of potential damage is staggering.

Cost of Past Disasters in Today's Dollars:

- 1811-12 New Madrid Earthquake, series of 4 Earthquakes over 7 weeks;
Estimated insured damage, today's dollars - \$88 Billion
- 1906 San Francisco Earthquake M8.3 Significant fire following damage;
Estimated insured damage, today's dollars - \$36 Billion

Even if the epicenter of a major earthquake is not located directly within the City of Cerritos, the aftershocks associated with that earthquake can cause significant damage. The hazards associated with aftershock earthquakes are the same as mainshock earthquakes and may cause significant damage and disruption. The primary difference between mainshock and aftershock earthquakes is aftershock earthquakes are categorized by the following two guidelines. First, it must occur within one rupture length of the mainshock rupture surface, or alternatively, within an "aftershock zone" based upon early aftershock activity and defined by seismologists. Second, it must occur within that designated area before the seismicity rate in that area returns to its "background", meaning pre-mainshock, level. Figure 3.1 from the Southern California Earthquake Data Center details the locations and magnitudes for historic Southern California earthquakes.

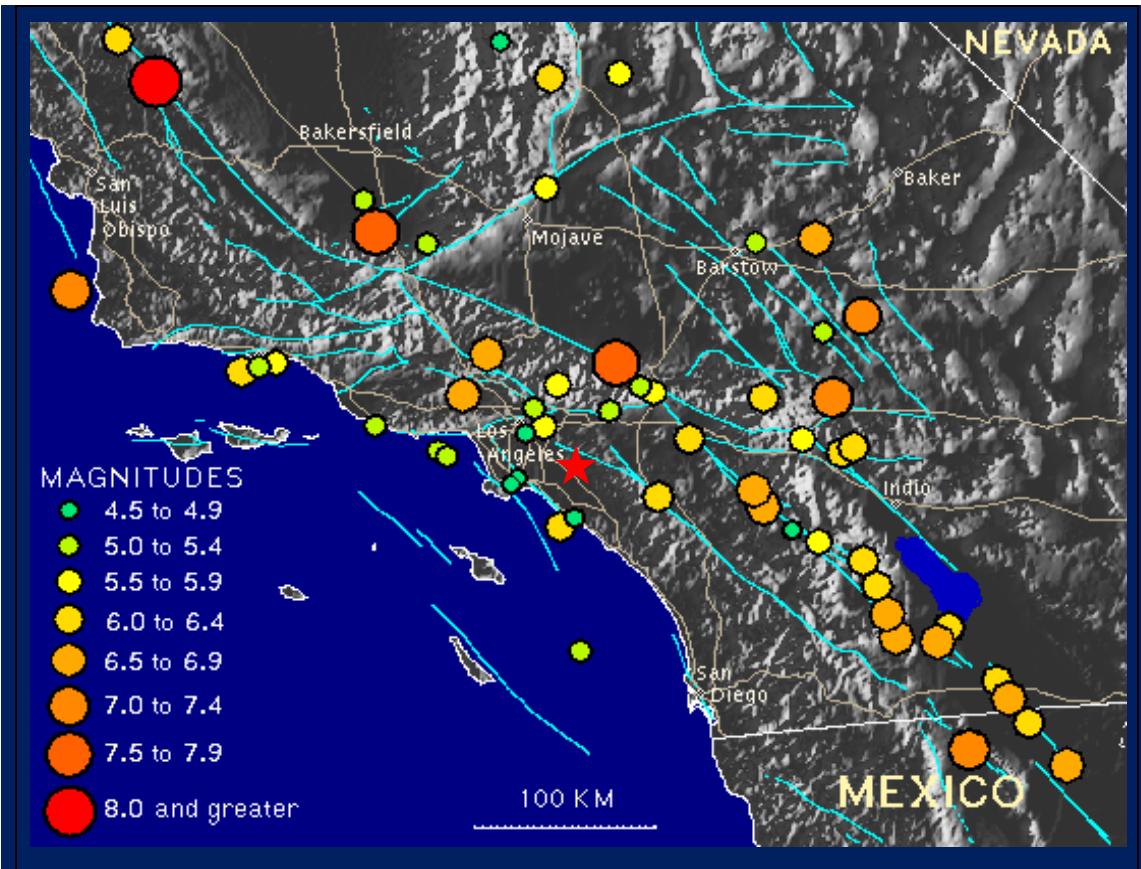


Figure 3.1: Southern California Historic Earthquakes Map

3.3.3 Earthquake Probability, Frequency, and Magnitude

The Steering Committee ranked earthquake as the greatest threat to the City of Cerritos. The City is located in a seismic fault zone near the Newport-Inglewood Fault according to a Preliminary Alquist-Priolo Earthquake Fault Zone map provided by the California Department of Conservation website and is located in a moderately high seismic risk zone.

Fault Zones

There are many faults and fault zones throughout Southern California. After reviewing maps of the United States, California and specifically the Southern California area, the research showed potential earthquake areas that could impact the City of Cerritos. Faults that were reviewed include: the San Andreas, Newport-Inglewood, Rose Canyon, Cristianos, San Joaquin Hills, Rose Canyon, Coronado Bank, Whittier-Elsinore, Palos Verdes, San Diego Trough, and San Clemente Faults. These faults, all considered active, are capable of producing earthquakes in the 4.5 – 8+ magnitude range. This report focused on the four faults that could most seriously impact the area.

1. San Andreas Fault
2. Newport-Inglewood Fault
3. Whittier-Fault
4. Palos Verdes Fault

A major earthquake along any of these four faults could result in substantial casualties and damage resulting from collapsed buildings, damaged roads and bridges, fires, flooding, and other threats to life and property. There may still be unmapped earthquake faults throughout Southern California that could also affect the City of Cerritos. Figures 3.1 and 3.2 provides the local earthquake faults in the City of Cerritos and Southern California areas. In addition, Tables 3.7 through 3.11 give fault specific information from the Southern California Earthquake Data Center for local faults that could affect the City of Cerritos.

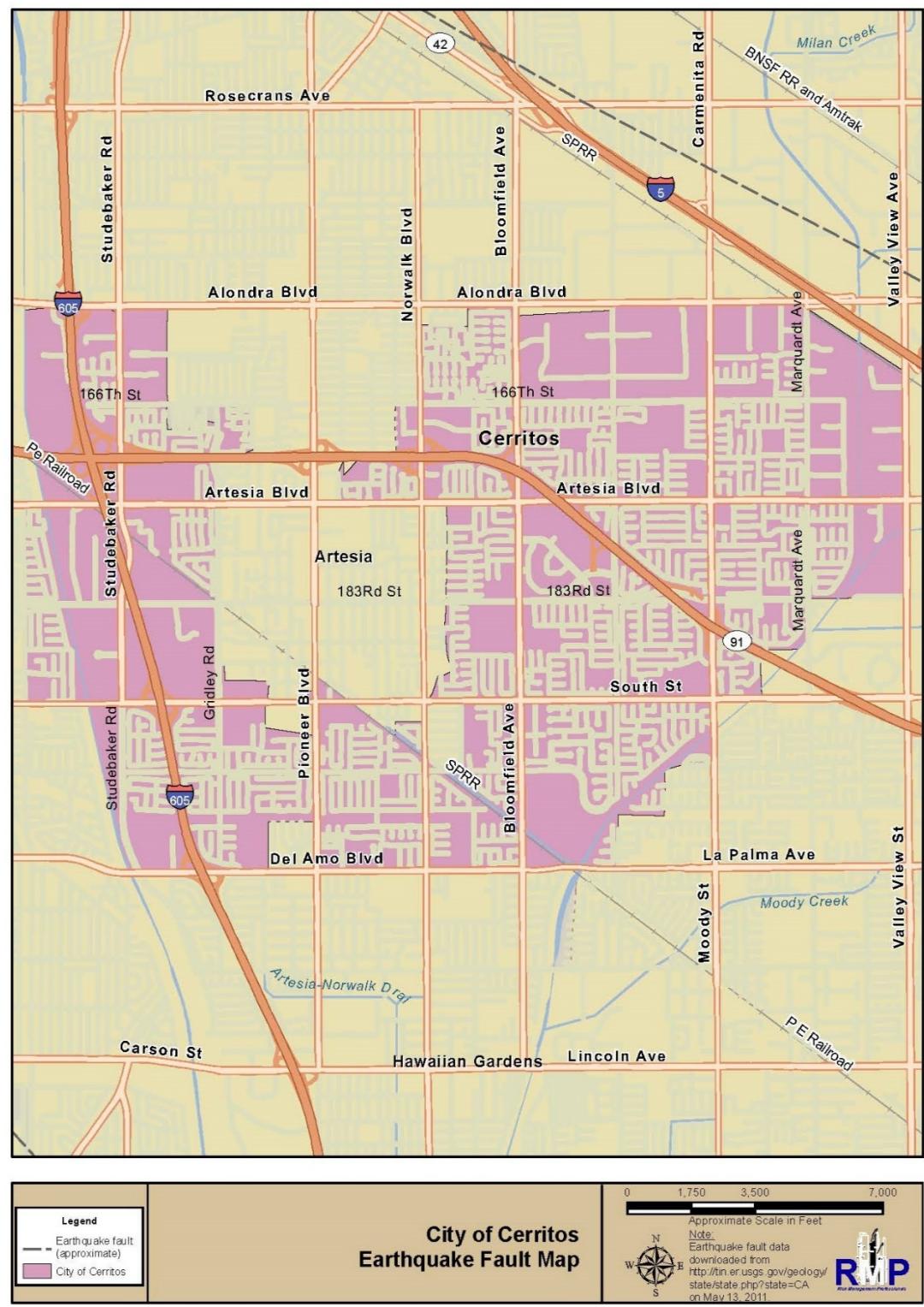


Figure 3.2: City of Cerritos Earthquake Fault Map

The San Andreas Fault

Table 3.7: San Andreas Fault Information

Type of fault:	Right-lateral strike-slip
Length:	1200 kilometers (km)
Nearby Communities:	Parkfield, Frazier Park, Palmdale, Wrightwood, San Bernardino, Banning, Indio
Last Major Rupture:	January 9, 1857 (Mojave segment); April 18, 1906 (Northern segment)
Slip rate:	20-35 millimeters/year (mm/yr)
Interval Between Major Ruptures:	Average of about 140 years on the Mojave segment; recurrence interval varies greatly from under 20 years (at Parkfield only) to over 300 years
Probable Magnitudes:	6.8 to 8.0
Distance and Direction from City:	Approximately 70 miles east

This fault marks the boundary between the North American and Pacific tectonic plates and is capable of producing earthquakes in the magnitude 8+ range. It has been scientifically determined through a carbon dating process that a major earthquake on this fault has occurred approximately every 145 years plus or minus 20 years. The last major earthquake on the Mojave segment of the fault occurred in 1857 (158 years ago as of 2015). The San Andreas Fault is considered one of the most active faults in the world today, and a major earthquake up to an 8.3 magnitude is expected to occur again within the next 20 years. The Fault traverses the Southern California region and is located approximately 70 miles east of the City. The ground shaking of an 8.3 magnitude earthquake on the Southern San Andreas Fault would result in serious damage in Southern California, including the City of Cerritos.

The Newport-Inglewood Fault

Table 3.8: Newport-Inglewood Fault Information

Type of fault:	Right-lateral; local reverse slip associated with fault steps
Length:	75 km

Nearby Communities:	Culver City, Inglewood, Gardena, Compton, Signal Hill, Long Beach, Seal Beach, Huntington Beach, Newport Beach, Costa Mesa
Last Major Rupture	March 10, 1933, M_w 6.4
Slip rate:	0.6 mm/yr
Interval Between Major Ruptures:	Unknown
Probable Magnitudes:	6.0-7.4
Distance and Direction from City:	Approximately 8 miles southwest

The Newport-Inglewood Fault is considered the second most active fault in California. It runs from the City of Inglewood through the City of Huntington Beach and out into the Pacific Ocean in the Newport Beach area. At its closest point, the fault lies about 8 miles southwest of the City. This fault is capable of producing earthquakes in the range of 6.3 to 7.5 magnitude. The 6.5 magnitude, 1933 Long Beach earthquake, occurred on the Newport-Inglewood fault causing 120 deaths and severe damage. Unreinforced masonry buildings collapsed leaving people trapped beneath the rubble.

Earthquakes are to be considered a major threat to the City. When scientists refer to the San Andreas Fault, they often call it "The Big One." In 1990, the Los Angeles Times newspaper did a series of articles on the Newport-Inglewood Fault and described it as "The Bigger One." Both faults would cause considerable damage; however, a 7.5 magnitude Newport-Inglewood earthquake could be more severe to the City of Cerritos than an 8.3 on the San Andreas due to the fault's proximity to the City. The cost estimates of damage are much greater for the Newport-Inglewood worst-case scenario than the San Andreas worst-case scenario.

Whittier-Elsinore Fault

Table 3.9: Whittier-Fault Information

Type of fault:	Right-lateral strike-slip with some reverse slip
Length:	40 km
Nearby Communities:	Yorba Linda, Hacienda Heights, Whittier

Most Recent Surface Rupture	Holocene
Slip rate:	Between 2.5 and 3.0 mm/yr
Interval Between Major Ruptures:	Unknown
Probable Magnitudes:	6.0-7.2
Distance and Direction from City:	Approximately 10 miles northeast

The Whittier Fault runs along the Chino Hills range between Chino Hills and Whittier. Earthquakes with surface rupture on the Whittier Fault are estimated to have return intervals for a M6.5 and M7.5 of 100 and 1,200 years, respectively. An unpublished paleoseismic investigation suggests that the Whittier segment has not moved for 2,000 years. Since the average interval between major characteristic (extreme) events on the Whittier segment is estimated to be on the order of 1,200 years, the fault is considered long overdue. The Whittier fault joins the Chino Fault near Prado Dam where they merge into the Elsinore Fault.

Table 3.10: Elsinore Fault Information

Type of fault:	Right-lateral strike-slip
Length:	180 km
Nearby Communities:	Temecula, Lake Elsinore, Julian
Last Major Rupture	May 15, 1910; Magnitude 6.0
Slip rate:	Roughly 4.0 mm/yr
Interval Between Major Ruptures:	Roughly 250 years
Probable Magnitudes:	6.5-7.5
Distance and Direction from City:	Approximately 10 miles northeast

The Elsinore Fault trends along the eastern base of the Santa Ana Mountains and is one of the largest in Southern California, and in historical times, has been one of the quietest. The main trace of the Elsinore Fault has only seen one historical event greater than magnitude 5.2, which was the M6.0 Elsinore Earthquake of 1910.

At the northern end, the fault splays into several faults, creating the Whittier-Elsinore Fault Zone about 10 miles northeast of the City. A “characteristic” Magnitude M6.9 on the northwest segment of the Whittier-Elsinore Fault Zone has been estimated to have a return period of 450 years. This “characteristic” earthquake would be expected to cause ground movement on the order of 3 to 6 feet, with peak horizontal ground accelerations up to one multiplier of gravity (1 g). Most structures built prior to 1997 were designed to withstand peak ground accelerations, described in further detail below, of up to 0.4 g, so a “characteristic” earthquake along this fault zone would have devastating consequences.

Palos Verdes Fault

Table 3.11: Palos Verdes Fault Information

Type of fault:	Right-reverse
Length:	Roughly 80 km
Nearby Communities:	San Pedro, Palos Verdes Estates, Torrance, Redondo Beach
Most recent surface rupture:	Holocene offshore; Late Quaternary onshore
Slip rate:	Between 0.1 and 3.0 mm/yr
Interval between major ruptures:	Unknown
Probable magnitudes:	6.0 – 7.0 (or greater); fault geometries may allow only partial rupture at any one time.
Distance and Direction from City:	

The Palos Verdes Hills Fault is capable of a 6.0 to 7.0 magnitude earthquake. It has two main branches and continues southward as the Palos Verdes-Coronado Bank Fault Zone.

This fault is located off the coast of Redondo Beach and Torrance, and continues southward through the Palos Verdes peninsula and offshore, outside the San Pedro Bay. The issue of concern is the fault causing shaking and liquefaction within the City of Cerritos.

Peak Ground Acceleration

Peak Ground Acceleration (PGA) mapping represents peak horizontal acceleration of the ground on firm-rock conditions. The approach of representing peak horizontal ground acceleration on firm-rock is a common and widely used method of showing ground accelerations. The development of probabilistic acceleration maps are a result of three types of basic input parameters:

- 1) Attenuation of ground shaking with distance from the earthquake source;
- 2) Frequency of earthquakes within an area or region, termed recurrence; and
- 3) The character and extent of regions and faults that generate earthquakes.

According to the following Peak Ground Acceleration Map, the City of Cerritos is located in an area that will experience a PGA ranging from 0.50 g to 0.70 g with 10% exceedance in 50 years (0.0021 annual probability).

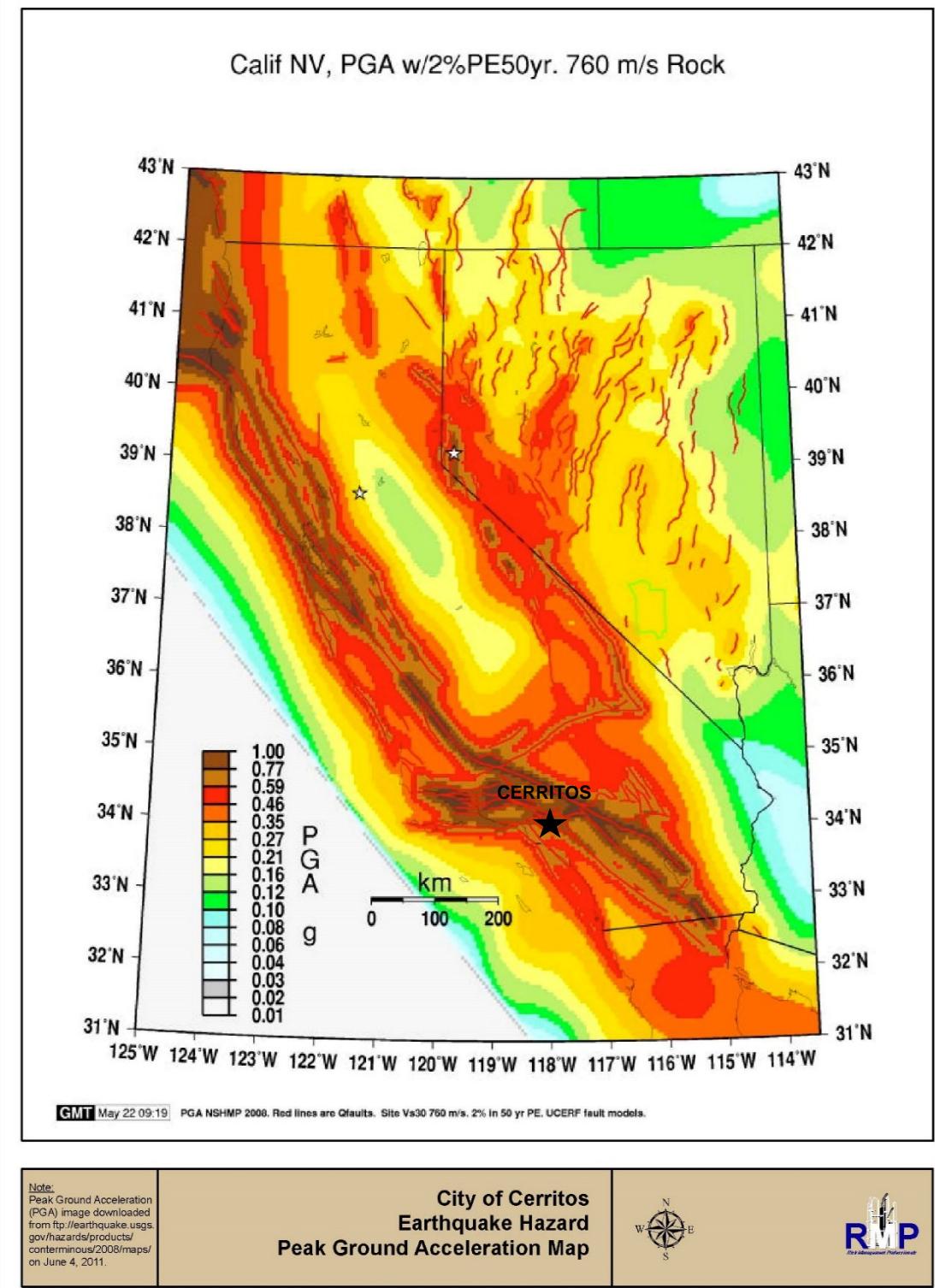


Figure 3.3: City of Cerritos Peak Ground Acceleration Map

According to Table 3.12 below (provided by the United States Geographic Survey), this PGA Value is typically associated with a 6.9 magnitude earthquake. Thus, there is a 0.21% annual possibility of a 6.9 magnitude earthquake affecting the City of Cerritos

Table 3.12: Mercalli Intensity and Corresponding Peak Group Acceleration

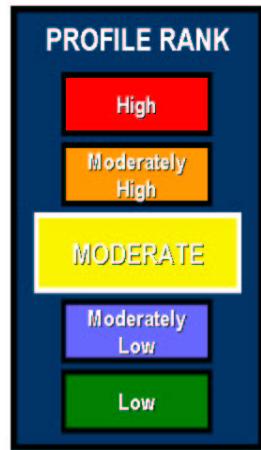
Mercalli Intensity	Richter Intensity	Acceleration (%g)	Velocity (cm/s)	Perceived Shaking	Potential Damage
I	3.5	< 0.17	< 0.1	Not Felt	None
II-III	4.2 – 4.3	0.17 - 1.4	0.1 - 1.1	Weak	None
IV	4.8	1.40 – 3.9	1.1 - 3.4	Light	None
V	4.9 – 5.4	3.9 - 9.2	3.4 - 8.1	Moderate	Very light
VI	5.5 – 6.0	9.2 - 18	8.1 - 16	Strong	Light
VII	6.1	18 - 34	16 - 31	Very Strong	Moderate
VIII	6.2	34 - 65	31 - 60	Severe	Moderate to Heavy
IX	6.9	65 - 124	60 - 116	Violent	Heavy
X+	> 7.0	> 124	> 116	Extreme	Very Heavy

The City has been impacted by earthquakes numerous times over the years. Typical of many locations in Southern California, seismic building standards have prevented these earthquakes from causing any severe damage within the City. However, as noted above, the potential for a large scale earthquake is possible. Given the frequency, and likelihood, of earthquake occurrences in the area coupled with the possibility for a large scale scenario, the City has ranked earthquakes as the hazard with highest vulnerability for the City.

3.4 Urban Fire Hazard Profile

Urban Fire Risk Assessment Summary

Risk Rank: Moderate

Probability/ Frequency:	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	 <p>The graphic is a vertical stack of five colored boxes. From top to bottom: a red box labeled 'High', an orange box labeled 'Moderately High', a yellow box labeled 'MODERATE' (in bold), a purple box labeled 'Moderately Low', and a green box labeled 'Low'. The word 'PROFILE RANK' is centered above the stack.</p>
Consequence/ Severity:	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	18	

3.4.1 Hazard Information and Background

Fire is a rapid oxidation process that can lead to uncontrolled burning, exposing and possibly consuming structures. Fires often spread quickly, and are usually signaled by dense smoke that may fill the area for miles around. Fires can be human-caused through acts such as arson or can be caused by natural events such as lightning. Fires are typically classified according to the following categories:



- **Urban fires** are primarily those associated with structures and the activities in and around them.
- **Wildland fires** occur in forests or other generally uninhabited areas and are fueled primarily by natural vegetation.

- **Urban Interface fires** occur where development and forest interface, with both vegetation and structures providing fuel, and are sometimes referred to as urban-wildland interface fires.

The following factors contribute significantly to aforementioned fire behavior.

- **Slope/Topography:** As slope increases the rate of fire spread increases. In the northern hemisphere, south facing slopes are also subject to greater solar radiation, making them drier and thereby intensifying fire behavior.
- **Fuel:** Weight and volume are the two methods of classifying fuel, with volume also referred to as fuel loading. Each fuel is assigned a burn index (the estimated amount of potential energy released during a fire), an estimate of the effort required to contain a fire, and an expected flame length.
- **Weather:** Variations in weather conditions have a significant effect on the occurrence and behavior of fires.

Firestorms that occur during extreme weather (e.g., high temperatures, low humidity, and high winds) have high intensity, which makes fire suppression virtually impossible. These events typically burn until the conditions change or the fuel is exhausted. Even small fires can threaten lives and resources and destroy properties. It is also important to note that, in addition to affecting people, fires may severely affect livestock and pets. Such events may require the emergency watering/feeding, shelter, evacuation, and even burying of animals.

Fire Secondary Events

The aftermath of a fire can be as disastrous, if not more so, than the fire. A particularly destructive fire burns away plants and trees that prevent erosion. If heavy rains occur after such a fire, landslides, ash flows, and flash floods can occur. This can result in property damage outside the immediate fire area, and can affect the water quality of streams, rivers, and lakes.

Fire as a Secondary Event

In addition to typical ignition sources for fires, earthquakes and floods have the potential to rupture buried gas lines, and high winds or accidents could cause overhead electric lines to break, creating ignition sources for fires. Catastrophic earthquakes could cause widespread urban fires, as multiple gas and electrical lines could be broken or disrupted.

3.4.2 Urban Fire Hazard History

Los Angeles County is well known as one of the world's great urban centers, but the county is also home to the 655,000-acre Angeles National Forest and a large portion of the Santa Monica Mountains National Recreational Area. Thousands of homes are located in foothill communities near these great natural areas, creating unique challenges for local fire agencies.

The most recent major fire in Los Angeles County started in Valencia, California in June 2013. The Magic Fire was a brushfire that burned 149 square miles. While the City of Cerritos and its surrounding cities are urbanized, it is possible for brush fires to spread and pose a threat to the area.



Table 3.13 provides a selection of recent fires in Los Angeles County and is taken from the California Department of Forestry and Fire Protection historical fire archives.

Table 3.13: Los Angeles County Historical Fires (2001-2013)

Fire Name	Date	Description
Topanga Fire	9/28/2005	The Topanga Fire burned 24,175 acres in the Chatsworth area.
Empire Fire	7/22/2006	The Empire Fire burned 1,094 acres on Catalina Island near the airport.
Quail Fire	8/13/2006	The Quail Fire burned 4,864 acres near the northbound Interstate 5 at Quail Lake Road in Gorman.
Cross Fire	8/28/2006	The Cross Fire burned 665 acres near Placerita Canyon Road and Sand Canyon Road in Santa Clarita.
Pines Fire	9/19/2006	The Pines Fire burned 113 acres in the Angeles National Forest near the Angeles Forest Highway and Angeles Crest Highway Junction.
Island Fire	5/10/2007	The Island Fire burned 4,750 acres near Avalon on Catalina Island.
Gorman Fire	5/19/2007	The Gorman Fire burned 2,500 acres at the edge of Los Padres National Forest.
Canyon Fire	7/7/2007	The Canyon Fire burned 815 acres near Agua Dulce Canyon and 14 Freeway.
North Fire	9/2/2007	The North Fire burned 2,200 acres 6 miles southwest of Acton in the Angeles National Forest.

Fire Name	Date	Description
Ranch Fire	10/20/2007	The Ranch Fire burned 58,401 acres near Townsend Peak southwest of Templin Highway and Interstate 5.
Buckweed (Agua Dulce) Fire	10/21/2007	The Buckweed (Agua Dulce) Fire burned 38,000 acres near Mint Canyon Road and Sierra Highway.
Canyon Fire	10/21/2007	The Canyon Fire burned 4,521 acres in the Malibu Canyon south of the Pacific Coast Highway.
Magic Fire	10/22/2007	The Magic Fire burned 2,824 acres near the Magic Mountain Parkway and The Old Road.
Corral Fire	11/24/2007	The Corral Fire burned 4,901 acres near Malibu Creek State Park.
Santa Anita Fire	4/26/2008	The Santa Anita Fire burned 584 acres in the mountains above the cities of Sierra Madre and Arcadia in the Angeles National Forest.
Big Horn Fire	5/13/2008	The Big Horn Fire burned 490 acres North of Mt. Baldy Village near Claremont.
Sesnon Fire	10/13/2008	The Sesnon Fire burned 14,703 acres in the Porter Ranch Community, Twin Lakes and Indian Hills area.
Marek Fire	10/28/2008	The Marek Fire burned 4,824 acres near the West Side Little Tujunga Canyon.
Sayre Fire	11/14/2008	The Sayre Fire burned 11,262 acres near Sylmar.
Osito Fire	7/15/2009	The Osito Fire burned 304 acres north of Castaic in the Angeles National Forest.
Morris Fire	8/25/2009	The Morris Fire burned 2,168 acres by San Gabriel Canyon near Morris Dam.
Station Fire	8/26/2009	The Station Fire burned 160,577 acres over 3 weeks by Highway 2, 1.5 miles north of USFS Angeles Crest Station.
PV Fire	8/27/2009	The PV Fire burned 235 acres near Rancho Palos Verdes.
Crown Fire	7/29/2010	The Crown Fire burned 14,000 acres over 6 days, north of Sierra Highway at Anthony Road, southwest of Palmdale.
Mint Fire	9/17/2011	The Mint Fire burned 634 acres near the Sierra Highway at Mint Canyon Road, north of Agua Dulce.

Fire Name	Date	Description
5 Mile Fire	7/6/2012	The 5 Mile Fire burned 525 acres off the I-5, north of Parker Road near Castaic.
Lake Fire	05/28/2013	The Lake Fire burned 712 acres off the southbound I-5 and Lake Hughes Road.
Magic Fire	6/10/2013	The Magic Fire burned 149 acres around Magic Mtn Parkway in Valencia.
Hunters Fire	6/2/2014	The Hunters Fire burned 677 acres near the southeast shore of Lake McClure.
Gulch Fire	9/10/2014	The Gulch Fire burned 1,375 acres east of Bella Vista.
Black Fire	9/13/2014	The Black Fire burned 403 acres north of Lake Mendocino.
Highway Fire	4/18/2015	The Highway Fire burned 1,049 acres near Prado Basin.
Park Hill Fire	6/20/2015	The Park Hill Fire burned 1,791 acres east of Santa Margarita.
Swedes Fire	7/29/2015	The Swedes Fire burned 400 acres off Swedes Flat Road, 3 miles north of Bangor.

3.4.3 Urban Fire Hazard Probability, Frequency, and Magnitude

Since the City of Cerritos consists of urban terrain, the expected type of fire is an urban fire. Urban fires often consume buildings with the potential to spread to adjoining buildings; however major urban fires are highly unlikely.

Wildfires are a major environmental hazard that have historically cost California more than \$800 million each year and contribute to "bad air days" throughout the state. Heat and smoke from fires can be more dangerous than the flames. Inhaling the smoke can sear the lungs, and fire also produces poisonous gases that cause disorientation and drowsiness, eventually leading to asphyxiation. As a result, asphyxiation is the leading cause of fire deaths, exceeding burns by a three-to-one ratio.

While the City has never experienced a large scale fire, the Steering Committee included urban fire as an identified hazard after considering the following factors. Currently,

California is experiencing a severe drought. Water conservation is imperative to ensure a reliable water source. As a result, water restrictions for landscaping have left much of the plant life dry and more susceptible to fire. Should drought conditions continue, the City's vulnerability will only increase. During a Steering Committee meeting, the Committee discussed Fire response times and determined they would likely be sufficient to control most fires occurring within the City. Figure 3.5 on the following page illustrates the fire threat to the City of Cerritos. As shown in the figure, the expected fire hazard is low.

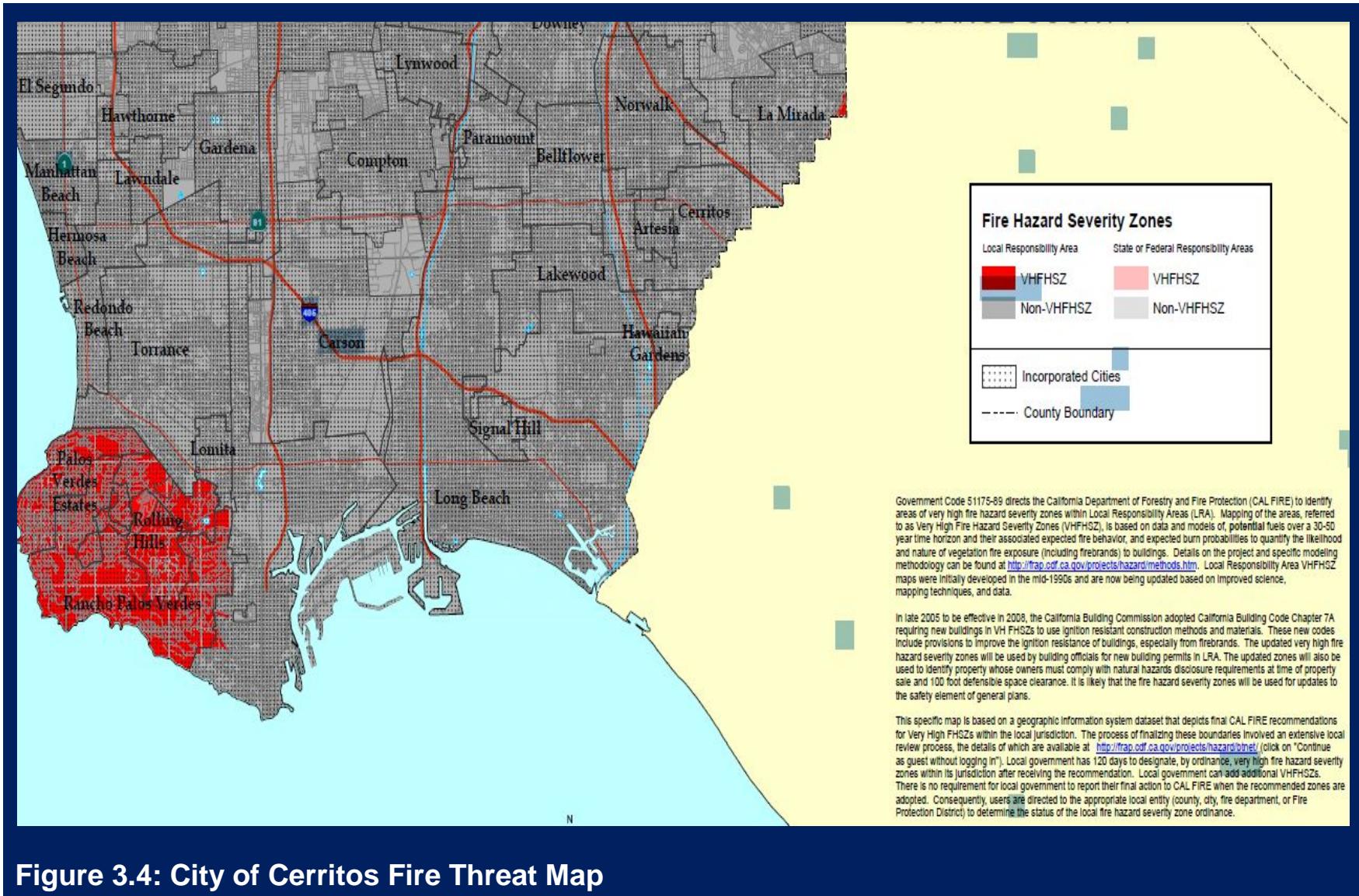
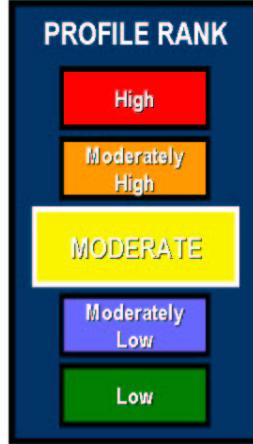


Figure 3.4: City of Cerritos Fire Threat Map

3.5 Transportation Accident/ Incident Hazard Profile

Transportation Accident/ Incident Risk Assessment Summary

Risk Rank: Moderate

Probability/ Frequency:	Rare event - occurs less than once every 50 years	 <p>The scale shows five levels of risk from High (red) to Low (green). The 'Moderate' level is highlighted in yellow.</p> <table border="1"><tr><td>High</td></tr><tr><td>Moderately High</td></tr><tr><td>Moderate</td></tr><tr><td>Moderately Low</td></tr><tr><td>Low</td></tr></table>	High	Moderately High	Moderate	Moderately Low	Low
High							
Moderately High							
Moderate							
Moderately Low							
Low							
Consequence/ Severity:	Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability						
Vulnerability:	Moderate damage area, moderate secondary impacts, moderate warning time						
Hazard Risk Rank Score:	16						

3.5.1 Transportation Accident/ Incident Hazard Information and Background

Roadway Incident

Freeway accidents occur very frequently in the Los Angeles County region. In the last few years, California has averaged about 3,000 freeway accident related deaths annually. Major local transportation routes include Interstates 5 and 605, and California State Route 91, creating local traffic congestion and increasing the potential for transportation accidents in the City of Cerritos.

Railway Incident

In addition to freeway accidents, a number of freight trains travel near the northeast border of the City hauling various types of hazardous materials. A major train derailment that occurs in a heavily populated industrial area could result in significant damage and potential loss of life. Both freeway and rail accidents can be a further hazard if the impacted vehicles

are transporting hazardous materials. As noted in the hazardous material release hazard profile, accidents in these cases can result in hazardous materials releases.

Airborne Incident

The City is also located in the flight path to the Los Angeles International Airport (LAX). With a high volume of flights over the City, there is the potential for airborne accidents as was experienced by the City in August 1986 when Aeromexico DC-9 Flight 498 collided with a single-engine Piper Archer 6,500 feet above a residential area. More detailed information about the incident can be found in the following section. Daily air traffic creates the potential for hazard events to occur in the skies over the City.

3.5.2 Transportation Accident/ Incident History

The City of Cerritos is located in close proximity to several busy highways and railways. According to the Federal Highway Administration, California had the most people fatally injured in motor vehicle crashes in 2009. Table 3.20, taken from the National Highway Traffic Safety Administration, presents recent traffic fatalities in California.

Table 3.14: Traffic Fatalities in California

	2007	2008	2009	2010	2011	2012	2013
Rural	1,496	1,324	1,320	1,162	1,190	1,181	1,166
Urban	2,499	2,110	1,770	1,558	1,626	1,676	1,834
Total	3,995	3,434	3,090	2,720	2,816	2,966	3,000

Cerritos Air Disaster

On August 31, 1986, Aeromexico DC-9 Flight 498 collided with a single-engine Piper Archer at 6,500 feet above the City at about 11:52 AM. The collision sent the smaller airplane into an empty playground at Cerritos Elementary School while the larger DC-9 crashed into a residential neighborhood at Holmes Avenue and Reva Circle. All 67 of the passengers and crew aboard each of the aircraft, along



with 15 citizens on the ground, died in the aftermath with an additional eight injured. As a result of the accident, the aviation industry changed and now requires anti-collision instruments in jetliners. In addition, smaller airplanes must now carry Mode C transponders that broadcast altitudes to air traffic controllers. The accident also pushed forward the idea of providing mental health support to victims and first responders which is a concept now practiced at a national level. Still, aircrafts pass over the City daily, which presents the potential for future incidents.

3.5.3 Transportation Accident/ Incident Probability, Frequency, and Magnitude

Due to the high volume of commuter traffic traveling through the streets, freight transportation on the railways, and air traffic in the skies above the City of Cerritos, there is a high potential for a transportation accident. In the event of a major incident, roadways could be populated by vehicles carrying hazardous chemicals and flammable materials, which could create the potential for fire, hazardous material releases, and other harmful events. As the City has already experienced, the aftermath of an airborne incident could be devastating to the community resulting in extensive property damage and loss of lives.

Figure 3.12 on the following page depicts the transportation routes for the City of Cerritos and the potential areas for freeway-related accidents.

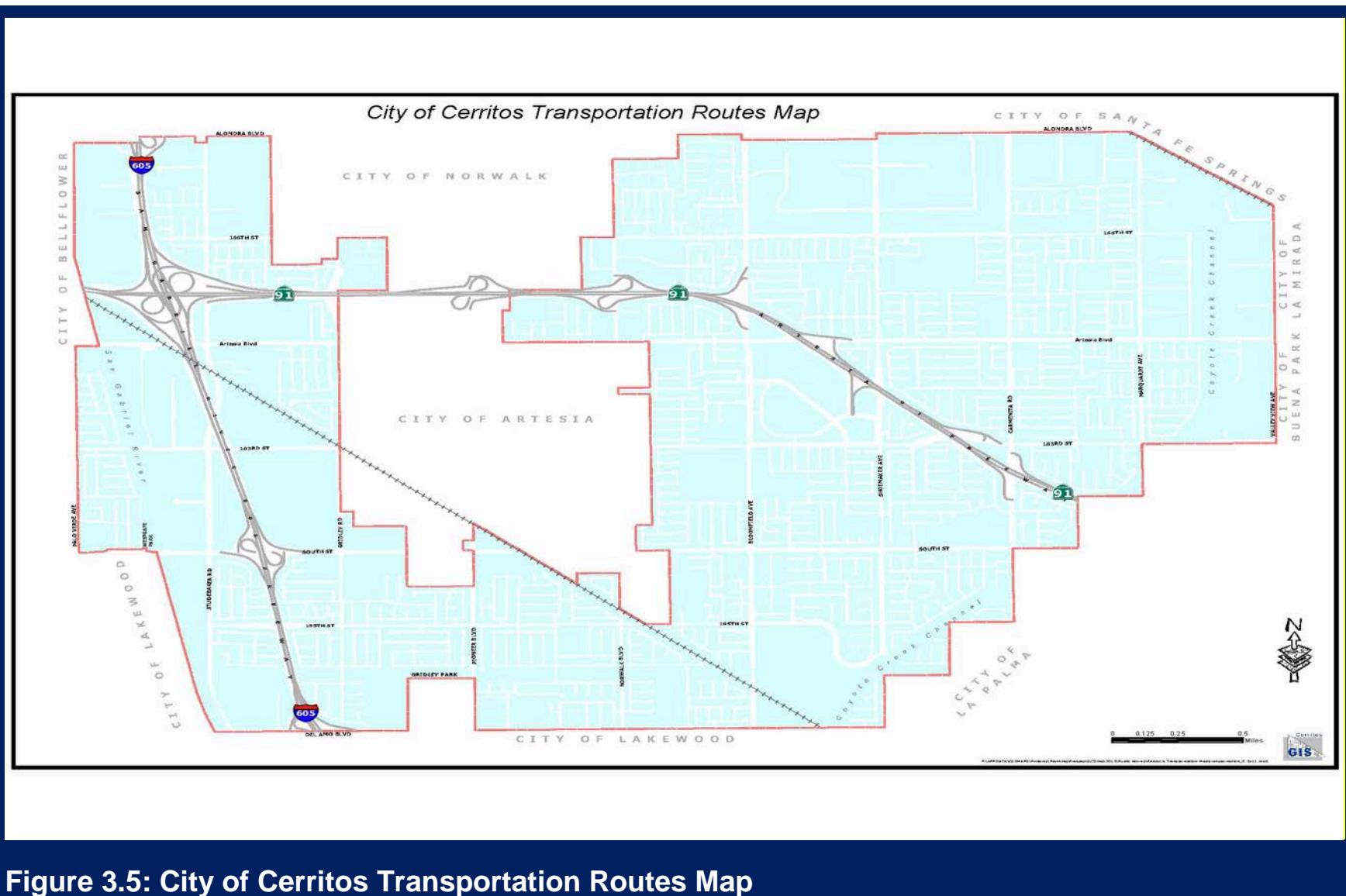


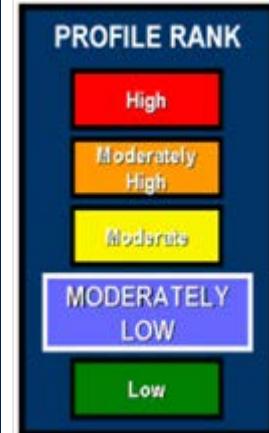
Figure 3.5: City of Cerritos Transportation Routes Map

3.6 Flood/ Dam Failure Hazard Profile

Flood/ Dam Failure Risk Assessment Summary

Risk Rank: Moderately Low

Probability/	Rare event - occurs less than once every
Frequency:	50 years
Consequence/ Severity:	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability
Vulnerability:	Moderate damage area, moderate secondary impacts, moderate warning time
Hazard Risk Rank Score:	12



3.6.1 Flood/ Dam Failure Hazard Information and Background

According to the National Flood Insurance Program (NFIP), flood is the most common type of disaster including both man made and naturally occurring incidents in the United States. Land along rivers, streams, lakeshores, and coastlines are particularly susceptible to flooding.

The primary responsibility of the local governments during widespread flooding is to protect public safety. The second responsibility is protection of the environment followed by property such as highways, streets, bridges, and structure protection.

The types and causes of flooding that can occur within the City of Cerritos are the result of:

- Heavy rains,
- Dam failure,
- Flood control channel overflow,

- Waste water flooding within residences as a result of lift station failures,
- Coastal, tropical, and/or hurricane storms, and
- Accidents such as reservoir leaks and water main breaks.

Due to light annual rain fall and the City's location on the flood plain protecting it from channel overflow, dam failure is the most likely cause of flooding with the City of Cerritos.

What are Floods?

A flood occurs any time a body of water rises to cover what is usually dry land. Floods have many causes, including heavy rains, spring snowmelt, coastal storms, and dam or levee failure. When flooding occurs, affected areas may sustain damage to structures and personal property, as well as severe damage to the environment in the form of soil erosion, deforestation and damage to utilities and transportation systems.

Floods can take several hours to days to develop. The following flood characterization designates the amount of time for response.

- **Flood Watch** – a flood is possible in the area.
- **Flood Warning** – flooding is already occurring or will occur soon in the area.
- **Flash Flood Watch** – a flash flood is possible in the area. Those affected should seek immediate shelter or higher ground.
- **Flash Flood Warning** – flooding is already occurring or will occur soon in the area. Flash floods can occur without warning, during heavy rain in mountainous regions ensure that precautions and flash flood warnings are adhered to.

Alluvial Fan Flooding

Alluvial fan flooding occurs in the steep arid or semiarid mountains found throughout California. Alluvial fans are fan-shaped deposits of eroded rock and soil carried out of mountains and into valley floors by landslides, mudslides, mudflows, and surface runoff. At the beginning of the valley, alluvial fans are steep and narrow with boulders and other coarse material. The deposited material becomes increasingly fine as the gradient decreases and the material, mainly gravel, sand and mud, spreads.

When rain falls, runoff from the canyon walls flows as a high-velocity sheet that channels into rivulets, and then to natural drainage courses. The rapidly moving water often carries large boulders and other material from the watershed depositing them into runoff channels, blocking the flow of water. Floodwater then spills out onto the fan, with each event finding

a new channel that soon fills up with deposits and overflows. Flooding in alluvial fans often can cause greater damage than clear-water flooding.

Flash Flooding

A flash flood is a rapid flooding of low-lying areas, rivers and streams that is caused by the intense rainfall associated with a thunderstorm or multiple thunderstorms. Flash floods also occur when a man-made structure, such as a dam, collapses. Flash flooding occurs when the ground under a storm becomes saturated with water so quickly that it cannot be absorbed. The runoff collects in low-lying areas and flows rapidly downhill. As a result, anything in its path is suddenly in rising water. Typically, flash floods begin with a slow moving thunderstorm. A slow moving thunderstorm usually takes longer to move out of the affected areas and causes the area to endure a greater amount of rainfall for a longer period of time. In addition, a thunderstorm may pass over an affected area repeatedly, dumping even more rainfall.

The heavy rainfall associated with these storm systems contributes to urban flooding in a number of ways. Primarily, heavy rainfall will often overwhelm the capacity of the conventional drainage system made up of storm drains, catch basins, sewers, and additional natural mechanisms for storm-water management. These systems typically cannot handle more than one or two inches of rainfall per hour before they begin to backup and overflow. This amount is further diminished if the storm drains, and other components of the storm-water management system, have not been adequately maintained, are clogged with debris such as trash or natural waste, or are old and in a state of disrepair. Heavy rainfall, combined with storm-water runoff, can cause local waterways to rise and overflow their banks.

3.6.2 Flood/ Dam Failure History

A flood event in Los Angeles County can range from a few isolated areas where a number of streets are flooded preventing temporary access to homes and businesses, to numerous homes inundated with several feet of water causing millions of dollars of damage. Floods in the City of Cerritos area can cause extensive damage to residential and business properties, parks and recreational facilities, road and highway infrastructure, and critical utility facilities.

To indicate the potential for a flooding event, Table 3.15 below, taken from National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center, lists an excerpt of large-scale flooding events that have resulted in damage within Los Angeles County.

Table 3.15: Historical Flooding Damage in Los Angeles County

Date	Injuries	Fatalities	Property Damage (\$)	Crop Damage (\$)
2/17/1994	1	0	0	0
2/20/1994	0	0	50,000	0
1/04/1995	0	1	50,000,000	0
1/10/1995	0	0	500,000	0
2/07/1998	0	3	0	0
10/20/2004	0	1	0	0
1/09/2005	0	1	0	0
1/11/2005	0	0	2,000,000	0
2/20/2005	0	0	1,000,000	0
12/21/2005	1	0	0	0
9/22/2007	0	0	300,000	0
11/26/2008	0	0	10,000	0
1/19/2010	0	0	0	3,000,000
10/11/202	0	0	0	0
2/28/2014	0	0	0	0

Historical Flooding Events

Los Angeles County Flood of 1938

According to the Suburban Emergency Management Project, the Los Angeles County Flood of 1938 was caused by two oceanic storms that swept through the Los Angeles Basin to the San Gabriel Mountains in late February and early March of 1938. Rainfall from the two storms totaled nearly 9.5 inches over a three-day period, resulting in a large natural disaster. The flood was responsible for destroying 5,601 homes, damaging another 1,500, and killing nearly 110 people. The Los Angeles River reached a maximum flow rate of 130,000 cubic

feet per second. As a result, the U.S. Army Corps of Engineers channelized the local rivers and built more flood control dams.



The above photographs are courtesy of California State University Northridge. The photograph on the left illustrates flooding of the Los Angeles River along Victory Blvd. The photograph on the right illustrates the levee failures along the Los Angeles River.

Historical Dam Failure Events

As stated previously, the most likely cause of flood within the City would be dam failure. The City has never been impacted by a dam failure. However, there have been a total of 45 dam failures in California's history. Failures have occurred for a variety of reasons. According to the United States Bureau of Reclamation, overtopping accounts for 30 percent of all dam failures in the United States in the last 75 years. Other dams have failed due to specific shortcomings in the dam itself or an inadequate assessment of the surrounding geomorphologic characteristics. The first notable dam failure occurred in 1883 in Sierra County, while the most recent failure occurred in 1965. The greatest catastrophe relating to California dam failures was William Mulholland's infamous St. Francis Dam, which failed in 1928 and resulted in a major disaster. Because of this failure and the exposure to potential risk to the general populace from a number of water storage dams in California, the Legislature in 1929 enacted legislation providing for supervision over non-federal dams in the State. Before the enactment of this legislation, either the State Engineer or the State Railroad Commission exercised State supervision over dams. This supervision was limited in scope and extended to less than half of the dams in the State.

The statute enacted in 1929 provided for:

- examination and approval or repair of dams completed prior to the effective date of the statute, August 14, 1929,
- approval of plans and specifications, and supervision of construction of new dams, and of the enlargement, alteration, repair, or removal of existing dams, and
- supervision over maintenance and operation of all dams of jurisdictional size.

Overall, there have been at least 460 deaths from dam failures in California. These failures are outlined in Table 3.16.

Table 3:16: Dam Failure Events in California

Year Failed	Dam	Location	Cause of Failure/Deaths
1883	English	Sierra County	Dam crumbles to foundations, decay of timber used
1892	Long Valley Creek	San Jacinto	Heavy rains, dam carried away by flood
1895	The Angels	Calaveras County	Undetermined during flood, poor foundation/ 1 death reported
1896	Vernon Heights	Oakland	Shallow foundation
1898	Snake Ravine	Stanislaus County	Poor compaction
1905	Piedmont No.1	Oakland	Outlet pipe sheared off at core wall
1906	San Andreas	San Mateo County	Crack along axis
1912	Morena	San Diego	Overtopping
1916	Lower Otay	San Diego	Leakage and overtopping due to inadequate spillway
1918	Lake Hodges	San Diego	Cracks in pier
1963	Baldwin Hills	Los Angeles	Leak through embankment turned into washout/ 3 Deaths
1964	Hell Hole	Rubicon River	Failed during construction due to unprecedeted rains
1965	Matilija	Ventura	Bad foundation and concrete disintegrating

Note: Information was taken from UC Davis Civil & Environmental Engineering

3.6.3 Flood/ Dam Failure Probability, Frequency, and Magnitude

The City is not prone to urban flooding and has not experienced a large scale flood event. Figures 3.6 on the following page provides FEMA Flood Insurance Rate Maps (FIRM) for the City of Cerritos, as well as Southern California. According to the maps, the City is located in 500-year flood plains. The 500-year recurrence intervals indicates a 0.002 annual probability of a flooding event.

However, as stated above, there is still the potential for flooding as the result of dam failure. The Whitter-Narrows and Prado dams present the greatest threat based on their distance from the City. Still, it is stated in the City's SEMS Multi-Hazard Functional Plan that is unlikely either Dam would fail during a catastrophic event. Nonetheless, should these dams fail, according to recent estimates, waters from the Whittier-Narrows Dam would reach the City in 15 hours and would be about four feet deep. Waters from the Prado Dam would only take 8.5 hours to reach the City and would be about 7 feet deep.

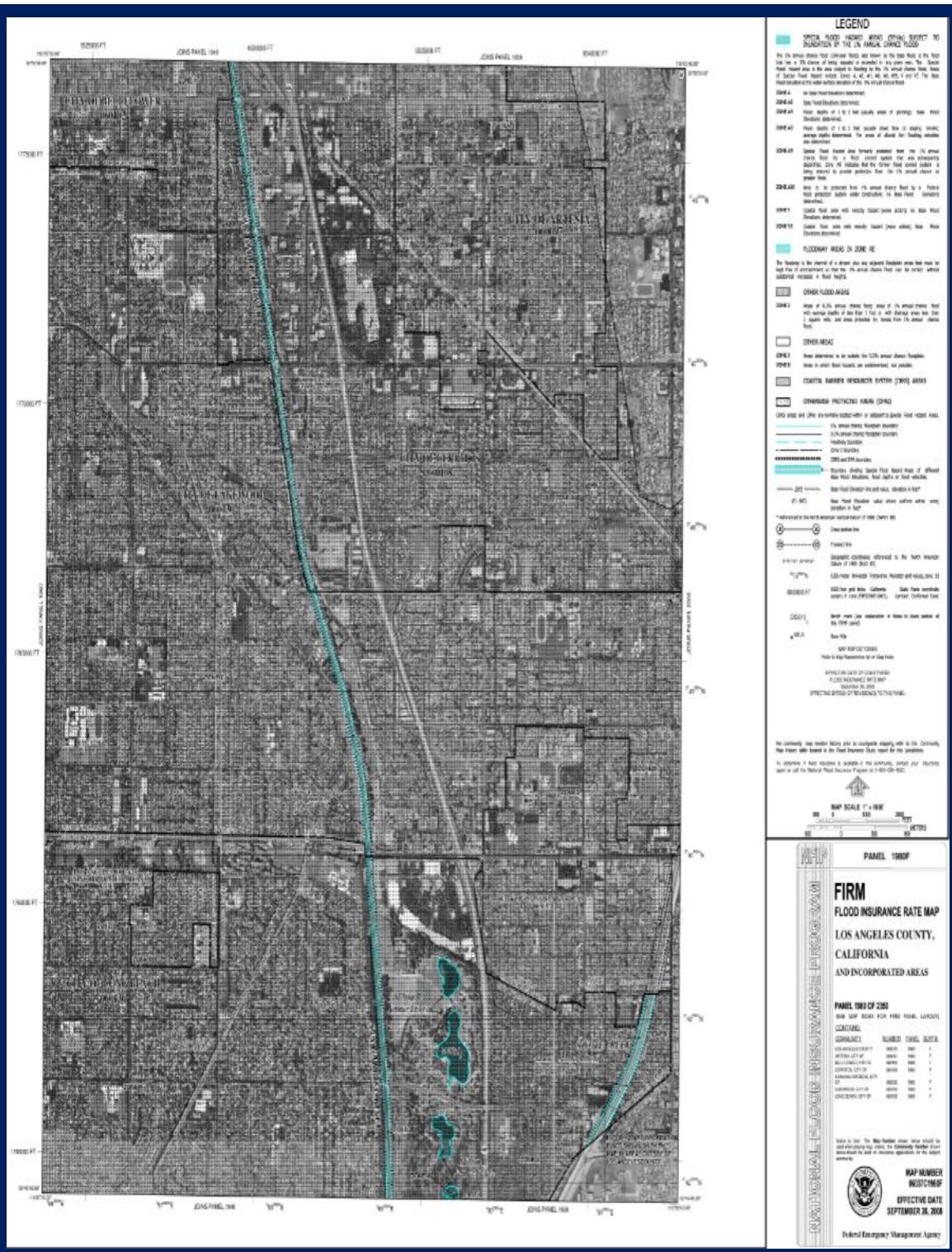
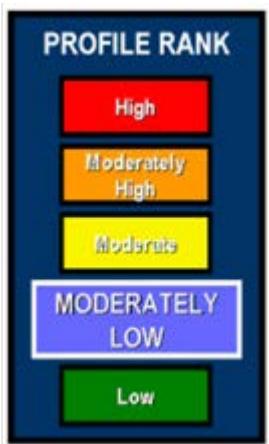


Figure 3.6: City of Cerritos FEMA Insurance Rate Map (FIRM)

3.7 Pipeline Failure/ Hazardous Material Release Hazard Profile

Pipeline Failure/ Hazardous Material Release Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Rare event - occurs less than once every 50 years	 <p>The scale shows five horizontal bars stacked vertically. From top to bottom, the colors are red, orange, yellow, blue, and green. The red bar is labeled 'High'. The orange bar is labeled 'Moderately High'. The yellow bar is labeled 'Moderate'. The blue bar is labeled 'MODERATELY LOW'. The green bar is labeled 'Low'.</p>
Consequence/ Severity:	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	12	

3.7.1 Pipeline Failure/ Hazardous Material Release Information and Background

Hazardous materials include hundreds of substances that can potentially pose a significant risk to the general population if released. These substances may be highly toxic, reactive, corrosive, flammable, radioactive or infectious. They are present in nearly every community in the United States where they may be manufactured, used, stored, transported, or disposed. According to reports obtained through the Toxic Release Inventory (TRI) Program, there are thousands of hazardous material release events annually that contaminate air, soil, and groundwater resources. These events can potentially trigger millions of dollars in clean-up costs, human and wildlife injuries, and occasionally human deaths.

Accidents which result in chemical clouds or release of hazardous materials into public water or sewer systems may affect outlying neighborhoods or the community at large. Depending upon the scale of the release, large segments of the residential and business populations may need to be evacuated quickly for extended periods of time. Effective emergency planning with regard to hazardous materials, therefore, requires the concentrated efforts of the Fire and Police Departments as well as other public safety officials and private organizations such as the Red Cross. Hazardous material releases may occur from any of the following:

Table 3.17: Types of Hazardous Material Incidents

Fixed-Site	Includes all releases involving the production and manufacturing, handling, and storage of a hazardous product at a single facility as well as any releases that may occur at a designated hazardous waste disposal site.
Transportation	Includes all releases that occur while the product is in transit from one facility to another or en route to be disposed of at a designated hazardous waste disposal site, of which the main concerns for the City of Cerritos are the 5, 605, and 91 freeways.
Intentional Spills and Releases	Includes all criminal acts and acts of terrorism in which a hazardous material is used to intentionally cause injuries and/or fatalities, damage the environment and/or property, or advance a political or social agenda. Terrorism and Weapons of Mass Destruction will be discussed in further detail in the Terrorism section of this document.

In response to concerns over the environmental and safety hazards posed by the storage and handling of toxic chemicals, Congress passed the Emergency Planning and Community Right to Know Act (EPCRA) in 1986. To reduce the likelihood of hazardous material releases, EPCRA established specific requirements on federal, state and local governments, Indian tribes, and industry to plan for hazardous materials emergencies. EPCRA's Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities working with facilities can use the information to improve chemical safety and protect public health and the environment. Under EPCRA, hazardous materials must be reported to the Environmental Protection Agency (EPA), even if they do not result in human exposure.

Hazardous material releases may include the following.

- Air emissions (e.g., pressure relief valves, smokestacks, broken pipes, water or ground emissions with vapors)
- Discharges into bodies of water (e.g., outflows to sewers, spills on land, water runoff, contaminated groundwater)
- Discharges onto land
- Solid waste disposals in onsite landfills
- Transfer of wastewater to public sewage plants
- Transfers of waste to offsite facilities for treatment or storage

In addition to accidental human-caused hazardous material events, natural hazards may cause the release of hazardous materials and complicate response activities. The impact of earthquakes on fixed facilities may be particularly damaging due to the impairment of the physical integrity or even failure of containment facilities. The threat of any hazardous material event may be magnified due to restricted access, reduced fire suppression and spill containment, and even complete cut-off of response personnel and equipment.

In recognition of the dangers associated with keeping hazardous substances, the California State legislature has enacted several laws regulating the use and transport of identified hazardous materials. In particular, Chapter 6.95 of the Health and Safety Code requires all businesses using these materials to inform local government agencies of the types and quantities of materials stored on site. This disclosure enables emergency response agencies to respond quickly and appropriately to accidents involving dangerous substances. Chapter 6.95 of the California Health and Safety Code and Title 19 of the California Code of Regulations describe the requirements for chemical disclosure, business emergency plans, and community right to know programs. According to these state requirements, a business that uses or handles hazardous materials in amounts equal to or greater than 55 gallons, 500 pounds or 200 cubic feet at any one time must prepare a business emergency plan and chemical inventory. The inventory must be updated annually and the business plan must be updated every two years. The chapter also has incorporated certain requirements from Federal Superfund Amendments and Reauthorization Act (SARA) Title III for chemicals designated as acutely hazardous. In addition, these regulations apply to industrial accidents, refinery explosions and incidences of high volume releases.

3.7.2 Pipeline Failure/ Hazardous Material Release History

According to the Emergency Response Notifications System (ERNS), there were over 2,143 spills and accidents in California during 2013. As illustrated in Table 3.18 below, the majority of these incidents were caused by mobile vehicles, which represent a threat to the City of Cerritos due to multiple transportation routes that run within the City.

Table 3.18: ERNS Spills and Accidents in California in 2013

Type of Incident	Number of Incidents
Fixed site (e.g., incident at a building)	651
Continuous release	1
Storage tank, drilling platform, or pipeline	176
Unknown sheen on water	313
Mobile vehicle (plane, truck, train, ship, etc.)	1,002
Other or unknown	0
Total	2,143

2012 Richmond Refinery Fire

On August 6, 2012, a piping segment at the Number 4 Crude Unit at a Chevron refinery in Richmond, California, failed, leading to a release of hydrocarbons. The hydrocarbon vapor cloud then ignited, resulting in a large, uncontrolled fire. The fire burned for several hours before being contained later that night. The picture below illustrates the smoke plume from the fire.



Photo taken from a Cal/OSHA presentation on 2/26/2014

Fortunately, there were no fatalities from the fire. According to the final investigation report completed by the United States Chemical Safety and Hazard Investigation Board, over 15,000 residents surrounding the refinery sought medical treatment for respiratory irritation. The incident tied up many local emergency response agencies and also shut down local service for the Bay Area Rapid Transit (BART). Although the 2012 Richmond Refinery Fire did not impact the City, the incident illustrates the potential major impacts to residential areas that a release of this magnitude could have on the City.

3.7.3 Pipeline Failure/ Hazardous Material Release Probability, Frequency, and Magnitude

While the City has never experienced a large scale release, hazardous material emergencies can occur during transportation and all major highways are susceptible to releases of toxic and flammable chemicals. While the City has taken measures to reduce the potential for hazardous materials events, Interstates 5 and 605, and California State Route 91 are still located in and around the City. Due to the volume of traffic and the nature of the materials transported, there is a risk of a hazardous material leak or spill within the City. The ongoing use, production, and transportation of hazardous materials in and through the City pose constant and real threats to the safety of the community. An

accidental release of a hazardous substance into the environment has the potential to cause localized or widespread upset.

While there is currently no mechanism to assign a true probability of a fixed-site or transportation hazardous material emergency, it is important to consider a relatively high likelihood of occurrence and conduct planning and training accordingly. Figure 3.7 provides an overview of the transportation corridors throughout the City of Cerritos, including Interstates 5 and 605, and the 91 freeway, which are considered major shipping and transportation routes.

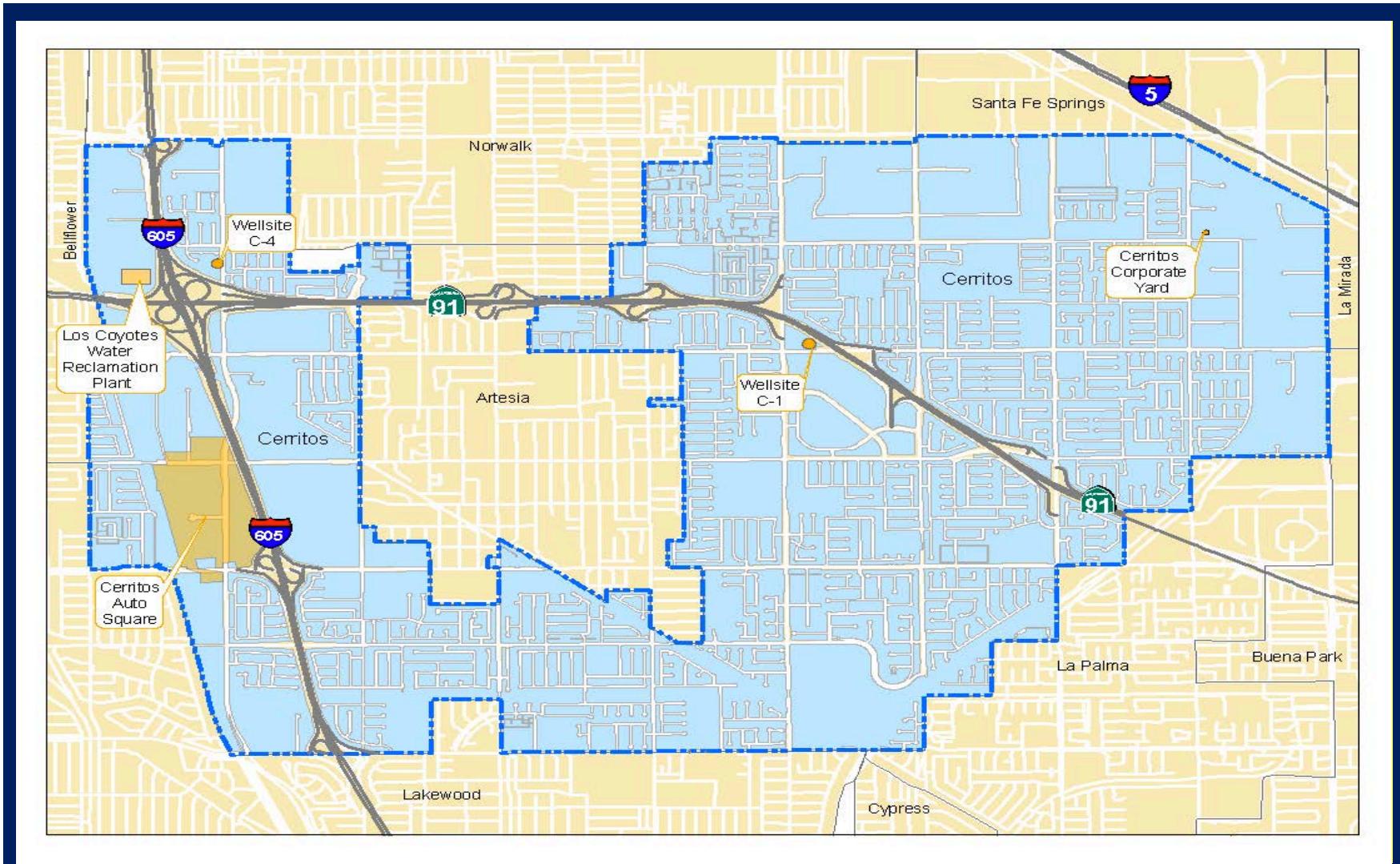
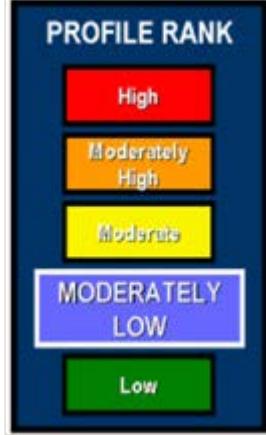


Figure 3.7: City of Cerritos Hazardous Materials Facilities

3.8 Drought Hazard Profile

Drought Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Regular event - occurs between once a year and once every 7 years	 <p>The scale shows five levels: High (red), Moderately High (orange), Moderate (yellow), MODERATELY LOW (blue), and Low (green). The 'MODERATELY LOW' box is highlighted.</p>
Consequence/ Severity:	Minor/ slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	
Vulnerability:	Localized damage area	
Hazard Risk Rank Score:	12	

3.8.1 Drought Information and Background

A drought or an extreme dry periodic climate is an extended period where water availability falls below the statistical requirements for a region. Drought is not a purely physical phenomenon, but rather an interplay between natural water availability and human demands for water supply. The precise definition of drought is made complex owing to political considerations, but there are generally four types of conditions that are referred to as drought.

- **Meteorological drought** is brought about when there is a prolonged period with less than average precipitation.
- **Agricultural drought** is brought about when there is insufficient moisture for average crop or range production. This condition can arise, even in times of average precipitation, owing to soil conditions or agricultural techniques.
- **Hydrologic drought** is brought about when the water reserves available in sources such as aquifers, lakes, and reservoirs fall below the statistical average. This

condition can arise, even in times of average (or above average) precipitation, when increased usage of water diminishes the reserves.

- **Socioeconomic drought** associates the supply and demand of water services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall.

Due to the extensive nature of water supply infrastructure – reservoirs, groundwater basins, and inter-regional conveyance facilities – mitigation for the effect of short-term dry periods is implicit for most systems. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or wildland fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts, however, occur slowly and over a multi-year period. There is no universal definition of when a drought begins or ends. Impacts of drought are typically felt first by those most reliant on annual rainfall – ranchers engaged in dryland grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable source. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

Droughts may cause a shortage of water for human and industrial consumption, hydroelectric power, recreation, and navigation. Water quality may also decline and the number and severity of wildland fires may increase. Severe droughts may result in the loss of agricultural crops and forest products, undernourished wildlife and livestock, lower land values, and raise unemployment.

3.8.2 Drought History

As stated in the City's Urban Water Management Plan, the City of Cerritos supplies most of its water from groundwater pumped from the Central Ground Basin. Additionally, the City is a member agency of the Central Basin Municipal Water District (CBMWD). The CBMWD imports water from the Metropolitan Water District of Southern California (MWD) and distributes it to its member agencies. Purchased water made up only 1.17 percent of the City's total potable water supplies in 2014. Additionally, the City utilizes recycled water to meet its nonpotable demands. Furthermore, the City is a retailer, providing potable water to the Golden State Water Company and the City of Norwalk. The City boundaries, as shown previously in Figure 2.1 provide an estimate of the service area of the City of Cerritos.

Because water systems are interconnected, the regional impacts of drought may have adverse impacts for the City of Cerritos. For example, as stated in the City's Urban Water Management Plan, the Colorado River, which supplies potable water to the City through CBMWD and MWD, is impacted by climatic changes. Therefore, any significant rise in temperature, due to an unseasonably hot summer or perhaps the impacts of climate change, could reduce the available water supply for each retailer decreasing the available water supply for the City's use. It is important to consider droughts that have occurred and currently are occurring throughout the State. Figure 3.8 provides the annual runoff in California for the last century, and is provided by the United States Geological Survey.

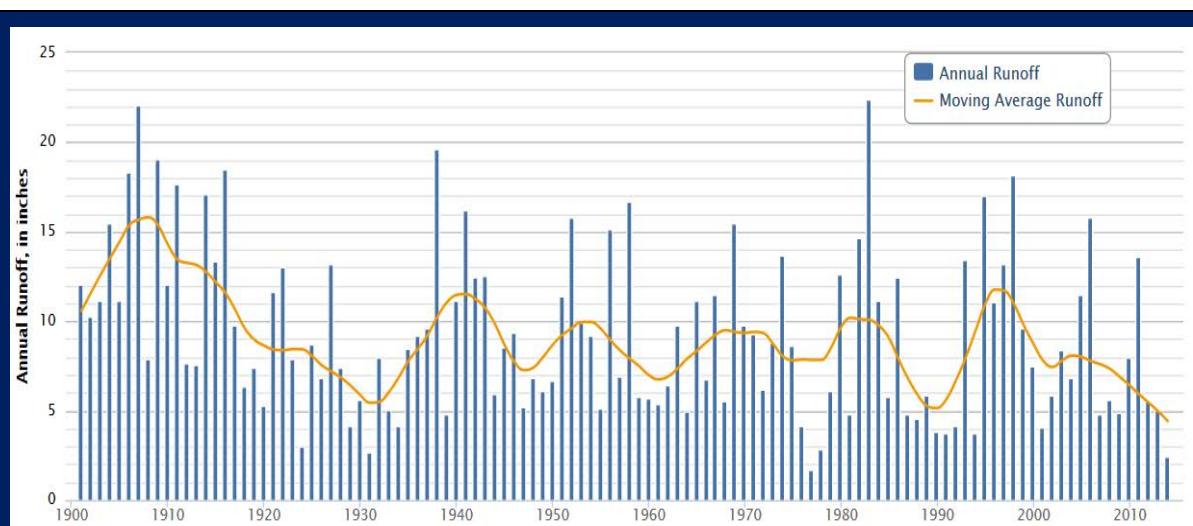


Figure 3.8: Annual Runoff in California

Figure 3.9 illustrates the current state of drought in California and is provided by the California Governor's Office of Emergency Services.

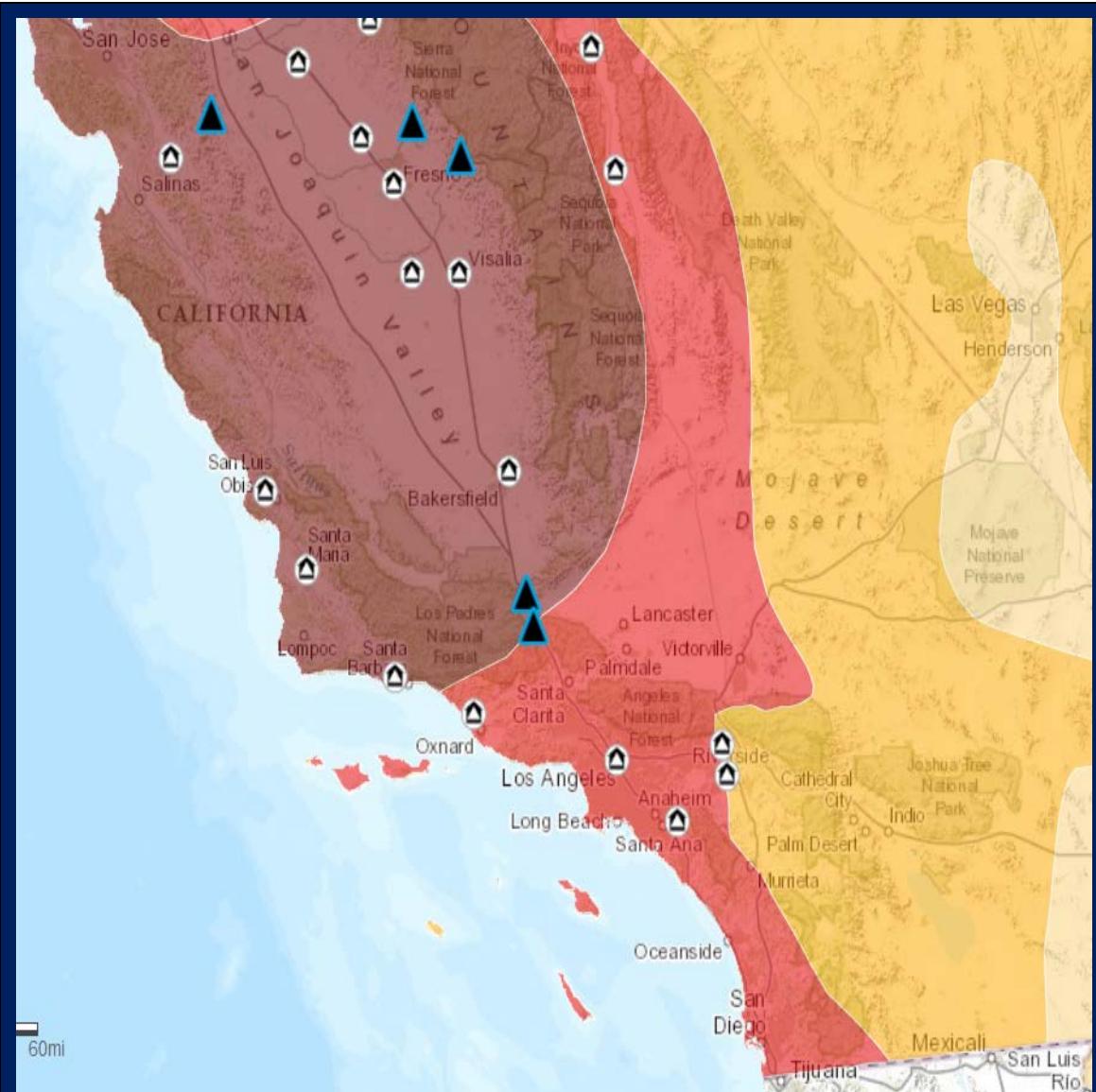


Figure 3.9: Southern California Drought Conditions, 2014

As stated by the California Department of Water Resources, the last part of 2013 began one of the driest periods in California's recorded history. On January 14, 2014, Governor Edmund G. Brown declared a drought state of emergency which triggered municipalities to take preventative actions. While the City has continued to provide potable water to its residents, the County of Los Angeles has imposed conservation measures to circumvent potential drought hazards. The City will rely on the previously discussed infrastructure to maintain water services for its residents.

3.8.3 Drought Probability, Frequency, and Magnitude

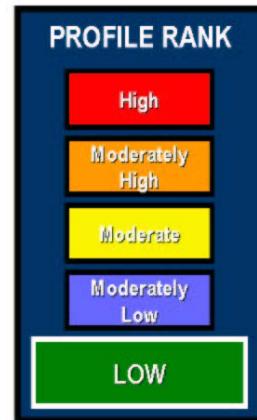
For years, the City has enjoyed an abundant supply of high-quality water. However, as water demand continues to increase statewide and the supply fluctuates with current drought conditions, the City must be even more conscientious about the water supply and maximize the efficient use of this precious natural resource. The City of Cerritos and the Metropolitan Water District of Southern California work closely together to evaluate new and innovative water management and supply development programs, including water reuse and recycling, recharge facility construction, ocean and brackish water desalination, surface storage, and water use efficiency programs. These efforts are helping to enhance long-term water reliability and water quality.

3.9 Terrorism Hazard Profile

Terrorism Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Rare event - occurs less than once every 50 years
Consequence/ Severity:	Minor/ slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability
Vulnerability:	Localized damage area
Hazard Risk Rank Score:	4



3.9.1 Terrorism Hazard Information and Background

Terrorism is the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of a political or social objective.

A weapon of mass destruction (WMD) is a type of weapon that can bring significant harm to a large number of people or structures. Examples of WMD include nuclear, radiological, biological, or chemical agents. Aside from attacking local targets, terrorists might also use WMD to inflict harm on a large population.

The Federal Bureau of Investigation (FBI) has categorized two types of terrorism in the United States.

International Terrorism involves terrorist activity committed by groups or individuals who are foreign-based and/or directed by countries or groups outside the United States, or whose activities transcend national boundaries.

Domestic Terrorism involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction.

Well-known international terrorist groups include Islamic Fundamentalist groups, such as Islamic State in Iraq and Syria (ISIS); European terrorists, including the Red Brigade in Italy, Spain's Euskadi Ta Askatasuna (ETA), and the Japanese Red Army; separatist groups, such as Sierra Lumenoso, and the "Shining Path" in Peru. Add to these a host of narco-terrorists, such as the Medellin and Cali drug cartels.

In the United States, a number of animal rights activists; environmentalist groups; white supremacists, such as the League of Aryan nations; and groups including the Covenant, Sword and Arm of the Lord, New World Order, and skinheads have been responsible for acts of terrorism on United States soil. Added to these are groups like the Klu Klux Klan; survivalists, such as the Freemen in Montana; and doomsday cults, such as David Koresh in Waco, Texas, and Jim Jones in Guyana.

There are a number of methods a terrorist may use to carry out their objective, including attacks of a chemical, biological, radiological, nuclear, explosive, and cyber nature. In addition, terrorists conduct hijackings, assassinations, armed assaults, kidnappings/hostage taking, arson fires, sabotage of critical infrastructures such as utilities and transportation, and the dissemination of confidential or otherwise sensitive information for the planning of terrorist attacks.

Chemical

Chemical agents involve the use of chemical compounds to kill or seriously injure victims. There are numerous kinds of chemical weapons and their effectiveness is determined by a number of factors, including age, purity, weather conditions, wind direction, and means of dissemination.

Biological

Biological agents include microbes, such as bacteria or viruses, and toxins derived from plants or animals that can produce illness or death. Illegal facilities that manufacture these substances are difficult to detect because they employ fermentation technology commonly used in the production of legitimate products such as antibiotics, vaccines, and consumables.

Radiological and Nuclear

Radiological or nuclear terrorism is the use of radioactive materials and/or nuclear explosives, as well as any terrorist actions against nuclear facilities by individuals or groups,

to inflict harm on a population and advance political or social objectives. Sources of radiological material including nuclear fuel cycle waste, medical and dental equipment, military weaponry, and machines used in private industry.

Explosive

The impact of a bombing depends largely on the type, size, and placement of the device used. Additionally, a WMD in combination with an explosive device expands the lethality, physical damage, and economic disruption. The use of an explosive device can also inflict significant disruption of society through destruction of critical infrastructure and widespread fear amongst the target population.

Cyber

Cyber terrorism is a premeditated, politically motivated attack against information, computer systems, computer programs, and data which results in violence against noncombatant targets by sub-national groups or clandestine agents. Cyber terrorists can be domestic or international. Classification of being a cyber-terrorist depends on if the terrorist relies on cyber terrorism to further their cause, or uses it in addition to conventional terrorism.

Additional Terrorism Methods

Additional terrorism methods include hijackings, kidnappings, and the taking of hostages; armed assaults and mass shootings; assassinations of public figures; sabotage of transportation systems and utility infrastructure; the dissemination of confidential information that would aid terrorist organizations when planning an attack; arson fires; and many other means of disrupting normal society or endangering lives and property.

3.9.2 Terrorism Hazard History

The United States has proven to be a high priority target for both domestic and international terrorists. Acts of terror have become increasingly alarming in their magnitude in recent years. Examples of this include the bombing of the Alfred P. Murrah Federal Building in Oklahoma City and the attacks of September 11, 2001 on the World Trade Center complex and the Pentagon. Not all attacks, however, are at this level of intensity. The United States has also been subject to small scale attacks in the past such as the bombing at the Boston Marathon in 2013. Specifically, the City of Cerritos has not been directly impacted by terrorism events in the past.

3.9.3 Terrorism Hazard Probability, Frequency, and Magnitude

While the City has never fallen victim to a terrorist attack, the City recognizes the potential for a terrorism event to impact the City. Given current escalating terrorism trends, the threat of a terrorist event within the United States is a credible possibility and the City ranked the probability of terrorism accordingly during the Hazard Identification Workshop. Although Cerritos does not have any hard targets within the City's boundaries, the potential threat exists due to its proximity to the City and County of Los Angeles, the Los Angeles Airport, and other identified targets.

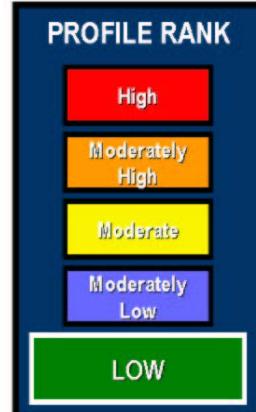
Additionally, the City of Cerritos completed a Security Vulnerability Assessment to comply with the Bioterrorism Act of 2002. The Security Vulnerability Assessment evaluated the City's vulnerability to malevolent attacks, including terrorism and contamination, and developed recommendations to protect against the malevolent attacks. However, because of the security sensitive nature of the information, the terrorism risk assessment results are not repeated as part of the Hazard Mitigation Plan.

3.10 Windstorm Hazard Profile

Windstorm Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Rare event - occurs less than once every 50 years
Consequence/ Severity:	Minor/ slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability
Vulnerability:	Localized damage area
Hazard Risk Rank Score:	4



3.10.1 Windstorm Hazard Information and Background

Wind can be described as the flow of air caused by a difference in air pressure within the Earth's atmosphere. Differences in atmospheric pressure cause air to move from high pressure areas to lower. The greater the difference between the two pressure areas, the greater the speed at which the air moves from one pressure area to the other. Strong winds have been known to cause minor property damage and in extreme cases destroy large structures in its path.

The Beaufort Scale is widely used to describe wind speeds based on observed ocean conditions. Since its most recent modification in the 1940s, the scale utilizes a seventeen level system ranging from no air flow to winds that exceed 140 miles per hour (mph; 120 knots) and describe wind speeds in empirical terms. According to this scale, air speeds during a windstorm usually fall between 65 mph (56 knots) and 72 mph (63 knots). Winds of this speed and greater have been known to cause tornado-like property damage and could inhibit utility, telecommunications, and transportation systems in and around the City of Cerritos.

3.10.2 Windstorm History

To indicate the potential for a severe storm event, Table 3.19 lists an excerpt of large-scale severe storms extracted from the NOAA National Climatic Data Center, including lightning, thunderstorms, hail, fog, winter weather, and wind some of which have resulted in extensive regional damage. This list is not considered to be comprehensive, since severe storms are an annual event causing minor damages and economic disruption (closed roads, fallen power lines, etc.).

Table 3.19: Historical Severe Weather Damage in Los Angeles County

Date	Fatalities	Injuries	Property Damage (\$)
8/07/1990	0	8	0
2/23/1993	0	0	50,000
4/25/1994	0	0	5,000
3/14/1996	0	1	0
12/14/1996	1	2	0
1/20/1997	0	4	0
7/20/1998	0	1	0
5/23/1999	1	0	0
7/13/1999	0	1	0
2/23/2000	0	1	0
4/20/2001	0	1	0
7/28/2003	0	1	0
11/12/2003	0	0	3,500,000
1/07/2005	0	0	5,000,000
9/01/2007	0	0	0

Date	Fatalities	Injuries	Property Damage (\$)
7/15/2010	0	0	0
3/17/2013	0	0	0
3/1/2014	0	0	0

Note: Property Damage may not have been reported for each incident

Microbursts

As stated by the National Weather Service, a microburst is a downdraft in a thunder storm that is less than 2.5 miles in scale. Microbursts can be driven by a number of factors including mid-level dry air entrainment, cooling beneath the thunderstorm cloud base, sublimation, and the existence of rain and/or hail within the thunderstorm. Although microbursts are not widely recognized as tornadoes, they can cause comparable, and in some cases worse, damage than some tornadoes.



In April 2000, a microburst ripped through 4.9 square miles of The City of Paramount; less than 5 miles from the heart of the City. Hardest hit were the mobile homes where at least 141 structures were reported to have sustained damage, ranging from total loss to minor structural damage. The local Fire Department estimated at least \$843,000 in damage losses. Families were immediately placed in a Red Cross Shelter at a nearby park.

Santa Ana Winds

The Santa Ana Winds are a seasonal phenomenon in Southern California occurring between October and March. According to the California Climate Change Center, these dry winds occur when cold air moves southward into the Great Basin between the Sierra Nevada Mountain Range and the Southern California Coastal Range. The cold air mass is characterized by unusually high pressure near the land surface. As the wind moves through canyons and passes, the wind accelerates to speeds of 40 mph (35 knots) with gusts up to

about 70 mph (60 knots). This phenomenon has occurred irregularly since at least the mid-1800s. While generally overlooked, Santa Ana winds have been reported to have caused property damage, power outages, blocked roads due to fallen trees, increased fire threats, and even loss of life as the result of a secondary impact.

3.10.3 Windstorm Probability, Frequency, and Magnitude

Taking into account that Santa Ana Winds are (typically) an annual occurrence in Southern California, strong winds are very likely to continue to occur although infrequently in the City of Cerritos. In the past, high winds have toppled trees, damaged traffic signals, and in rare cases caused minor injury to residents. In response, the Steering Committee determined windstorm was still a possible threat to the City and warranted inclusion in the Plan update. Figure 3.10 below provides information on the average wind speeds for the Fullerton Municipal Airport Weather Station region.

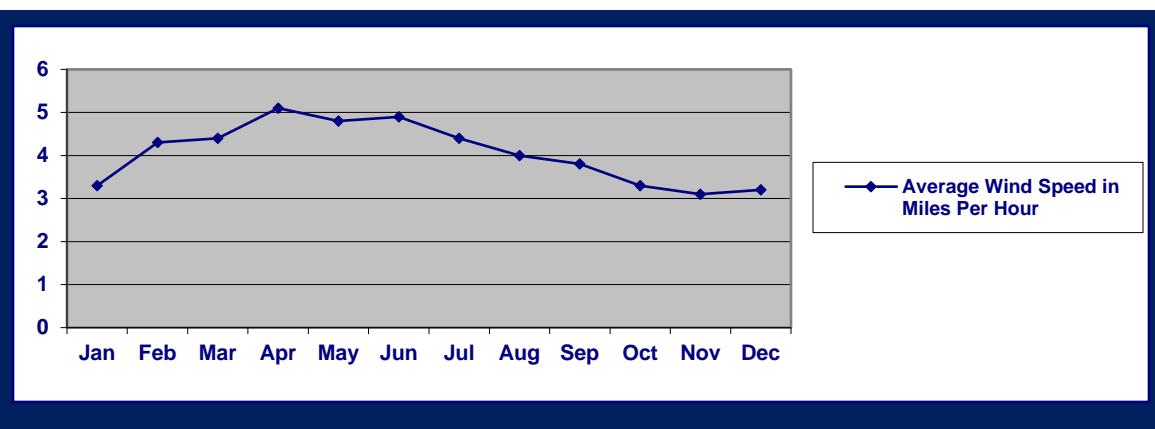


Figure 3.10: City of Cerritos Average Wind Speeds

Note: Data taken from the Western Regional Climate Center

3.11 Climate Change

With the release of the California Adaptation Planning Guide (APG) in March 2015, the City aimed to include the effects of climate change into the Hazard Mitigation Plan update. As identified in the “Understanding Regional Characteristics” portion of the APG, Cerritos is located in the South Coastal Region of California. As a result, the City considered the following climate change impacts as recommended by the APG:

- Increased Temperatures
- Reduced Precipitation
- Sea Level Rise
- Reduced Tourism
- Reduced Water Supply
- Wildfire Risk
- Public Health – Heat and Air Quality
- Coastal Erosion

The Steering Committee engaged in a discussion to determine which impacts posed a viable threat to the City. While some impacts clearly applied to the City, some required additional research. Studies were conducted to look at recorded trends for sea level rise, wildfire, and regional temperature increases. The result of the study was the following list of perceived, feasible impacts that might affect the City over the next 5 to 10 years:

Increased Temperatures

Reduced Precipitation

Reduced Water Supply

Fire Risk

After reviewing the results of each of these impacts, the Steering Committee decided to include hazards in the Plan update that represented how the impacts would be felt by the City. For example, increased temperatures, reduced precipitation, and reduced water supply would be recognized as a drought. Additionally, increased temperatures and reduced precipitation might result in a fire. Therefore, the Steering Committee identified Drought and Urban Fire as perceived hazards. Any information regarding the effects of these impacts on the City will be found under the hazard profiles listed above. Additionally,

mitigation strategies that apply to these impacts will be classified under Drought and Urban Fire in the mitigation actions identified in Chapter 4.

3.12 Asset Inventory

§201.6(c)(2)(ii)(A): [The plan should describe vulnerability in terms of] the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area

A critical step required to complete the Risk Assessment is to develop a detailed asset inventory and document potential asset damages due to each identified hazard. The calculated loss estimates will be based on the values determined during the initial asset inventory. In order to produce accurate loss estimates, the City of Cerritos developed a comprehensive inventory of all assets, including asset locations.

In order to develop loss estimates, specific values were assigned to the critical City facilities in the asset inventory. The following tables summarize the assigned values, as well as the sources utilized as the basis for the values including the following.

- FEMA's "Multi-hazard Loss Estimation Methodology, Earthquake Model, HAZUS MR4"
- FEMA's guidance document entitled "What is a Benefit? - Guidance on Benefit-Cost Analysis of Hazard Mitigation Projects, Draft Revision 2.0"

Replacement Values

The following table provides a mechanism for determining the cost per square foot for replacing assets. Using this table, the Steering Committee reviewed the asset inventory list and discussed and documented approximate square footages (based upon available building plans and expert knowledge) and building descriptions in order to identify the appropriate replacement cost for each asset.

Table 3.20 – Structural Replacement Values

Facility Category	Facility Sub-Category	Description	Replacement Cost (\$/SF)
Hospital	Medium	2-3 Stories, 55,000 SF	\$144.60
	Large	4-8 Stories, 200,000 SF	\$124.60
Medical Office / Clinic	Small	1 Story, 7,000 SF	\$118.01
	Medium	2 Stories, 7,000 SF	\$129.82
General Government Services	Town Hall, Small	1 Story, 11,000 SF	\$90.30
	Town Hall, Medium	2-3 Stories, 18,000 SF	\$112.94
Emergency Response	Courthouse, Small	1 Story, 30,000 SF	\$130.71
	Courthouse, Medium	2-3 Stories, 60,000 SF	\$136.81
Schools / Libraries	Post Office	13,000 SF	\$86.83
	Police Station	2 Stories, 11,000 SF	\$136.10
Colleges / Universities	Fire Station, Small	1 Story, 6,000 SF	\$105.53
	Fire Station, Medium	2 Stories, 10,000 SF	\$110.34
Schools / Libraries	High School	130,000 SF	\$92.80
	Elementary School	45,000 SF	\$90.22
Colleges / Universities	Jr. High School	110,00 SF	\$95.21
	Library	2 Stories, 22,000 SF	\$103.94
Colleges / Universities	Religious School	1 Story, 10,000 SF	\$112.19
	College Classroom	2-3 Stories, 50,000 SF	\$114.68
Colleges / Universities	College Laboratory	1 Story, 45,000 SF	\$119.51
	Vocational School	40,000 SF	\$93.96

Note: Values were listed from FEMA's "Multi-hazard Loss Estimation Methodology, Earthquake Model, HAZUS MR4"

Loss of Function Values

In order to provide a mechanism for evaluating the importance of lifelines and critical services, the following tables were used to identify per capita values for each category. Based upon the population in the City of Cerritos, the following values were assigned.

Table 3.21 - Loss of Function Values Per Capita – Utilities & Lifelines

Loss of Electric Power	Cost of Complete Loss of Service	
Reduced Regional Economic Activity1		\$87
Impacts on Residential Customers		\$101
Total Economic Impact		\$188
Loss of Potable Water Service	Cost of Complete Loss of Service	Cost of Water Unsafe for Drinking
Reduced Regional Economic Activity1	\$35	\$8.75
Impacts on Residential Customers	\$68	\$34
Total economic impact (all hazards)	\$103	\$43
Fire Following Earthquake Losses	Cost of Fire Damage	
Dry Climates		\$35
Moderate Climates		\$17.50
Wet Climates		\$8.75
Loss of Wastewater Service	Cost of Complete Loss of Service	Cost of Partial Treatment Only

Reduced Activity	Regional Impacts on Residential Customers	Economic	\$33.50	\$8.50
			None	None
Total Economic Impact			\$33.50	\$8.50
Road or Bridge Closure		Delay or Detour (per vehicle per hour)		
Economic Impact		\$32.23		
Total Economic Impact		\$32.23		

Note: The values listed in this table were obtained from FEMA's guidance document entitled "What is a Benefit? - Guidance on Benefit-Cost Analysis of Hazard Mitigation Projects, Draft Revision 2.0"

Contents Value Percentages

When assessing the potential losses, the value of the contents of the buildings was included in the analysis. The following table from FEMA's guidance provides a list of facility categories and the associated contents value percentages.

Table 3.22 - Contents Value Percentages

Occupancy Class	Contents Value %
Government – General Services	100
Government – Emergency Response	150
Education – Schools/Libraries	100
Education – Colleges/Universities	150
Industrial – Food/Drugs/Chemicals	150

Note: Values were listed from FEMA's "Multi-hazard Loss Estimation Methodology, Earthquake Model, HAZUS MR4"

Future Developments

Currently, there are no planned developments for new buildings within the City of Cerritos; however, the hazard maps and loss estimates are dynamic and the calculations will be updated to account for future developments as the potential arises. The hazard maps will also be used as a tool to pre-identify areas that are not conducive for construction.

The Asset Inventory Summary Tables and maps depicting the asset locations for the City of Cerritos are presented on the following tables.

Table 3.23 - Asset Inventory Summary – City of Cerritos

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
Public Buildings	Performing Arts Center	12700 Center Ct Dr. Cerritos, CA 90703	150,000	NA	78,607,367	NA	16,425,867	\$95,033,234
Public Buildings	Library	18025 Bloomfield Ave. Cerritos, CA 90703	88,780	NA	65,724,027	NA	10,951,708	\$76,675,735
City Property	Library Fine Arts	18025 Bloomfield Ave. Cerritos, CA 90703	0	NA	0	NA	1,283,435	\$1,283,435
Public Buildings	Sculpture Garden	18125 Bloomfield Ave. Cerritos, CA 90703	0	NA	0	NA	3,469,203	\$3,469,203
Public Buildings	Cerritos Park East (CPE)	13234 E 166th St. Cerritos, CA 90703	15,500	NA	7,535,821	NA	895,093	\$8,430,914
Public Buildings	City Hall	18125 Bloomfield Ave. Cerritos, CA 90703	53,288	NA	14,552,688	NA	4,880,262	\$19,432,950
Public Buildings	Corporate Yard	16540 Marquardt Ave. Cerritos, CA 90703	24,257	NA	3,064,373	NA	1,345,694	\$4,410,067
Public Buildings	Vehicle Storage	16540 Marquardt Ave. Cerritos, CA 90703	12,740	NA	1,040,620	NA	394,231	\$1,434,851
Fire Building	Fire Station	19030 Pioneer Blvd. Cerritos, CA 90703	10,575	NA	3,188,956	100%	3,188,956	\$6,377,912
Public Buildings	Swim Center	13150 E 166th St. Cerritos, CA 90703	38,909	NA	12,155,618	NA	407,217	\$12,562,835

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
Public Buildings	Senior Center at Pat Nixon Park	12340 South St. Cerritos, CA 90701	27,500	NA	12,419,313	NA	974,550	\$13,393,863
Public Buildings	Sports Complex & Skate Park	12340 South St. Cerritos, CA 90701	5,840	NA	181,321	NA	0	\$181,321
Schools	Whitney Gym	16800 South Shoemaker Ave. Cerritos, CA 90703	28,000	NA	0	NA	4,783	\$4,783
Police Building	Sheriff's Station	18135 Bloomfield Ave. Cerritos, CA 90703	15,000	NA	31,320,096	NA	1,298,154	\$32,618,250
Public Buildings	Parking Structure	18027 Bloomfield Ave. Cerritos, CA 90703	0	NA	15,361,209	NA	0	\$15,361,209
Public Buildings	Cerritos Towne Center	12731 Towne Center Dr. Cerritos, CA 90703	0	NA	88,742	NA	0	\$88,742
Parks	Frontier Park	16910 Maria Ave. Cerritos CA 90703	793	NA	116,992	NA	2,032	\$119,024
Public Buildings	Heritage Park	18600 Bloomfield Ave. Cerritos CA, 90703	2,915	NA	8,233,889	NA	37,995	\$8,271,884
Public Buildings	Golf Course Clubhouse	16401 Piuma Ave. Cerritos, CA 90703	1,815	NA	745,697	NA	196,649	\$942,346
Public Buildings	Golf Course Café	16401 Piuma Ave. Cerritos, CA 90703	350	NA	82,484	NA	24,609	\$107,093

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
Public Buildings	Liberty Park	19211 Studebaker Rd. Cerritos, CA 90703	11,500	NA	10,173,037	NA	238,125	\$10,411,162
Parks	Westgate Park	18830 South San Gabriel Cerritos, CA 90703	1,496	NA	228,346	NA	704	\$229,050
Parks	Friendship Park	13650 Acoro St. Cerritos, CA 90703	0	NA	25,177	NA	18,496	\$43,673
Parks	Joe A. Gonzalves Park	13611 East 166th St. Cerritos, CA 90703	855	NA	243,784	NA	0	\$243,784
Parks	Ecology Park	17133 Gridley Rd. Cerritos, CA 90703	0	NA	28,504	NA	2,072	\$30,576
Parks	Estella Utility Clearance	16400 Studebaker Rd. Cerritos, CA 90703	0	NA	35,502	NA	0	\$35,502
Parks	Gridley Park	Gridley Road & Yearling Cerritos, CA 90703	0	NA	131,715	NA	103,810	\$235,525
Parks	Jacob Park	Jacob Avenue & Yearling Cerritos, CA 90703	0	NA	40,665	NA	0	\$40,665
Parks	Rainbow Park	18600 S. Linda Cir. Cerritos, CA 90703	0	NA	95,783	NA	0	\$95,783
Parks	Reservoir Hill Park	16733 Studebaker Rd. Cerritos, CA 90703	0	NA	27,205	NA	0	\$27,205

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
Parks	Saddleback Park	13037 Acoro St. Cerritos, CA 90703	0	NA	15,593	NA	0	\$15,593
Parks	Satellite Park	12410 Ash Creek Rd. Cerritos, CA 90703	609	NA	19,542	NA	75,157	\$94,699
Parks	Sunshine Park	19310 Vickie Ave. Cerritos, CA 90703	660	NA	66,072	NA	32,309	\$98,381
Parks	Rosewood Park	17715 Eric St. Cerritos, CA 90703	0	NA	420,148	NA	59,359	\$479,507
Parks	Cerritos Regional County Park	19800 Bloomfield Ave. Cerritos, CA 90703	78,850	NA	4,243,770	NA	133,745	\$4,377,515
Parks	Bettencourt Park	13575 E. Andy St. Cerritos, CA 90703	0	NA	27,055	NA	0	\$27,055
Parks	El Rancho Verde Park	7815 Denni St. Cerritos, CA 90703	0	NA	27,055	NA	0	\$27,055
Parks	Loma Park	17503 Stark St. Cerritos, CA 90703	0	NA	27,055	NA	9,265	\$36,320
Parks	Brookhaven Park	13167 Brookhaven St. Cerritos, CA 90703	5,272	86.83	457,768	NA	0	\$457,768
Water	Water Well C-1	12701 East Artesia Blvd. Cerritos, CA 90703	1,700	NA	1,868,656	NA	962,545	\$2,831,201

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
Water	Water Well C-2	16540 Marquardt Ave. Cerritos, CA 90703	192	NA	6,131,966	NA	1,096,762	\$7,228,728
Water	Water Well C-4	16807 Studebaker Rd. Cerritos, CA 90703	192	NA	5,705,711	NA	1,074,319	\$6,780,030
Water	Water Well C-5	20101 Cabrillo Ln. Cerritos, CA 90703	0	NA	926,925	NA	0	\$926,925
Water	Reclaimed Water Pump	16515 Piuma Cerritos, CA 90703	0	NA	2,828,901	NA	0	\$2,828,901
Schools	Bragg Elementary School	11501 Bos St. Cerritos, CA 90703	70,095	90.22	6,323,971	100%	6,323,971	\$12,647,942
Schools	Carver Elementary School	19200 Ely Ave. Cerritos, CA 90703	56,557	90.22	5,102,573	100%	5,102,573	\$10,205,145
Schools	Cerritos Elementary School	13600 183rd St. Cerritos, CA 90703	61,172	90.22	5,518,938	100%	5,518,938	\$11,037,876
Schools	Gonsalves Elementary School	13650 Park St. Cerritos, CA 90703	61,868	90.22	5,581,731	100%	5,581,731	\$11,163,462
Schools	Juarez Elementary School	11939 Aclare St. Cerritos, CA 90703	61,530	90.22	5,551,237	100%	5,551,237	\$11,102,473

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
Schools	Leal Elementary School	12920 Droxford St. Cerritos, CA 90703	64,475	90.22	5,816,935	100%	5,816,935	\$11,633,869
Schools	Pat Nixon Elementary School	19600 Jacob Ave. Cerritos, CA 90703	48,731	90.22	4,396,511	100%	4,396,511	\$8,793,022
Schools	Stowers Elementary School	13350 Beach St. Cerritos, CA 90703	70,938	90.22	6,400,026	100%	6,400,026	\$12,800,053
Schools	Wittmann Elementary School	16801 Yvette Way Cerritos, CA 90703	46,468	90.22	4,192,343	100%	4,192,343	\$8,384,686
Schools	Carmenita Middle School	13435 166th St. Cerritos, CA 90703	127,175	95.21	12,108,332	100%	12,108,332	\$24,216,664
Schools	Haskell Junior High	11525 Del Amo Blvd. Cerritos, CA 90703	153,906	95.21	14,653,390	100%	14,653,390	\$29,306,781
Schools	Tetzlaff Junior High	12351 Del Amo Blvd. Cerritos, CA 90703	104,841	95.21	9,981,912	100%	9,981,912	\$19,963,823
Schools	Cerritos High School	12500 183rd St. Cerritos, CA 90703	347,997	92.80	32,294,122	100%	32,294,122	\$64,588,243
Schools	Cerritos High School Gym	12500 183rd St. Cerritos, CA 90703	0	NA	0	NA	5,000	\$5,000

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
Schools	Gahr High School	11111 Artesia Blvd. Cerritos, CA 90703	329,952	92.80	30,619,546	100%	30,619,546	\$61,239,091
Schools	Tracy High School	12222 Cuesta Dr. Cerritos, CA 90703	69,443	92.80	6,444,310	100%	6,444,310	\$12,888,621
Schools	Whitney High School	16800 Shoemaker Ave. Cerritos, CA 90703	152,790	92.80	14,178,912	100%	14,178,912	\$28,357,824
City Property	C-46 MWD COM	Castle & South St. Cerritos, CA 90703	0	NA	120,365	NA	51,353	\$171,718
City Property	La Palma Interconnect	Valley View Ave & 183rd St. Cerritos, CA 90703	0	NA	8,397	NA	0	\$8,397
City Property	Santa Fe Interconnect	1350 Alondra Blvd. Cerritos, CA 90703	0	NA	24,321	NA	0	\$24,321
City Property	Kings Row/South Vault	Kings Row Ave. & South St. Cerritos, CA 90703	0	NA	42,125	NA	491	\$42,616
City Property	Studebaker/South Vault	Studebaker Rd. & South St. Cerritos, CA 90703	0	NA	71,693	NA	0	\$71,693
City Property	Canehill/South Vault	Canehill Ave. & South St. Cerritos, CA 90703	0	NA	42,125	NA	491	\$42,616
City Property	South St. Blow-off	San Gabriel River & South St. Cerritos, CA 90703	0	NA	42,125	NA	491	\$42,616

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
City Property	Greyland Vault	12015 Artesia Blvd. Cerritos, CA 90703	0	NA	24,795	NA	0	\$24,795
City Property	183rd & Marquardt Lift Station	16924 Marquardt Ave. Cerritos, CA 90703	0	NA	89,172	NA	24,779	\$113,951
City Property	Bettencourt Lift Station	16924 Marquardt Ave Cerritos, CA 90703	0	NA	9,979	NA	2,370	\$12,349
City Property	Lift Station	Parkvalle Ave. & 183 rd St. Cerritos, CA 90703	0	NA	62,151	NA	14,397	\$76,548
City Property	Computer Equipment	Various Locations	0	NA	0	NA	3,445,371	\$3,445,371
City Property	Radio & Mobile Telephone Equipment	Various Locations	0	NA	0	NA	851,436	\$851,436
City Property	Scheduled & Mobile Equipment	Various Locations	0	NA	0	NA	2,814,696	\$2,814,696
City Property	On-Premises Auto	Various Locations	0	NA	0	NA	1,832,707	\$1,832,707
City Property	State Farm Property & Storage	19033 Studebaker Rd. Cerritos, CA 90703	11,682	NA	6,019,889	NA	0	\$6,019,889

Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value	Contents Value %	Contents Value	TOTAL
City Property	Mullikan Property	12616 E. 183rd St. Cerritos, CA 90703	33,378	NA	5,663,522	NA	0	\$5,663,522
City Property	Leased & Rented Equipment	Various Locations	0	NA	0	NA	1,236,585	\$1,236,585
City Property	Artwork in Public Places	Various Locations	0	NA	918,669	NA	3,832,960	\$4,751,629
City Property	Arco Station	18310 Carmenita Rd. Cerritos, CA 90703	0	NA	2,300,069	NA	0	\$2,300,069
City Property	Office/Warehouse	12880 Moore St. Cerritos, CA 90703	35,571	NA	6,125,874	NA	0	\$6,125,874
City Property	Office Building	12881 166th St. Cerritos, CA 90703	45,864	NA	9,640,718	NA	0	\$9,640,718
City Property	Vacant Building	18201 Studebaker Rd. Cerritos, CA 90703	0	NA	7,445,055	NA	0	\$7,445,055
Subtotal								\$729,653,799
Note: All Projected values were listed from FEMA's "Multi-hazard Loss Estimation Methodology, Earthquake Model, HAZUS MR5"								
Note: Stated values extracted from the CJPIA Property Schedule Prepared by Alliant Insurance Services, Inc. (2014)								

Table 3.24: Loss of Function

Loss of Function / Continuity Premium (1 day) - City of Cerritos				
Population: 49,041				
Category	Value Per Person	Value Per Day	Continuity Premium	Total
Fire Service	-	\$21,204	10	\$212,040
Police Service	-	\$36,589	10	\$365,890
Water Service	\$93	\$4,560,813	-	\$4,560,813
Electricity	\$126	\$6,179,166	-	\$6,179,166
Wastewater	\$41	\$2,010,681	-	\$2,010,681
Subtotal				\$13,328,590
Note: Values were listed from FEMA's "BCA Reference Guide, June 2009" except Fire Service				
Note: Fire Service values were provided by the LA County Fire Department				

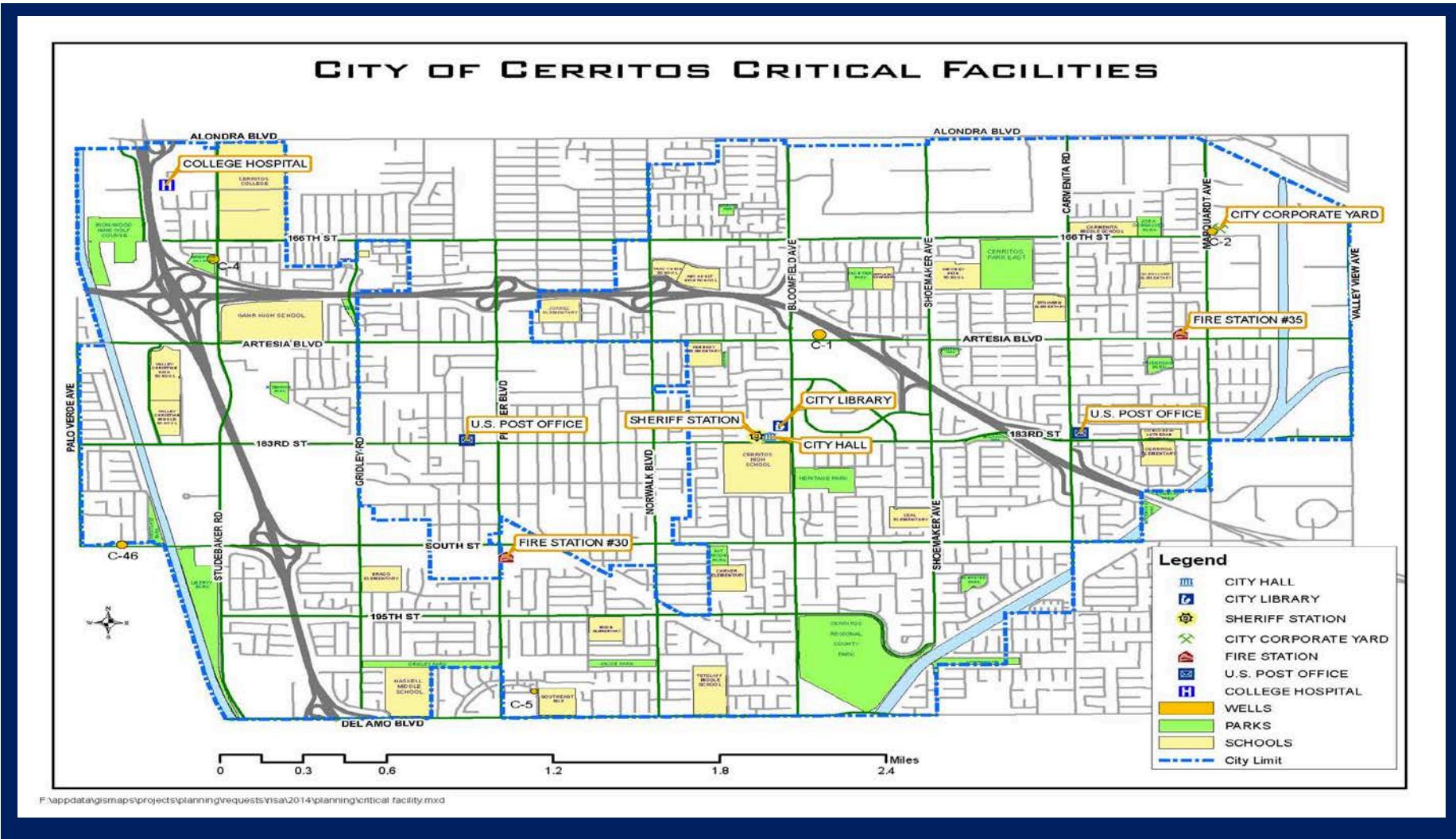


Figure 3.11: City of Cerritos Asset Inventory Map

3.13 Loss Estimates

§201.6(c)(2)(ii)(B): [The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate

Loss Assessment Calculations

The Steering Committee reviewed each asset category and assigned a potential percentage of damage expected due to each identified hazard. In addition, if there were identified lifeline or emergency service interruptions the loss of function values were also included. The tables of the following pages identify each asset category, name, total value, and the percent damage/damage value for each asset. The damages for each asset are totaled for each hazard to obtain the overall loss estimate for each hazard.

Table 3.25 Los Estimates/ Vulnerability Assessment – Earthquake through Flood/ Dam Failure

City of Cerritos Vulnerability Assessment Calculations			Earthquake		Urban Fire		Transportation Accident/Incident		Flood/ Dam Failure		
Type	Name	TOTAL	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate	% Damage	Loss Estimate	
Public Buildings	Performing Arts Center	12700 Center Ct Dr. Cerritos, CA 90703	\$95,033,234	25%	\$23,758,309	15%	\$14,254,985	5%	\$4,751,662	20%	\$19,006,647
Public Buildings	Library	18025 Bloomfield Ave. Cerritos, CA 90703	\$76,675,735	25%	\$19,168,934	25%	\$19,168,934	5%	\$3,833,787	10%	\$7,667,574
City Property	Library Fine Arts	18025 Bloomfield Ave. Cerritos, CA 90703	\$1,283,435	25%	\$320,859	25%	\$320,859	5%	\$64,172	10%	\$128,344
Public Buildings	Sculpture Garden	18125 Bloomfield Ave. Cerritos, CA 90703	\$3,469,203	25%	\$867,301	25%	\$867,301	5%	\$173,460	10%	\$346,920
Public Buildings	Cerritos Park East (CPE)	13234 E 166th St. Cerritos, CA 90703	\$8,430,914	20%	\$1,686,183	15%	\$1,264,637	10%	\$843,091	15%	\$1,264,637
Public Buildings	City Hall	18125 Bloomfield Ave. Cerritos, CA 90703	\$19,432,950	20%	\$3,886,590	10%	\$1,943,295	5%	\$971,648	15%	\$2,914,943
Public Buildings	Corporate Yard	16540 Marquardt Ave. Cerritos, CA 90703	\$4,410,067	25%	\$1,102,517	40%	\$1,764,027	10%	\$441,007	10%	\$441,007
Public Buildings	Vehicle Storage	16540 Marquardt Ave. Cerritos, CA 90703	\$1,434,851	25%	\$358,713	40%	\$573,940	10%	\$143,485	10%	\$143,485
Fire Building	Fire Station	19030 Pioneer Blvd. Cerritos, CA 90703	\$6,377,912	30%	\$1,913,374	10%	\$637,791	10%	\$637,791	5%	\$318,896
Public Buildings	Swim Center	13150 E 166th St. Cerritos, CA 90703	\$12,562,835	35%	\$4,396,992	35%	\$4,396,992	10%	\$1,256,284	15%	\$1,884,425

City of Cerritos Vulnerability Assessment Calculations				Earthquake		Urban Fire		Transportation Accident/Incident		Flood/ Dam Failure	
Type	Name	TOTAL		% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate	% Damage	Loss Estimate
Public Buildings	Senior Center at Pat Nixon Park	12340 South St. Cerritos, CA 90701	\$13,393,863	20%	\$2,678,773	15%	\$2,009,079	5%	\$669,693	15%	\$2,009,079
Public Buildings	Sports Complex & Skate Park	12340 South St. Cerritos, CA 90701	\$181,321	20%	\$36,264	15%	\$27,198	5%	\$9,066	15%	\$27,198
Schools	Whitney Gym	16800 South Shoemaker Ave. Cerritos, CA 90703	\$4,783	20%	\$957	15%	\$717	5%	\$239	15%	\$717
Police Building	Sheriff's Station	18135 Bloomfield Ave. Cerritos, CA 90703	\$32,618,250	20%	\$6,523,650	5%	\$1,630,913	5%	\$1,630,913	20%	\$6,523,650
Public Buildings	Parking Structure	18027 Bloomfield Ave. Cerritos, CA 90703	\$15,361,209	25%	\$3,840,302	5%	\$768,060	5%	\$768,060	15%	\$2,304,181
Public Buildings	Cerritos Towne Center	12731 Towne Center Dr. Cerritos, CA 90703	\$88,742	20%	\$17,748	10%	\$8,874	5%	\$4,437	10%	\$8,874
Parks	Frontier Park	16910 Maria Ave. Cerritos CA 90703	\$119,024	20%	\$23,805	15%	\$17,854	5%	\$5,951	10%	\$11,902
Public Buildings	Heritage Park	18600 Bloomfield Ave. Cerritos CA, 90703	\$8,271,884	20%	\$1,654,377	15%	\$1,240,783	5%	\$413,594	10%	\$827,188
Public Buildings	Golf Course Clubhouse	16401 Piuma Ave. Cerritos, CA 90703	\$942,346	20%	\$188,469	15%	\$141,352	5%	\$47,117	10%	\$94,235
Public Buildings	Golf Course Café	16401 Piuma Ave. Cerritos, CA 90703	\$107,093	20%	\$21,419	15%	\$16,064	5%	\$5,355	10%	\$10,709
Public Buildings	Liberty Park	19211 Studebaker Rd. Cerritos, CA 90703	\$10,411,162	20%	\$2,082,232	15%	\$1,561,674	10%	\$1,041,116	20%	\$2,082,232

City of Cerritos Vulnerability Assessment Calculations				Earthquake		Urban Fire		Transportation Accident/Incident		Flood/ Dam Failure	
Type	Name	TOTAL		% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate	% Damage	Loss Estimate
Parks	Westgate Park	18830 South San Gabriel Cerritos, CA 90703	\$229,050	20%	\$45,810	15%	\$34,358	5%	\$11,453	10%	\$22,905
Parks	Friendship Park	13650 Acoro St. Cerritos, CA 90703	\$43,673	20%	\$8,735	15%	\$6,551	5%	\$2,184	10%	\$4,367
Parks	Joe A. Gonzalves Park	13611 East 166th St. Cerritos, CA 90703	\$243,784	20%	\$48,757	15%	\$36,568	5%	\$12,189	10%	\$24,378
Parks	Ecology Park	17133 Gridley Rd. Cerritos, CA 90703	\$30,576	20%	\$6,115	15%	\$4,586	5%	\$1,529	10%	\$3,058
Parks	Estella Utility Clearance	16400 Studebaker Rd. Cerritos, CA 90703	\$35,502	20%	\$7,100	15%	\$5,325	5%	\$1,775	10%	\$3,550
Parks	Gridley Park	Gridley Road & Yearling Cerritos, CA 90703	\$235,525	20%	\$47,105	15%	\$35,329	5%	\$11,776	10%	\$23,553
Parks	Jacob Park	Jacob Avenue & Yearling Cerritos, CA 90703	\$40,665	20%	\$8,133	15%	\$6,100	5%	\$2,033	10%	\$4,067
Parks	Rainbow Park	18600 S. Linda Cir. Cerritos, CA 90703	\$95,783	20%	\$19,157	15%	\$14,367	5%	\$4,789	10%	\$9,578
Parks	Reservoir Hill Park	16733 Studebaker Rd. Cerritos, CA 90703	\$27,205	20%	\$5,441	15%	\$4,081	5%	\$1,360	10%	\$2,721
Parks	Saddleback Park	13037 Acoro St. Cerritos, CA 90703	\$15,593	20%	\$3,119	15%	\$2,339	5%	\$780	10%	\$1,559
Parks	Satellite Park	12410 Ash Creek Rd. Cerritos, CA 90703	\$94,699	20%	\$18,940	15%	\$14,205	5%	\$4,735	10%	\$9,470

City of Cerritos Vulnerability Assessment Calculations			Earthquake			Urban Fire		Transportation Accident/Incident		Flood/ Dam Failure	
Type	Name	TOTAL	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate	% Damage	Loss Estimate	
Parks	Sunshine Park	19310 Vickie Ave. Cerritos, CA 90703	\$98,381	20%	\$19,676	15%	\$14,757	5%	\$4,919	10%	\$9,838
Parks	Rosewood Park	17715 Eric St. Cerritos, CA 90703	\$479,507	20%	\$95,901	15%	\$71,926	5%	\$23,975	10%	\$47,951
Parks	Cerritos Regional County Park	19800 Bloomfield Ave. Cerritos, CA 90703	\$4,377,515	20%	\$875,503	15%	\$656,627	5%	\$218,876	10%	\$437,752
Parks	Bettencourt Park	13575 E. Andy St. Cerritos, CA 90703	\$27,055	20%	\$5,411	15%	\$4,058	5%	\$1,353	10%	\$2,706
Parks	EI Rancho Verde Park	7815 Dennie St. Cerritos, CA 90703	\$27,055	20%	\$5,411	15%	\$4,058	5%	\$1,353	10%	\$2,706
Parks	Loma Park	17503 Stark St. Cerritos, CA 90703	\$36,320	20%	\$7,264	15%	\$5,448	5%	\$1,816	10%	\$3,632
Parks	Brookhaven Park	13167 Brookhaven St. Cerritos, CA 90703	\$457,768	20%	\$91,554	15%	\$68,665	5%	\$22,888	10%	\$45,777
Water	Water Well C-1	12701 East Artesia Blvd. Cerritos, CA 90703	\$2,831,201	35%	\$990,920	40%	\$1,132,480	10%	\$283,120	10%	\$283,120
Water	Water Well C-2	16540 Marquardt Ave. Cerritos, CA 90703	\$7,228,728	35%	\$2,530,055	40%	\$2,891,491	5%	\$361,436	20%	\$1,445,746
Water	Water Well C-4	16807 Studebaker Rd. Cerritos, CA 90703	\$6,780,030	35%	\$2,373,011	40%	\$2,712,012	10%	\$678,003	10%	\$678,003
Water	Water Well C-5	20101 Cabrillo Ln. Cerritos, CA 90703	\$926,925	35%	\$324,424	40%	\$370,770	10%	\$92,693	10%	\$92,693

City of Cerritos Vulnerability Assessment Calculations				Earthquake		Urban Fire		Transportation Accident/Incident		Flood/ Dam Failure	
Type	Name	TOTAL		% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate	% Damage	Loss Estimate
Water	Reclaimed Water Pump	16515 Piuma Cerritos, CA 90703	\$2,828,901	35%	\$990,115	40%	\$1,131,560	10%	\$282,890	10%	\$282,890
Schools	Bragg Elementary School	11501 Bos St. Cerritos, CA 90703	\$12,647,942	35%	\$4,426,780	35%	\$4,426,780	5%	\$632,397	10%	\$1,264,794
Schools	Carver Elementary School	19200 Ely Ave. Cerritos, CA 90703	\$10,205,145	35%	\$3,571,801	35%	\$3,571,801	5%	\$510,257	10%	\$1,020,515
Schools	Cerritos Elementary School	13600 183rd St. Cerritos, CA 90703	\$11,037,876	35%	\$3,863,256	35%	\$3,863,256	5%	\$551,894	10%	\$1,103,788
Schools	Gonsalves Elementary School	13650 Park St. Cerritos, CA 90703	\$11,163,462	35%	\$3,907,212	35%	\$3,907,212	5%	\$558,173	10%	\$1,116,346
Schools	Juarez Elementary School	11939 Aclare St. Cerritos, CA 90703	\$11,102,473	35%	\$3,885,866	35%	\$3,885,866	10%	\$1,110,247	10%	\$1,110,247
Schools	Leal Elementary School	12920 Droxford St. Cerritos, CA 90703	\$11,633,869	35%	\$4,071,854	35%	\$4,071,854	5%	\$581,693	10%	\$1,163,387
Schools	Pat Nixon Elementary School	19600 Jacob Ave. Cerritos, CA 90703	\$8,793,022	35%	\$3,077,558	35%	\$3,077,558	5%	\$439,651	10%	\$879,302
Schools	Stowers Elementary School	13350 Beach St. Cerritos, CA 90703	\$12,800,053	35%	\$4,480,018	35%	\$4,480,018	5%	\$640,003	10%	\$1,280,005
Schools	Wittmann Elementary School	16801 Yvette Way Cerritos, CA 90703	\$8,384,686	35%	\$2,934,640	35%	\$2,934,640	5%	\$419,234	10%	\$838,469
Schools	Carmenita Middle School	13435 166th St. Cerritos, CA 90703	\$24,216,664	35%	\$8,475,832	35%	\$8,475,832	5%	\$1,210,833	10%	\$2,421,666
Schools	Haskell Junior High	11525 Del Amo Blvd. Cerritos, CA 90703	\$29,306,781	35%	\$10,257,373	35%	\$10,257,373	5%	\$1,465,339	10%	\$2,930,678

City of Cerritos Vulnerability Assessment Calculations				Earthquake		Urban Fire		Transportation Accident/Incident		Flood/ Dam Failure	
Type	Name	TOTAL		% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate	% Damage	Loss Estimate
Schools	Tetzlaff Junior High	12351 Del Amo Blvd. Cerritos, CA 90703	\$19,963,823	35%	\$6,987,338	35%	\$6,987,338	5%	\$998,191	10%	\$1,996,382
Schools	Cerritos High School	12500 183rd St. Cerritos, CA 90703	\$64,588,243	35%	\$22,605,885	35%	\$22,605,885	5%	\$3,229,412	10%	\$6,458,824
Schools	Cerritos High School Gym	12500 183rd St. Cerritos, CA 90703	\$5,000	35%	\$1,750	35%	\$1,750	5%	\$250	10%	\$500
Schools	Gahr High School	11111 Artesia Blvd. Cerritos, CA 90703	\$61,239,091	35%	\$21,433,682	35%	\$21,433,682	10%	\$6,123,909	10%	\$6,123,909
Schools	Tracy High School	12222 Cuesta Dr. Cerritos, CA 90703	\$12,888,621	35%	\$4,511,017	35%	\$4,511,017	5%	\$644,431	10%	\$1,288,862
Schools	Whitney High School	16800 Shoemaker Ave. Cerritos, CA 90703	\$28,357,824	35%	\$9,925,238	35%	\$9,925,238	5%	\$1,417,891	10%	\$2,835,782
City Property	C-46 MWD COM	Castle & South St. Cerritos, CA 90703	\$171,718	20%	\$34,344	10%	\$17,172	5%	\$8,586	10%	\$17,172
City Property	La Palma Interconnect	Valley View Ave. & 183rd St. Cerritos, CA 90703	\$8,397	20%	\$1,679	10%	\$840	5%	\$420	10%	\$840
City Property	Santa Fe Interconnect	1350 Alondra Blvd. Cerritos, CA 90703	\$24,321	20%	\$4,864	10%	\$2,432	5%	\$1,216	10%	\$2,432
City Property	Kings Row/South Vault	Kings Row Ave. & South St. Cerritos, CA 90703	\$42,616	20%	\$8,523	10%	\$4,262	5%	\$2,131	10%	\$4,262
City Property	Studebaker/South Vault	Studebaker Rd. & South St. Cerritos, CA 90703	\$71,693	20%	\$14,339	10%	\$7,169	5%	\$3,585	10%	\$7,169

City of Cerritos Vulnerability Assessment Calculations			Earthquake			Urban Fire		Transportation Accident/Incident		Flood/ Dam Failure	
Type	Name	TOTAL	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate	% Damage	Loss Estimate	
City Property	Canehill/South Vault	Canehill Ave. & South St. Cerritos, CA 90703	\$42,616	20%	\$8,523	10%	\$4,262	5%	\$2,131	10%	\$4,262
City Property	South St. Blow-off	San Gabriel River & South St. Cerritos, CA 90703	\$42,616	20%	\$8,523	10%	\$4,262	5%	\$2,131	10%	\$4,262
City Property	Greyland Vault	12015 Artesia Blvd. Cerritos, CA 90703	\$24,795	20%	\$4,959	10%	\$2,480	5%	\$1,240	10%	\$2,480
City Property	183rd & Marquardt Lift Station	16924 Marquardt Ave. Cerritos, CA 90703	\$113,951	20%	\$22,790	10%	\$11,395	5%	\$5,698	10%	\$11,395
City Property	Bettencourt Lift Station	16924 Marquardt Ave. Cerritos, CA 90703	\$12,349	20%	\$2,470	10%	\$1,235	5%	\$617	10%	\$1,235
City Property	Lift Station	Parkvalle Ave. & 183rd Cerritos, CA 90703	\$76,548	20%	\$15,310	10%	\$7,655	5%	\$3,827	10%	\$7,655
City Property	Computer Equipment	Various Locations	\$3,445,371	20%	\$689,074	10%	\$344,537	5%	\$172,269	10%	\$344,537
City Property	Radio & Mobile Telephone Equipment	Various Locations	\$851,436	20%	\$170,287	10%	\$85,144	5%	\$42,572	10%	\$85,144
City Property	Scheduled & Mobil Equipment	Various Locations	\$2,814,696	20%	\$562,939	10%	\$281,470	5%	\$140,735	10%	\$281,470
City Property	On-Premises Auto	Various Locations	\$1,832,707	20%	\$366,541	15%	\$274,906	5%	\$91,635	10%	\$183,271
City Property	State Farm Property & Storage	19033 Studebaker Rd. Cerritos, CA 90703	\$6,019,889	20%	\$1,203,978	15%	\$902,983	5%	\$300,994	10%	\$601,989
City Property	Mullikan Property	12616 E. 183rd St. Cerritos, CA 90703	\$5,663,522	20%	\$1,132,704	15%	\$849,528	5%	\$283,176	10%	\$566,352

City of Cerritos Vulnerability Assessment Calculations				Earthquake		Urban Fire		Transportation Accident/Incident		Flood/ Dam Failure	
Type	Name	TOTAL		% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate	% Damage	Loss Estimate
City Property	Leased & Rented Equipment	Various Locations	\$1,236,585	20%	\$247,317	15%	\$185,488	5%	\$61,829	10%	\$123,659
City Property	Artwork in Public Places	Various Locations	\$4,751,629	20%	\$950,326	15%	\$712,744	5%	\$237,581	10%	\$475,163
City Property	Arco Station	18310 Carmenita Rd. Cerritos, CA 90703	\$2,300,069	20%	\$460,014	40%	\$920,028	5%	\$115,003	10%	\$230,007
City Property	Office/Warehouse	12880 Moore St. Cerritos, CA 90703	\$6,125,874	20%	\$1,225,175	15%	\$918,881	5%	\$306,294	10%	\$612,587
City Property	Office Building	12881 166th St. Cerritos, CA 90703	\$9,640,718	20%	\$1,928,144	15%	\$1,446,108	5%	\$482,036	10%	\$964,072
City Property	Vacant Building	18201 Studebaker Rd. Cerritos, CA 90703	\$7,445,055	20%	\$1,489,011	15%	\$1,116,758	5%	\$372,253	10%	\$744,506
Fire Service			\$212,040	40%	\$84,816	25%	\$53,010	10%	\$21,204	10%	\$21,204
Police Service			\$365,890	40%	\$146,356	25%	\$91,473	10%	\$36,589	10%	\$36,589
Water Service			\$4,560,813	35%	\$1,596,285	10%	\$456,081	10%	\$456,081	5%	\$228,041
Electricity			\$6,179,166	20%	\$1,235,833	10%	\$617,917	10%	\$617,917	20%	\$1,235,833
Wastewater			\$2,010,681	35%	\$703,738	10%	\$201,068	10%	\$201,068	5%	\$100,534
				Earthquake	\$215,791,385	Urban Fire	\$189,781,378	Transportation Accident/Incide nt	\$44,244,477	Flood/ Dam Failure	\$92,190,436

Table 3.26 Loss Estimates / Vulnerability Assessment – Pipeline Failure/ Hazardous Material Release through Windstorm

City of Cerritos Vulnerability Assessment Calculations			Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm		
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	
Public Buildings	Performing Arts Center	12700 Center Ct Dr. Cerritos, CA 90703	\$95,033,234	5%	\$4,751,662	2%	\$1,900,665	10%	\$9,503,323	5%	\$4,751,662
Public Buildings	Library	18025 Bloomfield Ave. Cerritos, CA 90703	\$76,675,735	5%	\$3,833,787	2%	\$1,533,515	10%	\$7,667,574	2%	\$1,533,515
City Property	Library Fine Arts	18025 Bloomfield Ave. Cerritos, CA 90703	\$1,283,435	5%	\$64,172	2%	\$25,669	10%	\$128,344	2%	\$25,669
Public Buildings	Sculpture Garden	18125 Bloomfield Ave. Cerritos, CA 90703	\$3,469,203	5%	\$173,460	2%	\$69,384	5%	\$173,460	2%	\$69,384
Public Buildings	Cerritos Park East (CPE)	13234 E 166th St. Cerritos, CA 90703	\$8,430,914	15%	\$1,264,637	2%	\$168,618	5%	\$421,546	2%	\$168,618
Public Buildings	City Hall	18125 Bloomfield Ave. Cerritos, CA 90703	\$19,432,950	5%	\$971,648	2%	\$388,659	10%	\$1,943,295	2%	\$388,659
Public Buildings	Corporate Yard	16540 Marquardt Ave. Cerritos, CA 90703	\$4,410,067	20%	\$882,013	2%	\$88,201	5%	\$220,503	2%	\$88,201
Public Buildings	Vehicle Storage	16540 Marquardt Ave. Cerritos CA 90703	\$1,434,851	20%	\$286,970	2%	\$28,697	5%	\$71,743	2%	\$28,697
Fire Building	Fire Station	19030 Pioneer Blvd. Cerritos, CA 90703	\$6,377,912	5%	\$318,896	2%	\$127,558	5%	\$318,896	2%	\$127,558
Public Buildings	Swim Center	13150 E 166th St. Cerritos, CA 90703	\$12,562,835	15%	\$1,884,425	2%	\$251,257	5%	\$628,142	2%	\$251,257

City of Cerritos Vulnerability Assessment Calculations			Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm	
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate
Public Buildings	Senior Center at Pat Nixon Park	12340 South St. Cerritos, CA 90701	\$13,393,863	5%	\$669,693	2%	\$267,877	5%	\$669,693	2%
Public Buildings	Sports Complex & Skate Park	12340 South St. Cerritos, CA 90701	\$181,321	5%	\$9,066	2%	\$3,626	5%	\$9,066	2%
Schools	Whitney Gym	16800 South Shoemaker Ave. Cerritos, CA 90703	\$4,783	5%	\$239	2%	\$96	5%	\$239	2%
Police Building	Sheriff's Station	18135 Bloomfield Ave. Cerritos, CA 90703	\$32,618,250	10%	\$3,261,825	2%	\$652,365	10%	\$3,261,825	2%
Public Buildings	Parking Structure	18027 Bloomfield Ave. Cerritos, CA 90703	\$15,361,209	5%	\$768,060	2%	\$307,224	10%	\$1,536,121	2%
Public Buildings	Cerritos Towne Center	12731 Towne Center Dr. Cerritos, CA 90703	\$88,742	5%	\$4,437	2%	\$1,775	10%	\$8,874	2%
Parks	Frontier Park	16910 Maria Ave. Cerritos CA 90703	\$119,024	5%	\$5,951	2%	\$2,380	5%	\$5,951	2%
Public Buildings	Heritage Park	18600 Bloomfield Ave. Cerritos CA, 90703	\$8,271,884	5%	\$413,594	2%	\$165,438	5%	\$413,594	2%
Public Buildings	Golf Course Clubhouse	16401 Piuma Ave. Cerritos, CA 90703	\$942,346	5%	\$47,117	2%	\$18,847	5%	\$47,117	2%
Public Buildings	Golf Course Café	16401 Piuma Ave. Cerritos, CA 90703	\$107,093	5%	\$5,355	2%	\$2,142	5%	\$5,355	2%
Public Buildings	Liberty Park	19211 Studebaker Rd. Cerritos, CA 90703	\$10,411,162	5%	\$520,558	2%	\$208,223	5%	\$520,558	2%

City of Cerritos Vulnerability Assessment Calculations			Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm	
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate
Parks	Westgate Park	18830 South San Gabriel Cerritos, CA 90703	\$229,050	5%	\$11,453	2%	\$4,581	5%	\$11,453	2%
Parks	Friendship Park	13650 Acoro St. Cerritos, CA 90703	\$43,673	5%	\$2,184	2%	\$873	5%	\$2,184	2%
Parks	Joe A. Gonzalves Park	13611 East 166th St. Cerritos, CA 90703	\$243,784	5%	\$12,189	2%	\$4,876	5%	\$12,189	2%
Parks	Ecology Park	17133 Gridley Rd. Cerritos, CA 90703	\$30,576	5%	\$1,529	2%	\$612	5%	\$1,529	2%
Parks	Estella Utility Clearance	16400 Studebaker Rd. Cerritos, CA 90703	\$35,502	5%	\$1,775	2%	\$710	5%	\$1,775	2%
Parks	Gridley Park	Gridley Road & Yearling Cerritos, CA 90703	\$235,525	5%	\$11,776	2%	\$4,711	5%	\$11,776	2%
Parks	Jacob Park	Jacob Avenue & Yearling Cerritos, CA 90703	\$40,665	5%	\$2,033	2%	\$813	5%	\$2,033	2%
Parks	Rainbow Park	18600 S. Linda Cir. Cerritos, CA 90703	\$95,783	5%	\$4,789	2%	\$1,916	5%	\$4,789	2%
Parks	Reservoir Hill Park	16733 Studebaker Rd. Cerritos, CA 90703	\$27,205	5%	\$1,360	2%	\$544	5%	\$1,360	2%
Parks	Saddleback Park	13037 Acoro St. Cerritos, CA 90703	\$15,593	5%	\$780	2%	\$312	5%	\$780	2%
Parks	Satellite Park	12410 Ash Creek Rd. Cerritos, CA 90703	\$94,699	5%	\$4,735	2%	\$1,894	5%	\$4,735	2%

City of Cerritos Vulnerability Assessment Calculations			Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm	
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate
Parks	Sunshine Park	19310 Vickie Ave. Cerritos, CA 90703	\$98,381	5%	\$4,919	2%	\$1,968	5%	\$4,919	2%
Parks	Rosewood Park	17715 Eric St. Cerritos, CA 90703	\$479,507	5%	\$23,975	2%	\$9,590	5%	\$23,975	2%
Parks	Cerritos Regional County Park	19800 Bloomfield Ave. Cerritos, CA 90703	\$4,377,515	5%	\$218,876	2%	\$87,550	5%	\$218,876	2%
Parks	Bettencourt Park	13575 E. Andy St. Cerritos, CA 90703	\$27,055	5%	\$1,353	2%	\$541	5%	\$1,353	2%
Parks	El Rancho Verde Park	7815 Denni St. Cerritos, CA 90703	\$27,055	5%	\$1,353	2%	\$541	5%	\$1,353	2%
Parks	Loma Park	17503 Stark St. Cerritos, CA 90703	\$36,320	5%	\$1,816	2%	\$726	5%	\$1,816	2%
Parks	Brookhaven Park	13167 Brookhaven St. Cerritos, CA 90703	\$457,768	5%	\$22,888	2%	\$9,155	5%	\$22,888	2%
Water	Water Well C-1	12701 East Artesia Blvd. Cerritos, CA 90703	\$2,831,201	5%	\$141,560	2%	\$56,624	10%	\$283,120	2%
Water	Water Well C-2	16540 Marquardt Ave. Cerritos, CA 90703	\$7,228,728	5%	\$361,436	2%	\$144,575	10%	\$722,873	2%
Water	Water Well C-4	16807 Studebaker Rd. Cerritos, CA 90703	\$6,780,030	5%	\$339,002	2%	\$135,601	10%	\$678,003	2%
Water	Water Well C-5	20101 Cabrillo Ln. Cerritos, CA 90703	\$926,925	5%	\$46,346	2%	\$18,539	10%	\$92,693	2%
										\$18,539

City of Cerritos Vulnerability Assessment Calculations			Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm		
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	
Water	Reclaimed Water Pump	16515 Piuma Cerritos, CA 90703	\$2,828,901	5%	\$141,445	2%	\$56,578	10%	\$282,890	2%	\$56,578
Schools	Bragg Elementary School	11501 Bos St. Cerritos, CA 90703	\$12,647,942	5%	\$632,397	2%	\$252,959	10%	\$1,264,794	2%	\$252,959
Schools	Carver Elementary School	19200 Ely Ave. Cerritos, CA 90703	\$10,205,145	5%	\$510,257	2%	\$204,103	10%	\$1,020,515	2%	\$204,103
Schools	Cerritos Elementary School	13600 183rd St. Cerritos, CA 90703	\$11,037,876	5%	\$551,894	2%	\$220,758	10%	\$1,103,788	2%	\$220,758
Schools	Gonsalves Elementary School	13650 Park St. Cerritos, CA 90703	\$11,163,462	5%	\$558,173	2%	\$223,269	10%	\$1,116,346	2%	\$223,269
Schools	Juarez Elementary School	11939 Aclare St. Cerritos, CA 90703	\$11,102,473	5%	\$555,124	2%	\$222,049	10%	\$1,110,247	2%	\$222,049
Schools	Leal Elementary School	12920 Droxford St. Cerritos, CA 90703	\$11,633,869	5%	\$581,693	2%	\$232,677	10%	\$1,163,387	2%	\$232,677
Schools	Pat Nixon Elementary School	19600 Jacob Ave. Cerritos, CA 90703	\$8,793,022	5%	\$439,651	2%	\$175,860	10%	\$879,302	2%	\$175,860
Schools	Stowers Elementary School	13350 Beach St. Cerritos, CA 90703	\$12,800,053	5%	\$640,003	2%	\$256,001	10%	\$1,280,005	2%	\$256,001
Schools	Wittmann Elementary School	16801 Yvette Way Cerritos, CA 90703	\$8,384,686	5%	\$419,234	2%	\$167,694	10%	\$838,469	2%	\$167,694
Schools	Carmenita Middle School	13435 166th St. Cerritos, CA 90703	\$24,216,664	15%	\$3,632,500	2%	\$484,333	10%	\$2,421,666	2%	\$484,333
Schools	Haskell Junior High	11525 Del Amo Blvd. Cerritos, CA 90703	\$29,306,781	5%	\$1,465,339	2%	\$586,136	10%	\$2,930,678	2%	\$586,136

City of Cerritos Vulnerability Assessment Calculations			Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm		
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	
Schools	Tetzlaff Junior High	12351 Del Amo Blvd. Cerritos, CA 90703	\$19,963,823	5%	\$998,191	2%	\$399,276	10%	\$1,996,382	2%	\$399,276
Schools	Cerritos High School	12500 183rd St. Cerritos, CA 90703	\$64,588,243	5%	\$3,229,412	2%	\$1,291,765	10%	\$6,458,824	2%	\$1,291,765
Schools	Cerritos High School Gym	12500 183rd St. Cerritos, CA 90703	\$5,000	5%	\$250	2%	\$100	10%	\$500	2%	\$100
Schools	Gahr High School	11111 Artesia Blvd. Cerritos, CA 90703	\$61,239,091	5%	\$3,061,955	2%	\$1,224,782	10%	\$6,123,909	2%	\$1,224,782
Schools	Tracy High School	12222 Cuesta Dr. Cerritos, CA 90703	\$12,888,621	5%	\$644,431	2%	\$257,772	10%	\$1,288,862	2%	\$257,772
Schools	Whitney High School	16800 Shoemaker Ave. Cerritos, CA 90703	\$28,357,824	5%	\$1,417,891	2%	\$567,156	10%	\$2,835,782	2%	\$567,156
City Property	C-46 MWD COM	Castle & South St. Cerritos, CA 90703	\$171,718	5%	\$8,586	2%	\$3,434	5%	\$8,586	2%	\$3,434
City Property	La Palma Interconnect	Valley View Ave. & 183rd St. Cerritos, CA 90703	\$8,397	5%	\$420	2%	\$168	5%	\$420	2%	\$168
City Property	Santa Fe Interconnect	1350 Alondra Blvd. Cerritos, CA 90703	\$24,321	5%	\$1,216	2%	\$486	5%	\$1,216	2%	\$486
City Property	Kings Row/South Vault	Kings Row Ave. & South St. Cerritos, CA 90703	\$42,616	5%	\$2,131	2%	\$852	5%	\$2,131	2%	\$852
City Property	Studebaker/South Vault	Studebaker Rd. & South St. Cerritos, CA 90703	\$71,693	5%	\$3,585	2%	\$1,434	5%	\$3,585	2%	\$1,434

City of Cerritos Vulnerability Assessment Calculations			Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm		
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	
City Property	Canehill/South Vault	Canehill Ave. & South St. Cerritos, CA 90703	\$42,616	5%	\$2,131	2%	\$852	5%	\$2,131	2%	\$852
City Property	South St. Blow-off	San Gabriel River & South St. Cerritos, CA 90703	\$42,616	5%	\$2,131	2%	\$852	5%	\$2,131	2%	\$852
City Property	Greyland Vault	12015 Artesia Blvd. Cerritos, CA 90703	\$24,795	5%	\$1,240	2%	\$496	5%	\$1,240	2%	\$496
City Property	183rd & Marquardt Lift Station	16924 Marquardt Ave. Cerritos, CA 90703	\$113,951	5%	\$5,698	2%	\$2,279	5%	\$5,698	2%	\$2,279
City Property	Bettencourt Lift Station	16924 Marquardt Ave. Cerritos, CA 90703	\$12,349	5%	\$617	2%	\$247	5%	\$617	2%	\$247
City Property	Lift Station	Parkvalle Ave. & 183rd Cerritos, CA 90703	\$76,548	5%	\$3,827	2%	\$1,531	5%	\$3,827	2%	\$1,531
City Property	Computer Equipment	Various Locations	\$3,445,371	5%	\$172,269	2%	\$68,907	5%	\$172,269	2%	\$68,907
City Property	Radio & Mobile Telephone Equipment	Various Locations	\$851,436	5%	\$42,572	2%	\$17,029	5%	\$42,572	2%	\$17,029
City Property	Scheduled & Mobile Equipment	Various Locations	\$2,814,696	5%	\$140,735	2%	\$56,294	5%	\$140,735	2%	\$56,294
City Property	On-Premises Auto	Various Locations	\$1,832,707	5%	\$91,635	2%	\$36,654	5%	\$91,635	2%	\$36,654
City Property	State Farm Property & Storage	19033 Studebaker Rd. Cerritos, CA 90703	\$6,019,889	5%	\$300,994	2%	\$120,398	5%	\$300,994	2%	\$120,398

City of Cerritos Vulnerability Assessment Calculations			Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm	
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate
City Property	Mullikan Property	12616 E. 183rd St. Cerritos, CA 90703	\$5,663,522	5%	\$283,176	2%	\$113,270	5%	\$283,176	2%
City Property	Leased & Rented Equipment	Various Locations	\$1,236,585	5%	\$61,829	2%	\$24,732	5%	\$61,829	2%
City Property	Artwork in Public Places	Various Locations	\$4,751,629	5%	\$237,581	2%	\$95,033	5%	\$237,581	2%
City Property	Arco Station	18310 Carmenita Rd. Cerritos, CA 90703	\$2,300,069	5%	\$115,003	2%	\$46,001	5%	\$115,003	2%
City Property	Office/Warehouse	12880 Moore St. Cerritos, CA 90703	\$6,125,874	5%	\$306,294	2%	\$122,517	5%	\$306,294	2%
City Property	Office Building	12881 166th St. Cerritos, CA 90703	\$9,640,718	5%	\$482,036	2%	\$192,814	5%	\$482,036	2%
City Property	Vacant Building	18201 Studebaker Rd. Cerritos, CA 90703	\$7,445,055	5%	\$372,253	2%	\$148,901	5%	\$372,253	2%
Fire Service			\$212,040	5%	\$10,602	15%	\$31,806	15%	\$31,806	2%
Police Service			\$365,890	5%	\$18,295	2%	\$7,318	15%	\$54,884	2%
Water Service			\$4,560,813	5%	\$228,041	2%	\$91,216	15%	\$684,122	2%
Electricity			\$6,179,166	10%	\$617,917	2%	\$123,583	15%	\$926,875	10%
Wastewater			\$2,010,681	5%	\$100,534	2%	\$40,214	15%	\$301,602	2%
										\$40,214

City of Cerritos Vulnerability Assessment Calculations				Pipeline Failure/ Hazardous Material Release		Drought		Terrorism		Windstorm	
Type	Name	TOTAL	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate	
			Pipeline Failure/ Hazardous Material Release	\$44,448,879	Drought	\$14,872,057	Terrorism	\$68,415,284	Windstorm	\$18,189,822	

Table 3.27 summarizes the loss estimates for each hazard.

Table 3.27: Loss Estimates Summary

Hazard	Estimated Losses
Earthquake	\$215,791,385
Urban Fire	\$189,781,378
Transportation Accident / Incident	\$44,244,477
Flood/ Dam Failure	\$92,190,436
Pipeline Failure/ Hazardous Material Release	\$44,448,879
Drought	\$14,872,057
Terrorism	\$68,415,284
Windstorm	\$18,189,822

*Values are rounded to the nearest thousand

3.14 Information Sources

During the report development, the following sources provided information regarding historical hazard frequencies and probabilities, detailed hazard descriptions, and raw GIS data for hazard mapping:

California Department of Forestry and Fire Protection
(<http://www.fire.ca.gov/php/index.php>)

California Department of Water Resources (<http://www.water.ca.gov/>)

California Geological Survey (<http://www.consrv.ca.gov/cgs/>)

Federal Emergency Management Agency – www.fema.gov

Federal Highway Administration – www.fhwa.dot.gov

Los Angeles County Pandemic Influenza Plan -
<http://publichealth.lacounty.gov/acd/docs/Flu/pandemicfluexec011106.pdf>

National Climactic Data Center - <http://www.ncdc.noaa.gov/oa/ncdc.html>

National Flood Insurance Program – www.floodsmart.gov

Southern California Earthquake Data Center - <http://www.data.scec.org/>

The Los Angeles Times - <http://articles.latimes.com/2006/mar/26/local/me-immig26>

The Martin Luther King Jr. Research and Education Institute - <http://mlk-kpp01.stanford.edu/index.php/>

The Right-to-Know Network – www.rtknet.org

Toxic Release Inventory (TRI) Program - <http://www2.epa.gov/toxics-release-inventory-tri-program>

United States Chemical Safety Board - <http://www.csb.gov/chevron-refinery-fire/>

United States Bureau of Reclamation – FEMA workshop -
http://www.damsafety.org/media/Documents/DownloadableDocuments/ResourcesByTopic/EMI_TS20_2013/PRESENTATION06.pdf

United States Geological Survey - <http://www.usgs.gov/>

United States News - www.usnews.com

Western Regional Climate Center
(<http://www.wrcc.dri.edu/htmlfiles/westwind.final.html>)

4 MITIGATION STRATEGIES

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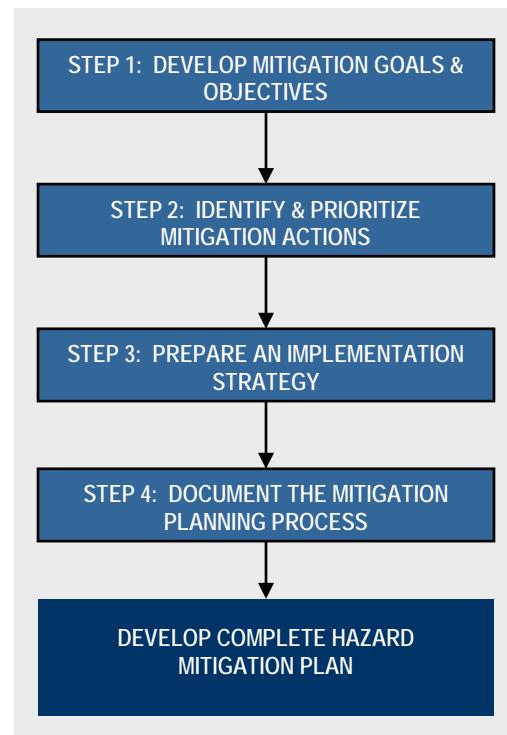
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4.1 Mitigation Goals and Objectives

To structure goals and objectives that produce appropriate mitigation actions, the hazard profiles and loss estimates were thoroughly reviewed to identify patterns in the location of potential hazard events and the vulnerability of the infrastructure identified within those locations. This information was used to develop clear goals to mitigate the effects of hazard events.

The mitigation goals provide guidelines for developing mitigation projects to provide prioritized hazard reduction. The goals are based on the goals from the 2004 Natural Hazards Mitigation Plan, the findings of the Risk Assessment, and input from the Steering Committee and characterize long-term hazard reduction targets as well as the enhancement of current mitigation capabilities.



§201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Table 4.1 includes the Plan goals and corresponding mitigation objectives. These strategies were developed and reviewed by the Steering Committee using knowledge of the local area (including high-hazard areas and sensitive populations), review of past efforts, findings of the Risk Assessment, and identification of mitigation projects.

Table 4.1: Overall Plan Goals and Objectives

1. Protect Life, Property, and Commerce.
<ul style="list-style-type: none">• <i>Strategy 1a:</i> Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from hazards.• <i>Strategy 1b:</i> Reduce losses and repetitive damages for chronic hazard events while promoting loss prevention options for catastrophic hazards.• <i>Strategy 1c:</i> Improve hazard assessment information to make recommendations for encouraging preventative measures for new and existing developments which are vulnerable to hazards.• <i>Strategy 1d:</i> Promote business continuity planning for local businesses.
2. Promote Public Awareness.
<ul style="list-style-type: none">• <i>Strategy 2a:</i> Develop and implement educational and outreach programs to increase public awareness of the risks associated with hazards.• <i>Strategy 2b:</i> Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.
3. Protect The Environment.
<ul style="list-style-type: none">• <i>Strategy 3a:</i> Balance natural resource management and land use planning with hazard mitigation to protect wildlife and the environment.• <i>Strategy 3b:</i> Improve hazard assessment information to make recommendations for encouraging preventative measures for new and existing developments vulnerable to hazards with regard to environmental protection.
4. Develop and Expand Partnerships and Implementation.
<ul style="list-style-type: none">• <i>Strategy 4a:</i> Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, businesses, and industries to gain a vested interest in hazard mitigation.• <i>Strategy 4b:</i> Encourage leadership within public and private sector organizations to prioritize and implement local and regional hazard mitigation activities.

5. Enhance Emergency Services Capabilities.

- *Strategy 5a:* Establish a policy to ensure the creation of mitigation projects for critical facilities, services, and infrastructure.
- *Strategy 5b:* Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industries.
- *Strategy 5c:* Coordinate and integrate all-hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

Following the development of the overall Plan goals and strategies, each hazard was reviewed to determine hazard-specific mitigation objectives. These objectives were determined using the overall plan goals, the hazard profiles, and the 2004 Plan hazard-specific objectives, and were used to help establish mitigation action items. Figure 4.1 provides an overview of the mitigation process.



Figure 4.1: Mitigation Process

As illustrated in the figure, the hazard mitigation process involves building off of previous steps in order to mitigate each identified hazard. The overall plan goals identified in Table 4.1 are used with the Risk Assessment to identify the hazard-specific objectives, which are then used to brainstorm the mitigation actions. Table 4.2, below, provides the hazard-specific objectives. Table 4.3 in Chapter 4.2 provides the mitigation actions.

Table 4.2: Hazard-Specific Objectives

Hazard	Objectives
Earthquake	EQ01 - Identify potential vulnerabilities in the City and conduct structural improvement projects, as appropriate.
	EQ02 - Ensure earthquake preparedness and recovery education remains a priority.
Urban Fire	UF01 - Identify vulnerable communities that could be affected by urban fires.
	UF02 - Ensure urban fire preparedness and recovery education remains a priority.
Transportation Accident/ Incident	TA01 - Continue to coordinate with affected agencies (NTSB, MTA, local public and private transit agencies, CHP, fire, HazMat department and sheriff) to address effective emergency responses.
	TA02 - Ensure heavy industrial traffic is properly managed to minimize the potential for transportation accidents.
Flood/ Dam Failure	FL01 - Continue to ensure security awareness training is provided to contract agencies and City personnel.
	DF01 - Continue to coordinate with the Army Corps of Engineers (for the Prado and Whittier-Narrows Dams) to ensure dam failure preparedness.
	DF02 - Continue to update mass evacuation planning with regard to dam failure.
Pipeline Failure/ Hazardous Materials Release	PF01 - Continue to coordinate with pipeline owners to ensure pipeline integrity is maintained in order to minimize the potential for failures.
	PF02 - Continue public education for pipeline safety (Dig Alert).

Hazard	Objectives
Drought	DR01 - Continue to coordinate with local public and private water agencies to ensure that losses of water have minimal impacts to residents of Cerritos.
	DR02 - Continue to expand and improve the City's recycled water systems.
Terrorism	TR01 - Continue to coordinate with law enforcement and fire to ensure response and recovery procedures are fully established.
	TR02 - Coordinate with the City MIS division and contracted service providers to update policies to combat cyber-terrorism.
	TR03 - Coordinate with the County Public Health Department to ensure response and recovery in the event of a bio-terrorism/pandemic incident.
	TR04 - Continue public education to identify potential acts of terrorism ("See something, say something").
Windstorm	WS01 - Continue to maintain the tree-trimming program to minimize the effects of severe weather and destructive winds.
	WS02 - Ensure that any above-ground public utility assets are analyzed and upgraded to withstand a windstorm.

4.2 Identification of Mitigation Recommendations

§201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Mitigation actions are administrative and/or engineering project recommendations to reduce the City's vulnerability to the identified hazards. Vital City employees are required in the development of actions and projects that are designed to mitigate these hazards and solve problems cost-effectively, as well as ensure consistency with the City's long-term mitigation goals and capital improvements. During the fourth Steering Committee meeting, a team-based approach was used to brainstorm mitigation projects based on the identified hazards and associated loss estimates. In addition, FEMA's Local Mitigation Planning Handbook and the California Adaptation Planning Guide were used to identify actions to mitigate the effects of climate change.

The evaluation and prioritization of the mitigation actions were used as aids to produce a list of recommended mitigation actions to incorporate into the mitigation plan. Each of the mitigation recommendations listed in Table 4.3 fell into one or more of the following categories:

- Prevention – planning and zoning, building codes, capital improvement projects, open space preservation, and storm water management
- Property Protection – acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass
- Personnel Education and Awareness – outreach projects, real estate disclosure, hazard information centers, and education programs
- Natural Resource Protection – sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation
- Emergency Services – warning systems, emergency response services, and protection of critical facilities
- Structural Projects – dams, levees, floodwalls, seawalls, retaining walls, and safe rooms

Table 4.3 provides an overview of the mitigation actions and other relevant information, in no specific order. Following the identification of mitigation actions, a Cost-Benefit Review was conducted in order to determine a prioritization of the items. Chapter 4.4 contains more information on the Cost-Benefit Review and the prioritization of the projects.

Table 4.3: Mitigation Action Identification

Mitigation Activity	Hazards Mitigated	Mitigation Action Category	Corresponding Goals & Objectives	Responsible Department	Resources	Estimated Project Cost ¹	Timeframe	Protects New Buildings	Protects Existing Buildings
2015.HMP.01 - Establish a formal role for the City of Cerritos Hazard Mitigation Steering Committee for implementing, monitoring, and evaluating citywide mitigation activities.	Multi-Hazard	Prevention	1A	Administration	Staff Time	Staff Time	Short	Y	Y
2015.HMP.02 - Develop public and private partnerships to foster hazard mitigation program coordination and collaboration in the City of Cerritos.	Multi-Hazard	Prevention	4A	Community Safety	Staff Time	Staff Time	Ongoing	N	Y
2015.HMP.03 - Conduct evaluations of critical facilities to develop inventories of at-risk buildings and identify areas for improvement. This includes, but is not limited to, incorporating alternative power sources and identifying vulnerabilities to fire and earthquake. Initiate mitigation projects accordingly.	Multi-Hazard	Property Protection	1C	Public Works	Staff Time/ General Fund	\$500,000	Medium	N	Y
2015.HMP.04 - Strengthen emergency services preparedness and response by linking emergency services with hazard mitigation programs and enhancing public education on a regional scale.	Multi-Hazard	Emergency Services	5C	Community Safety	Staff Time	\$5,000 Staff Time	Ongoing	N	Y
2015.HMP.05 - Conduct annual tabletop multi-hazard disaster exercises with local law enforcement, emergency managers, town and county officials, the Local Emergency Planning Committee (LEPC) and other disaster response agencies to identify vulnerabilities in emergency services and response.	Multi-Hazard	Emergency Services	5B	Community Safety	Staff Time	\$1,000 Staff Time	Ongoing	N	Y
2015.HMP.06 - Retrofit Traffic Signals for coordination with Emergency Vehicles to decrease response time during a hazard event.	Multi-Hazard	Emergency Services	5A	Public Works	General Fund/ Grant Funding	\$2,000,000	Short	N	Y
2015.HMP.07 - Develop a Business Continuity Planning Display. The display will be designed to raise awareness of why it is important to have a Business Continuity Plan, how to develop a Plan, and will encourage businesses to make sure that their Plan fits in the County's Plan. The display will be appropriate for use at local Chamber of Commerce meetings and activities, civic group gatherings, and other business-related gatherings.	Multi-Hazard	Prevention/ Education and Awareness	1D	Community Development	Staff Time/ General Fund	\$1,500 Staff Time	Short	N	Y
2015.HMP.08 – Work with the U.S. Geological Survey (USGS) to verify current GIS earthquake hazard mapping data is accurate for the City of Cerritos and utilize technical analysis of earthquake hazards to identify vulnerabilities in accordance with the Safety Element of the City's General Plan (SAF-2.3).	Earthquake	Prevention	EQ01	Community Development	General Fund/ Grant Funding	Staff Time	Medium	N	Y
2015.HMP.09 - In accordance with the Safety Element of the City's General Plan (SAF-2.3), conduct new seismic strength evaluations of critical City facilities built before 1980 to identify vulnerabilities and initiate improvement projects accordingly. These evaluations should highlight potential mitigation actions that would improve public infrastructure and reinforce critical facilities to meet current seismic standards.	Earthquake	Prevention/ Property Protection	EQ01	Public Works	General Fund/ Grant Funding	\$250,000	Short	N	Y

Mitigation Activity	Hazards Mitigated	Mitigation Action Category	Corresponding Goals & Objectives	Responsible Department	Resources	Estimated Project Cost ¹	Timeframe	Protects New Buildings	Protects Existing Buildings
2015.HMP.10 - In accordance with the Safety Element of the City's General Plan (SAF-2.1), create and distribute outreach materials that will increase public awareness to encourage the initiation of nonstructural and structural projects to minimize vulnerability to earthquakes in the local community.	Earthquake	Education and Awareness	EQ02	Administrative Services	General Fund	\$5,000 Staff Time	Ongoing	N	Y
2015.HMP.11 - Provide information to new home and property buyers on earthquake, fire and multi-hazard safety and encourage the public sector to identify vulnerabilities and initiate improvement projects.	Urban Fire	Education and Awareness	UF01	Administrative Services	General Fund/ Grant Funding	\$5,000 Staff Time	Short	Y	N
2015.HMP.12 - Coordinate with County and State (e.g. LEPC) representatives to maintain awareness of current trends in illegal transportation of hazardous materials within the City or that may impact the City.	Transportation Accident/ HazMat Release	Education and Awareness	TA02	Community Safety	Staff Time/ General Fund	Staff Time	Short	N	Y
2015.HMP.13 - In accordance with the Safety Element of the City's General Plan (SAF-1.4 & SAF-1.2), conduct evaluations of City flood controls within the City to ensure efficient operations and identify potential storm drain improvements. Then, identify key areas to initiate improvement projects accordingly.	Flood/ Dam Failure	Prevention/ Property Protection	FL01	Public Works	General Fund	\$50,000 Staff Time	Short	N	Y
2015.HMP.14 - In accordance with the Safety Element of the City's General Plan (SAF-5.3), ensure current maps of underground pipelines are up-to-date and educate the public for pipeline safety (Dig Alert).	Pipeline Failure/ Hazardous Materials Release	Prevention/ Education and Awareness	PF01	Administrative Services /Community Development	Staff Time/ General Fund	\$500 Staff Time	Medium	Y	Y
2015.HMP.15 - Continue to add recycled water channels to the City's water system to help conserve potable water.	Drought	Structural Projects/ Natural Resource Protection	DR02	Public Works	General Fund/ Grant Funding	\$50,000	Ongoing	Y	Y
2015.HMP.16 - Continue public outreach on water conservation.	Drought	Education and Awareness/ Natural Resource Protection	DR01	Administrative Services	Staff Time	\$10,000 Staff Time	Ongoing	N	Y
2015.HMP.17 - Continue public education regarding "See something, say something" for terrorism.	Terrorism	Education and Awareness	TR04	Administrative Services	Staff Time/ General Fund	Staff Time	Ongoing	N	Y
2015.HMP.18 - Coordinate with existing high-profile, private facilities to ensure security and anti-terrorism safety features are in use.	Terrorism	Prevention	4A	Sheriff's Department	Staff Time	Staff Time	Ongoing	N	Y

Mitigation Activity	Hazards Mitigated	Mitigation Action Category	Corresponding Goals & Objectives	Responsible Department	Resources	Estimated Project Cost ¹	Timeframe	Protects New Buildings	Protects Existing Buildings
2015.HMP.19 - Update the General Plan to include anti-terrorism requirements for new projected high-profile, private building projects. Anti-terrorism requirements should include, but are not limited to, adequate escape routes for pedestrians & motorists and built-in security systems.	Terrorism	Prevention	1A	Community Development	Staff Time	\$1,000,000	Long	Y	N
2015.HMP.20 - Continue to update the City's tree inventory and identify vulnerabilities. All trees should be maintained according to the standards in the City's Municipal Code to minimize potential hazards.	Windstorm	Natural Resource Protection	WS01	Public Works	Staff Time	Staff Time	Ongoing	N	Y

Notes:

1 Values provided by Steering Committee

2 Timeframe definitions are as follows.

- a)Short: Task to be completed within 1-2 years
- b)Medium Task to be completed within 3-5 years
- c)Long: Task to be completed after the 5-year planning period

Mitigation Strategy Discussion

The Mitigation Actions described in Table 4.3, above, and prioritized in Table 4.5, below, are the final products of the Steering Committee's efforts. It should be noted that several actions had been put forth by the Committee, but, upon further discussion, were removed because it was decided the actions would be ineffective in mitigating the specified hazard or that the actions were captured by another Mitigation Strategy. For example, it was suggested the City could educate the public on best driving practices for commercial vehicles to mitigate the potential for future transportation accidents within the City. It was noted, however, that most commercial transportation throughout the City is carried out by companies headquartered outside the City boundaries and would not fall under the City's jurisdiction. Additionally, there was a recommendation to develop, enhance, and implement educational programs aimed at mitigating risk to citizens. This was removed and replaced with several hazard-specific outreach tasks that further defined the City's objectives regarding public education. Lastly, it was suggested the team add a mitigation action to specifically address climate change. In this case, the Steering Committee decided to focus on the effects on climate change and include tasks that were specific to the hazards resulting from climate change impacts, specifically drought, urban fire, and flood.

4.3 National Flood Insurance Program Compliance

§201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

The National Flood Insurance Program (NFIP) is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the Federal Government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the Federal Government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an alternative to disaster assistance and reduce the escalating costs of repairing damage to buildings and their contents caused by floods.

Table 4.4 summarizes the City of Cerritos' participation in the program.

Table 4.4: NFIP Participation

CID	Community Name	County	Init. FHBM Identified	Init. FIRM Identified	Curr. Eff. Map Date	Reg-Emer. Date	Tribal
060108	City of Cerritos	Los Angeles	06/28/74	09/26/08	09/26/08	02/20/79	No

Continued Compliance

As part of the City of Cerritos continued compliance with NFIP, the Cerritos Municipal Code includes Chapter 6.36: Floodplain Management Program and Regulations. This is designed to promote the the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in flood-prone areas. The ordinance outlines several methods of reducing flood losses including documenting standards of construction for utilities, subdivisions, and manufactured homes

Flood Recommendations/Repetitive Loss Properties

There were no properties identified as having repetitive losses or assets impacted by regular flooding. In fact, the City of Cerritos is located in a Flood Zone X (Map Number 06037C1839F, Panels 1839, 1840, and 1980; dated November 26, 2007). According to the FEMA website, areas of this designation are expected to have minimal flood incidents, are outside the 500-year flood level, and are protected by levee from the 100-year flood. However, the City identified a recommendation for mitigating flood hazards in the "Mitigation Action Identification" table. Specifically, action HMP.2015.13 is designed to minimize losses to critical City facilities as a result of flooding.

4.4 Prioritization of Mitigation Recommendations

§201.6(c)(3)(iii): [The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

A simplified Benefit-Cost Review was applied in order to prioritize the mitigation recommendations for implementation. The priority for implementing mitigation recommendations depends upon the overall cost effectiveness of the recommendation, when taking into account monetary and non-monetary costs and benefits associated with each action. Additionally, the following questions were considered when developing the Benefit-Cost Review:

- How many people will benefit from the action?
- How large an area is impacted?
- How critical are the facilities that benefit from the action?
- Environmentally, does it make sense to do this project for the overall community?

Table 4.5 provides a detailed benefit-cost review for each mitigation recommendation, as well as a relative priority rank (High, Medium, and Low) based upon the judgment of the Steering Committee. The general category guidelines are listed below.

- High – Benefits are perceived to exceed costs without further study or evaluation
- Medium – Benefits are perceived to exceed costs, but may require further study or evaluation prior to implementation
- Low – Benefits and cost evaluations requires additional evaluation prior to implementation

It should be noted that the values for costs (cons), are estimates only.

Table 4.5: Mitigation Action Prioritization: Benefit-Cost Review

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
2015.HMP.01 - Establish a formal role for the City of Cerritos Hazard Mitigation Steering Committee for implementing, monitoring, and evaluating citywide mitigation activities.	<ul style="list-style-type: none">Avoids Emergency Management Costs	<ul style="list-style-type: none">Staff time for coordination	High
2015.HMP.02 - Develop public and private partnerships to foster hazard mitigation program coordination and collaboration in the City of Cerritos.	<ul style="list-style-type: none">Avoids Emergency Management Costs	<ul style="list-style-type: none">Staff time for coordination	High
2015.HMP.03 - Conduct evaluations of critical facilities to develop inventories of at-risk buildings and identify areas for improvement. This includes, but is not limited to, incorporating alternative power sources and identifying vulnerabilities to fire and earthquake. Initiate mitigation projects accordingly.	<ul style="list-style-type: none">Avoids Physical DamageAvoids Loss-of-Function CostsAvoids Casualties	<ul style="list-style-type: none">\$500,000 (evaluations of all forty-five [45] critical facilities in the City with special attention given to identifying vulnerabilities and mitigation actions)Construction costs for resulting mitigation projects	High
2015.HMP.04 - Strengthen emergency services preparedness and response by linking emergency services with hazard mitigation programs and enhancing public education on a regional scale.	<ul style="list-style-type: none">Avoids Emergency Management CostsAvoids Loss-of-Function Costs	<ul style="list-style-type: none">Staff time for coordination and to establish the capability of the City to participate in regional safety efforts\$5,000 (Material costs of outreach program)	Medium

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
2015.HMP.05 - Conduct annual tabletop multi-hazard disaster exercises with local law enforcement, emergency managers, town and county officials, the Local Emergency Planning Committee (LEPC) and other disaster response agencies to identify vulnerabilities in emergency services and response.	<ul style="list-style-type: none"> • Avoids Emergency Management Costs • Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> • \$1,000 (Material costs for exercise development) • Staff time for coordination 	High
2015.HMP.06 - Retrofit traffic signals for coordination with Emergency Vehicles to decrease response time during a hazard event.	<ul style="list-style-type: none"> • Avoids Physical Damages (Emergency Authorities can respond faster therefore reducing the amount of damage) • Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> • \$2,000,000 (City-wide traffic signal upgrades to respond to Emergency Vehicles) 	Low
2015.HMP.07 - Develop a Business Continuity Planning display. The display will be designed to raise awareness of why it is important to have a Business Continuity Plan, how to develop a Plan, and will encourage businesses to make sure their Plan aligns with the County's Plan. The display will be appropriate for use at local Chamber of Commerce meetings and activities, civic group gatherings, and other business-related gatherings.	<ul style="list-style-type: none"> • Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> • Staff time for coordination • \$1,500 (Material Costs of display development) 	Medium

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
2015.HMP.08 - Work with the U.S. Geological Survey (USGS) to verify current GIS earthquake hazard mapping data is accurate for the City of Cerritos and utilize technical analysis of earthquake hazards to identify vulnerabilities in accordance with the Safety Element of the City's General Plan (SAF-2.3).	<ul style="list-style-type: none"> Avoids Physical Damages Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> Staff time to ensure the City acquires all new USGS map updates 	High
2015.HMP.09 - In accordance with the Safety Element of the City's General Plan (SAF-2.3), conduct new seismic strength evaluations of critical City facilities built before 1980 to identify vulnerabilities and initiate improvement projects accordingly. These evaluations should highlight potential mitigation actions that would improve public infrastructure and reinforce critical facilities to meet current seismic standards.	<ul style="list-style-type: none"> Avoids Physical Damages Avoids Casualties Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> \$250,000 (Cost of new evaluations to pre-1980 facilities including, but not limited to, City Hall, Heritage Park, and Swim Center locations) Construction costs for resulting mitigation projects 	Low
2015.HMP.10 - In accordance with the Safety Element of the City's General Plan (SAF-2.1), create and distribute outreach materials that will increase public awareness and encourage the initiation of nonstructural and structural projects to minimize vulnerability to earthquakes in the local community.	<ul style="list-style-type: none"> Avoids Physical Damages Avoids Casualties Avoids Loss of Function Costs 	<ul style="list-style-type: none"> \$5,000 (Material costs of outreach program) Staff time for coordination 	Medium

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
2015.HMP.11 - Provide information to new home and property buyers on earthquake, fire and multi-hazard safety and encourage the public sector to identify vulnerabilities and initiate improvement projects.	<ul style="list-style-type: none"> • Avoids Physical Damages • Avoids Casualties • Avoids Loss of Function Costs 	<ul style="list-style-type: none"> • Staff time for coordination • \$5,000 annually (Material costs of outreach program) 	High
2015.HMP.12 - Coordinate with County and State (i.e. Local Emergency Planning Committee (LEPC)) representatives to maintain awareness of current trends in illegal transportation of hazardous materials within the City or that may impact the City.	<ul style="list-style-type: none"> • Avoids Physical Damages • Avoids Casualties 	<ul style="list-style-type: none"> • Staff time for coordination 	High
2015.HMP.13 - In accordance with the Safety Element of the City's General Plan (SAF-1.4 & SAF-1.2), conduct evaluations of City flood controls within the City to ensure efficient operations and identify potential storm drain improvements. Then, identify key areas to initiate improvement projects accordingly.	<ul style="list-style-type: none"> • Avoids Physical Damages • Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> • \$50,000 (Flood control evaluation) • Construction costs for resulting mitigation projects • Staff time for coordination 	Medium
2015.HMP.14 - In accordance with the Safety Element of the City's General Plan (SAF-5.3), ensure current maps of underground pipelines are up-to-date and educate the public for pipeline safety (Dig Alert).	<ul style="list-style-type: none"> • Avoids Loss-of-Function Costs • Avoids Physical Damages • Avoids Casualties 	<ul style="list-style-type: none"> • \$500 (Annual cost of map evaluation) • Staff time needed to implement public outreach 	High

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
2015.HMP.15 - Continue to add recycled water channels to the City's water system to help conserve potable water.	<ul style="list-style-type: none"> Avoids Physical Damages to landscaping Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> \$50,000 (project cost to add additional water channels) 	Low
2015.HMP.16 - Continue public outreach on water conservation.	<ul style="list-style-type: none"> Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> \$10,000 (Material costs of a variety of printed materials to continue high-priority outreach program) Staff time for coordination 	High
2015.HMP.17 - Continue public education regarding "See something, say something" for terrorism.	<ul style="list-style-type: none"> Avoids Physical Damages Avoids Casualties Avoids Loss-of-Function Costs 	<ul style="list-style-type: none"> Staff time for coordination 	Low
2015.HMP.18 - Coordinate with existing high-profile, private facilities to ensure security and anti-terrorism safety features are in use.	<ul style="list-style-type: none"> Avoids Emergency Management Costs Avoids Loss-of-Function Costs Avoids Casualties Avoids Physical Damages 	<ul style="list-style-type: none"> Staff time for coordination 	Medium

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
2015.HMP.19 - Update the General Plan to include anti-terrorism requirements for new projected high-profile, private building projects. Anti-terrorism requirements should include, but are not limited to, adequate escape routes for pedestrians & motorists and built-in security systems.	<ul style="list-style-type: none"> • Avoids Emergency Management Costs • Avoids Loss-of-Function Costs • Avoids Casualties • Avoids Physical Damages 	<ul style="list-style-type: none"> • \$1,000,000 (Full General Plan update to include anti-terrorism requirements) 	Low
2015.HMP.20 - Continue to update the City's tree inventory and identify vulnerabilities. All trees should be maintained according to the standards in the City's Municipal Code to minimize potential hazards.	<ul style="list-style-type: none"> • Avoids Physical Damages • Avoids Loss-of-Function Costs • Avoids Casualties 	<ul style="list-style-type: none"> • Staff Time for coordination 	High

4.5 Implementation Strategy

Mitigation Actions classified as high-priority mitigation actions provide the most significant vulnerability reduction, as related to cost and probability, and are typically implemented before lower ranked improvements. The City of Cerritos, however, may find that under some circumstances a recommendation classified as a low-priority mitigation action may need to be implemented before a higher priority recommendation. The priority levels associated with each improvement are indicated on the “Mitigation Action Prioritization: Benefit-Cost Review” table in the previous section.

2004 Hazard Mitigation Plan Strategies

The Project Team reviewed the mitigation strategies and actions from the 2004 Local Hazard Mitigation Plan. The 2004 Plan outlined mitigation strategies scheduled for completion in the near future and additional projects for consideration. However, as many of these projects are contingent on the City receiving grant funding to implement, few of them have been implemented.

Several of the Future Mitigation Strategies from the 2004 Plan have been carried through into this update. Table 4.6 on the following page provides the mitigation strategies from the 2004 Plan and their correlation to the current Plan. As mentioned, previously, few of the mitigation actions garnered the funding necessary for implementation. The table on the following page denoted whether or not an action was completed since the last Plan update.

Table 4.6: Ongoing Mitigation Strategies

2004 Plan Mitigation Strategies	Correlated Current Mitigation Strategies	Completed
MH #1-1 Integrate the goals and action items from the City's Natural Hazard Mitigation Plan into existing regulatory documents and programs, where appropriate	As no known plans were set for update within the planning period, this action was removed.	Ongoing
MH #1-2 Identify and pursue funding opportunities to develop and implement local mitigation activities	This action was not considered relevant to the revision of the Plan and was removed.	No
MH #1-3 establish a formal role for the City of Cerritos Hazard Mitigation Advisory Committee to develop a sustainable process for implementing, monitoring, and evaluations citywide mitigation activities.	2015.HMP.01 - Establish a formal role for the City of Cerritos hazard Mitigation Steering Committee for implementing, monitoring, and evaluation citywide mitigation activities.	No
MH #1-4 Develop public and private partnerships to foster natural hazard mitigation program coordination and collaboration in the City of Cerritos.	2015.HMP.02 - Develop public and private partnerships to foster hazard mitigation program coordination and collaboration in the City of Cerritos.	Yes/Ongoing
MH #1-5 Develop inventories of at-risk building and infrastructure and prioritize mitigation projects.	2015.HMP.03 - Conduct evaluations of critical facilities to develop inventories of at-risk buildings and identify areas for improvement. This includes, but is not limited to, incorporating alternative power sources and identifying vulnerabilities to fire and earthquake. Initial mitigation projects accordingly.	No
MH #1-6 Strengthen emergency services preparedness and response by linking emergency services with natural hazard mitigation programs and enhancing public education on a regional scale.	2015.HMP.04 - Strengthen emergency services preparedness and response by linking emergency services with hazard mitigation programs and enhancing public education on a regional scale.	No
MH #1-7 Develop, enhance, and implement education program aimed at mitigation natural hazards, and reducing the risk to citizens, public agencies, private property owners, businesses, and schools	This mitigation action was separated into several hazard-specific mitigation actions several with additional directions about the type of information the City would like to share with the public. Please see actions 2015.HMP.07, 20105.HMP.10, 2015.HMP.11, 2015.HMP.16, 2015.HMP.17, and 2015.HMP.18.	Yes/Ongoing

MH #1-8 - Conduct annual tabletop disaster exercises with local law enforcement, emergency managers, town and county officials, the LEPC and other disaster response agencies.	2015.HMP.05 - Conduct annual tabletop multi-hazard disaster exercises with local law enforcement, emergency managers, town and county officials, the Local Emergency Planning Committee and other disaster response agencies to identify vulnerabilities in emergency services and response.	Yes
MH #1-9 All Building Code Compliance	This mitigation action was not clear. Currently, all City building codes are being enforced. The action was deemed irrelevant.	No
MH #1-10 Adopt Uniform Building Code	This mitigation action is already implemented by the City and was therefore deemed irrelevant.	Yes
MH #1-11 - Retrofit Traffic Signals for coordination with Emergency Vehicle Response	2015.HMP.06 - Retrofit Traffic Signals for coordination with Emergency Vehicles to decrease response time during a hazard event.	No
MH #1-12 Develop a Business Continuity Planning Display. The display will be designed to raise the awareness level of why it is important to have a Business Continuity Plan, how to develop a plan, and will encourage business to make sure that their plan fits in with the County's plan. This display will be appropriate for use at local Chamber of Commerce meetings and activities, civic group gatherings and other business-related gathers.	2015.HMP.07 - Develop a Business Continuity Planning Display. The display will be designed to raise the awareness level of why it is important to have a Business Continuity Plan, how to develop a plan, and will encourage business to make sure that their plan fits in with the County's plan. This display will be appropriate for use at local Chamber of Commerce meetings and activities, civic group gatherings and other business-related gathers.	No
MH #1-13 Conduct a study of Public facilities for redesign	2015.HMP.03 - Conduct evaluations of critical facilities to develop inventories of at-risk buildings and identify areas for improvement. This includes, but is not limited to, incorporating alternative power sources and identifying vulnerabilities to fire and earthquake. Initiate mitigation projects accordingly	No
EQ #2-1 Integrate new earthquake hazard mapping data for the City of Cerritos and improve technical analysis of earthquake hazards.	2015.HMP.08 - Work with U.S. Geological Survey (USGS) to verify current GOS earthquake hazard mapping data is accurate for the City of Cerritos and utilize technical analysis of earthquake hazards to	Yes

	identify vulnerabilities in accordance with the Safety Element of the City's General Plan (SAF-2.3)	
EQ #2-2 - Incorporate the Regional Earthquake Transportation Evacuation Routes developed by the Regional Emergency Manager's groups into the City General Plan.	The General Plan update is not anticipated to take place until the next planning period. Therefore, this action was dropped from the list to be inserted again at the appropriate time.	No
EQ #2-3 Identify funding sources for structural and nonstructural retrofitting of structures that are identified as seismically vulnerable.	As an approved HMP inherently makes the City eligible for grant funding, this task was considered irrelevant.	No
EQ #2-4 Encourage seismic strength evaluations of critical facilities in the City to identify vulnerabilities for mitigation of public infrastructure, and critical facilities to meet current seismic standards	2015.HMP.03 - Conduct evaluations of critical facilities to develop inventories of at-risk buildings and identify areas for improvement. This includes, but is not limited to, incorporating alternative power sources and identifying vulnerabilities to fire and earthquake. Initiate mitigation projects accordingly	No
EQ #2-5 Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.	2015.HMP.11- Provide information to new home and property buyers on earthquake, fire, and multi-hazard safety and encourage the public sector to identify vulnerabilities and initiate improvement projects.	Yes
EQ #2-6 - Saf-2 Saf-2.1 – Outreach materials	2015.HMP.10 - In accordance with the Safety Element of the City's General Plan (SAF-2.1), create and distribute outreach materials that will increase public awareness to encourage the initiation of nonstructural and structural projects to minimize vulnerability to earthquakes in the local community.	Yes
EQ #2-7 Install and improve back-up power to critical facilities.	This action was deemed no longer critical by the current Steering Committee and was dropped from the action list.	No
EQ #2-8 Provide new home and property buys with information on quality redevelopment. The information is probably most efficiently dispersed at the town hall and other community-owned public facilities	2015.HMP.11- Provide information to new home and property buyers on earthquake, fire, and multi-hazard safety and encourage the public sector to identify vulnerabilities and initiate improvement projects.	Yes

FLD #3-1 Develop better urban flood warning systems	Any improvements in the flood warning system would have to come from the U.S. Corp of Engineers. As a result, this action was dropped from the Plan revision.	No
FLD #3-2 Enhance data and mapping for flooding information within the City and identify and map flood-prone areas.	The City identify any portions of the City as "flood-prone". A new action was developed to focus on flood controls to highlight storm drain improvements.	No
FLD #3-3 - Saf-1 Gen Plan Saf-1.4 maintenance of flood control facilities	2015.HMP.13 - In accordance with the Safety Element of the City's General Plan (SAF-1.4 & SAF-1.2), conduct evaluations of City flood controls within the City to ensure efficient operations and identify potential storm drain improvements. Then, identify key areas to initiate improvement projects accordingly.	No
FLD #3-4 Saf-1 Gen Plan Saf-1.2 Identify storm drain improvements	2015.HMP.13 - In accordance with the Safety Element of the City's General Plan (SAF-1.4 & SAF-1.2), conduct evaluations of City flood controls within the City to ensure efficient operations and identify potential storm drain improvements. Then, identify key areas to initiate improvement projects accordingly.	No
FLD #3-5 Saf-1 Gen Plan saf-1.3 Annual review of SEMS and evacuation route	2015.HMP.04 - Strengthen emergency services preparedness and response by linking emergency services with hazard mitigation programs and enhancing public education on a regional scale.	No
FLD #3-6 saf-1 Gen Plan Saf-1.1 Flood damage control	This action was not complete and unnecessary due to newly added mitigation activities. As a result, this mitigation action was dropped.	No
WS #4-1 Develop and implement programs to keep falling trees from threatening lives, property, and public infrastructure during windstorm events.	2015.HMP.20 - Continue to update the City's tree inventory and identify vulnerabilities. All trees should be maintained according to the standards in the City's Municipal Code to minimize potential hazards.	Yes/Ongoing

WS #4-2 Enhance strategies for debris management after windstorm events.	The City's debris removal capabilities were deemed sufficient. As a result, this mitigation action was dropped.	No
WS #4-3 Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	The City's powerlines are mostly underground. Therefore, this action was no longer relevant and dropped from the action list.	Yes
WS #4-4 Increase public awareness of windstorm mitigation activities.	This mitigation action was separated into several hazard-specific mitigation actions several with additional directions about the type of information the City would like to share with the public. Please see actions 2015.HMP.07, 2015.HMP.10, 2015.HMP.11, 2015.HMP.16, 2015.HMP.17, and 2015.HMP.18.	Yes/Ongoing

5

PLAN MAINTENANCE

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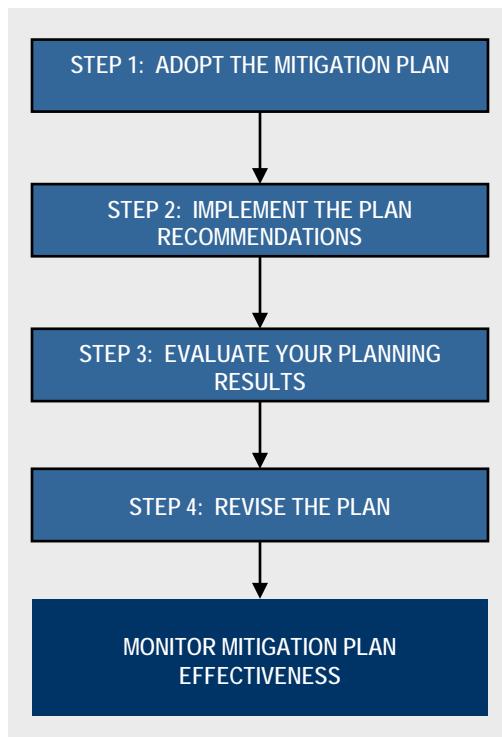
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5.1 Mitigation Progress Monitoring

The Mitigation Strategy section in the Hazard Mitigation Plan identifies mitigation actions that have been prioritized based on the loss estimates and the probability of each hazard, which will typically be implemented according to the priority rank. To thoroughly track hazard mitigation status, the City of Cerritos must continuously monitor and document the progress of the implementation of mitigation actions. Though mitigation actions may be delegated to different departments within the City, the Management Analyst will have the responsibility of monitoring overall progress.



§201.6(c)(4)(i): [The plan maintenance process **shall** include a] section describing the method and schedule of **monitoring**, evaluating, and updating the mitigation plan within a five-year cycle.

To facilitate this monitoring process, Table 5.2: “Action Item Implementation” was developed to provide a mechanism for monitoring the overall implementation progress. The table is designed to monitor mitigation actions according to project managers, project status, and project milestones.

5.2 Planning Mechanisms

§201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

5.2.1 Process to Incorporate the Mitigation Strategy into Other Planning Mechanisms

The City of Cerritos maintains the following processes to incorporate mitigation strategies of the Hazard Mitigation Plan into planning mechanisms.

Website

The City of Cerritos Hazard Mitigation Plan will be posted on the City website to enable citizens to review and provide feedback regarding mitigation objectives and strategies. Feedback from residents can be incorporated during the annual review or five year update of the Hazard Mitigation Plan.

City of Cerritos City Council

The City of Cerritos City Council is responsible for approving projects, plans, and programs on a City-wide level. By providing mitigation planning concepts to the City Council, mitigation actions and projects will be incorporated into relevant planning efforts.

Commissions

To assist Cerritos' City Council in reviewing prominent issues, the City has established the five (5) commissions listed below.

- Economic Development
- Fine Arts and Historical
- Parks and Recreation
- Planning
- Property Preservation

As necessary, each specialized commission can review and implement hazard mitigation activities that affect its goals and objectives.

Committees

In addition to the five (5) commissions, the City has also established the Community Safety and Let Freedom Ring Committees to educate and assist the community with relevant safety issues and coordinate local gatherings.

These committees can help raise awareness about hazardous events that can affect the City, educate the public about the actions the City is taking to reduce loss, and supply avenues for the community to provide feedback.

Community Development Department

The Planning Division of Cerritos' Community Development Department works closely with the Planning Commission to ensure that development within the City is consistent with the General Plan goals and policies, as well as in the best interests of the City. This includes development of land use, general planning, zoning requirements, and residential projects. Mitigation measures can be incorporated into potential projects.

The Building and Safety Division (the Division) of Cerritos' Community Development Department is responsible for reviewing construction plans and various building inspection activities. The objective of the Division is to protect the public in regards to building design and construction. Hazard mitigation activities that get incorporated into building codes will be enforced by the Division.

5.2.2 Available Planning Mechanisms to Incorporate Mitigation Requirements

The City of Cerritos uses the following local planning mechanisms for incorporating the mitigation requirements of the Hazard Mitigation Plan.

General Planning

The City of Cerritos is responsible for updating and incorporating mitigation actions and concepts in the General Plan. The General Plan is evaluated on a periodic basis, which includes a review of the policies and programs associated with land use and development, among other things. Mitigation actions from the Hazard Mitigation Plan will be reviewed during the next scheduled update of the General Plan, and incorporated as applicable. As part of this review, ordinances and codes will be reviewed to ensure they are consistent with the mitigation strategies and referred to the appropriate regulatory authority as needed.

Urban Water Management Plan

The City of Cerritos is responsible for updating and incorporating mitigation actions and concepts into the City of Cerritos Urban Water Management Plan (UWMP). The UWMP is updated every five years, which includes a review of the policies and programs associated with providing adequate water supplies to meet demands under a range of water supply conditions. Mitigation actions from the Hazard Mitigation Plan will be reviewed during the next scheduled update of the plan and incorporated as applicable. As part of this review, ordinances and codes will be reviewed to ensure they are consistent with the mitigation strategies and referred to the appropriate regulatory authority as needed. The UWMP was updated in 2010, with its next revision scheduled in the near future.

Emergency Operations Plan

The City of Cerritos maintains an Emergency Operations Plan (EOP) that includes profiles and specific responses for earthquake, hazardous materials incident, flooding and several other hazards mentioned in the Hazard Mitigation Plan. The City will incorporate the Risk Assessment into the EOP in addition to using emergency scenarios outlined in the report to flush out potential mitigation actions.

Capital Improvements Program

The City of Cerritos maintains a Capital Improvements Program (CIP) with projects that are budgeted for at least a five year period. Engineering mitigation projects are included within the CIP. Additionally, the projects already included within the CIP are reviewed for mitigation improvements (e.g., areas prone to flooding are configured with mitigation elements, current seismic design criteria is applied to construction, facility locations are reviewed for special hazards, etc.).

5.3 Periodic Assessment Requirements

§201.6(c)(4)(i): [The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, **evaluating**, and updating the mitigation plan within a five-year cycle.

Mitigation planning is an ongoing process, and as such, the Hazard Mitigation Plan should be treated as a living document that must grow and adapt in order to keep pace with changes within the City. Continuing from the 2004 Natural Hazards Mitigation Plan, an annual assessment will be completed to document any changes in site hazards (e.g., updated FIRM maps, contemporary seismic studies, etc.) or the installation and purchase of new equipment (e.g., back-up generators, emergency response equipment, etc.) to ensure they do not have any major effects on City's hazard vulnerabilities that would impact the conclusions or actions associated with the Hazard Mitigation Plan. Prior to the fifth year of the revision cycle, these annual observations will be reviewed to determine what changes should be implemented in the required Hazard Mitigation Plan Update. The results of the annual evaluations will be folded back into each phase of the planning process and should yield decisions on how to update each section of the Plan.

The Management Analyst has the responsibility of implementing these annual and five-year requirements. During the annual review, if any updates are deemed minor, then the Management Analyst or designee will perform the updates. However, if more major updates are required, then the Steering Committee will be reconvened to discuss the effects on the Plan. For the fifth year revision, the entire Steering Committee will reconvene in order to use their expertise to update the Plan in its entirety.

In addition to these periodic requirements, any significant modification to the City's facilities should be considered with respect to a possible impact on the Hazard Mitigation Plan. All Steering Committee members are responsible for providing updates for the Plan to the Management Analyst as necessary. As noted in the following section, the completed Hazard Mitigation Plan will be available on the City's website to allow the public to continue to be involved during these periodic reviews.

5.4 Update Requirements

§201.6(c)(4)(i): [The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and **updating** the mitigation plan within a five-year cycle.

§201.6(c)(4)(iii): [The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.

The Emergency Management and Assistance regulations (44 CFR Part 201) state that it is the responsibility of local agencies (i.e., the City of Cerritos) to “at a minimum, review and, if necessary, update the local mitigation plan every five years from date of plan approval to continue program eligibility.” As stated in Section 5.3, this responsibility lies with the Management Analyst. The evaluation procedures listed below will provide insight into the major changes that need to be included in the five year update and resubmission to FEMA.

- Annual Hazard Mitigation Plan review with respect to changes in hazard vulnerability (e.g., additional hazards identified, natural hazard events, etc.)
- Annual Hazard Mitigation Plan review with respect to development of new facilities
- Five year comprehensive update to address the findings of the annual reviews
- Re-submittal of the updated Hazard Mitigation Plan to CalOES/FEMA

Additionally, the risk assessment portion of the plan will be reviewed to determine if the information should be updated or modified. Each division/department responsible for the various implementation actions will report on:

- Status of their projects,
- Implementation processes,
- Any difficulties encountered,
- How coordination efforts are proceeding, and
- Which strategies should be revised.

5.4.1 Plan Update

The City's Hazard Mitigation Plan had not been updated since 2004. During Steering Committee Meeting #2, the Plan goals were reviewed for consistency and applicability to the City of Cerritos, along with the goals from the 2013 California State Hazard Mitigation Plan and 2014 Los Angeles County Hazard Mitigation Plan. One of the main objectives of the review process was to convert the fragment concepts in the original Plan into complete, clear goals. Table 5.1 illustrates the changes in the priorities of the Plan.

Table 5.1: Hazard Mitigation Plan Goals

2004 Plan Goals	Current Plan Goals
1. Protect life and property	1. Protect life, property, and commerce
2. Public Awareness	2. Promote public awareness
3. Natural Systems	3. Protect the environment
4. Partnerships and Implementation	4. Develop and expand partnerships and implementation
5. Emergency Services	5. Enhance emergency services capabilities

As shown in Table 5.1, the Plan goals are quite similar although further defined. In addition to these general Plan goals, supporting goal objectives and hazard-specific objectives were also validated, as documented in Chapter 4.

5.4.2 Continued Public Involvement

To facilitate ongoing public input, the completed and adopted Hazard Mitigation Plan will be posted on the City's website to allow the public to remain engaged and provide feedback. The website will include a link to a contact form to allow the public to submit comments. When updating the Hazard Mitigation Plan, the City of Cerritos will solicit participation from Steering Committee participants to discuss any issues that need to be addressed in the Hazard Mitigation Plan update. Public participation will be solicited through public notices and advertised on the website.

The goal of outreach regarding update meetings is to solicit public involvement in the Steering Committee, which brainstorms the hazards facing the City and discusses ways

to mitigate those hazards. The public was encouraged to participate in the hazard mitigation process through the release of a public survey. Results from the survey highlighted the hazards that were of most concern to the community. The City of Cerritos can use the information from the survey results when deciding which mitigation action to implement. It can generally be assumed that actions reducing risk for the top rated hazards will be well received by the community. More detailed information regarding the survey results can be found in Chapter 1 and Appendix D.

Table 5.2: Action Item Implementation

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
2015.HMP.01:	Establish a formal role for the City of Cerritos Hazard Mitigation Steering Committee for implementing, monitoring, and evaluating citywide mitigation activities.	<ul style="list-style-type: none">• Administration	Short	Open	
2015.HMP.02	Develop public and private partnerships to foster hazard mitigation program coordination and collaboration in the City of Cerritos.	<ul style="list-style-type: none">• Community Safety	Ongoing	Open	
2015.HMP.03	Conduct evaluations of critical facilities to develop inventories of at-risk buildings and identify areas for improvement. This includes, but is not limited to, incorporating alternative power sources and identifying vulnerabilities to fire and earthquake. Initiate mitigation projects accordingly.	<ul style="list-style-type: none">• Public Works	Medium	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
2015.HMP.04	Strengthen emergency services preparedness and response by linking emergency services with hazard mitigation programs and enhancing public education on a regional scale.	• Community Safety	Ongoing	Open	
2015.HMP.05	Conduct annual tabletop multi-hazard disaster exercises with local law enforcement, emergency managers, town and county officials, the Local Emergency Planning Committee (LEPC) and other disaster response agencies to identify vulnerabilities in emergency services and response.	• Community Safety	Ongoing	Open	
2015.HMP.06	Retrofit Traffic Signals for coordination with Emergency Vehicles to decrease response time during a hazard event.	• Public Works	Short	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
2015.HMP.07	Develop a Business Continuity Planning Display. The display will be designed to raise awareness of why it is important to have a Business Continuity Plan, how to develop a Plan, and will encourage businesses to make sure that their Plan fits in the County's Plan. The display will be appropriate for use at local Chamber of Commerce meetings and activities, civic group gatherings, and other business-related gatherings.	• Community Development	Short	Open	
2015.HMP.08	Work with the U.S. Geological Survey (USGS) to verify current GIS earthquake hazard mapping data is accurate for the City of Cerritos and utilize technical analysis of earthquake hazards to identify vulnerabilities in accordance with the Safety Element of the City's General Plan (SAF-2.3).	• Community Development	Medium	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
2015.HMP.09	In accordance with the Safety Element of the City's General Plan (SAF-2.3), conduct new seismic strength evaluations of critical City facilities built before 1980 to identify vulnerabilities and initiate improvement projects accordingly. These evaluations should highlight potential mitigation actions that would improve public infrastructure and reinforce critical facilities to meet current seismic standards.	• Public Works	Short	Open	
2015.HMP.10	In accordance with the Safety Element of the City's General Plan (SAF-2.1), create and distribute outreach materials that will increase public awareness to encourage the initiation of nonstructural and structural projects to minimize vulnerability to earthquakes in the local community.	• Administrative Services	Ongoing	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
2015.HMP.11	Provide information to new home and property buyers on earthquake, fire and multi-hazard safety and encourage the public sector to identify vulnerabilities and initiate improvement projects	• Administrative Services	Short	Open	
2015.HMP.12	Coordinate with County and State (e.g. LEPC) representatives to maintain awareness of current trends in illegal transportation of hazardous materials within the City or that may impact the City.	• Community Safety	Short	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
2015.HMP.13	In accordance with the Safety Element of the City's General Plan (SAF-1.4 & SAF-1.2), conduct evaluations of City flood controls within the City to ensure efficient operations and identify potential storm drain improvements. Then, identify key areas to initiate improvement projects accordingly.	<ul style="list-style-type: none"> Public Works 	Short	Open	
2015.HMP.14	In accordance with the Safety Element of the City's General Plan (SAF-5.3), ensure current maps of underground pipelines are up-to-date and educate the public for pipeline safety (Dig Alert).	<ul style="list-style-type: none"> Administrative Services Community Development 	Medium	Open	
2015.HMP.15	Continue to add recycled water channels to the City's water system to help conserve potable water.	<ul style="list-style-type: none"> Public Works 	Ongoing	Open	
2015.HMP.16	Continue public outreach on water conservation.	<ul style="list-style-type: none"> Administrative Services 	Ongoing	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
2015.HMP.17	Continue public education regarding “See something, say something” for terrorism.	• Administrative Services	Ongoing	Open	
2015.HMP.18	Coordinate with existing high-profile, private facilities to ensure security and anti-terrorism safety features are in use.	• Sheriff’s Department	Ongoing	Open	
2015.HMP.19	Update the General Plan to include anti-terrorism requirements for new projected high-profile, private building projects. Anti-terrorism requirements should include, but are not limited to, adequate escape routes for pedestrians & motorists and built-in security systems.	• Community Development	Long	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
2015.HMP.20	<p>Continue to update the City's tree inventory and identify vulnerabilities.</p> <p>All trees should be maintained according to the standards in the City's Municipal Code to minimize potential hazards.</p>	<ul style="list-style-type: none"> • Public Works 	Ongoing	Open	

A

GLOSSARY & HAZUS MODELS

Active fault - For implementation of Alquist-Priolo Earthquake Fault Zoning Act (APEFZA) requirements, an active fault is one that shows evidence of, or is suspected of having experienced surface displacement within the last 11,000 years. APEFZA classification is designed for land use management of surface rupture hazards. A more general definition (National Academy of Science, 1988), states "a fault that on the basis of historical, seismological, or geological evidence has the finite probability of producing an earthquake" (see potentially active fault).

Aftershocks - Minor earthquakes following a greater one and originating at or near the same place.

Asset - Any man-made or natural feature that has value, including, but not limited to people, buildings, infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

A zone - Under the National Flood Insurance Program, area subject to inundation by the 100-year flood where wave action does not occur or where waves are less than 3 feet high, designated Zone A, AE, A1-A30, A0, AH, or AR on a Flood Insurance Rate Map (FIRM).

Base flood - Flood that has a 1 percent probability of being equaled or exceeded in any given year. Also known as the 100-year flood.

Bedrock - The solid rock that underlies loose material, such as soil, sand, clay, or gravel.

Contour - A line of equal ground elevation on a topographic (contour) map.

Critical facility - Facilities that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.

Debris - (Seismic) The scattered remains of something broken or destroyed; ruins; rubble; fragments. (Flooding, Coastal) Solid objects or masses carried by or floating on the surface of moving water.

Debris flow - A saturated, rapidly moving saturated earth flow with 50 percent rock fragments coarser than 2 mm in size which can occur on natural and graded slopes.

Duration - How long a hazard event lasts.

Earthquake - Vibratory motion propagating within the Earth or along its surface caused by the abrupt release of strain from elastically deformed rock by displacement along a fault.

Epicenter - The point at the Earth's surface directly above where an earthquake originated.

Erosion - Under the National Flood Insurance Program, the process of the gradual wearing away of landmasses. In general, erosion involves the detachment and movement of soil and rock fragments, during a flood or storm or over a period of years, through the action of wind, water, or other geologic processes.

Essential facility - Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include: government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations.

Extent - The size of an area affected by a hazard or hazard event.

Fault - A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are differentially displaced parallel to the plane of fracture.

Fault slip rate - The average long-term movement of a fault (measured in cm/year or mm/year) as determined from geologic evidence.

Federal Emergency Management Agency (FEMA) - Independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery.

Flash flood - A flood event occurring with little or no warning where water levels rise at an extremely fast rate.

Flood - A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.

Floodplain - Any land area, including watercourse, susceptible to partial or complete inundation by water from any source.

Frequency - A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration,

and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average, and would have a 1 percent chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered.

Geographic Information Systems (GIS) - A computer software application that relates physical features on the Earth to a database to be used for mapping and analysis.

Ground motion - The vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter, but soft soils can further amplify ground motions.

Ground rupture - Displacement of the earth's surface as a result of fault movement associated with an earthquake.

Hailstorm – Storm associated with spherical balls of ice. Hail is a product of thunderstorms or intense showers. It is generally white and translucent, consisting of liquid or snow particles encased with layers of ice. Hail is formed within the higher reaches of a well-developed thunderstorm. When hailstones become too heavy to be caught in an updraft back into the clouds of the thunderstorm (hailstones can be caught in numerous updrafts adding a coating of ice to the original frozen droplet of rain each time), they fall as hail and a hailstorm ensues.

Hazard - A source of potential danger or adverse condition. Hazards in this how to series will include naturally occurring events such as floods, earthquakes, tornadoes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. A natural event is a hazard when it has the potential to harm people or property.

Hazard event - A specific occurrence of a particular type of hazard.

Hazard identification - The process of identifying hazards that threaten an area.

Hazard mitigation - Sustained actions taken to reduce or eliminate long-term risk from hazards and their effects.

Hazard Mitigation Grant Program (HMGP) – Authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster.

Hazard Mitigation Plan – A collaborative document in which hazards affecting the community are identified, vulnerability to hazards assessed, and consensus reached on how to minimize or eliminate the effects of these hazards.

Hazard profile - A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.

Hazardous Material Facilities – Facilities housing industrial and hazardous materials, such as corrosives, explosives, flammable materials, radioactive materials, and toxins.

HAZUS (Hazards U.S.) - A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA.

Hurricane - An intense tropical cyclone, formed in the atmosphere over warm ocean areas, in which wind speeds reach 74-miles-per-hour or more and blow in a large spiral around a relatively calm center or "eye." Hurricanes develop over the north Atlantic Ocean, northeast Pacific Ocean, or the south Pacific Ocean east of 160°E longitude. Hurricane circulation is counter-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

Hydrology - The science of dealing with the waters of the earth. A flood discharge is developed by a hydrologic study.

Infrastructure - Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, and includes an area's transportation system such as airports, heliports; highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, drydocks, piers and regional dams.

Landslide - A general term covering a wide variety of mass-movement landforms and processes involving the downslope transport, under gravitational influence, of soil and rock material en masse.

Liquefaction - Changing of soils (unconsolidated alluvium) from a solid state to weaker state unable to support structures; where the material behaves similar to a liquid as a consequence of earthquake shaking. The transformation of cohesionless soils from a solid or liquid state as a result of increased pore pressure and reduced effective stress.

Magnitude - A measure of the strength of a hazard event. The magnitude (also referred to as severity) of a given hazard event is usually determined using technical measures specific to the hazard.

Mitigation plan - A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the state and includes a description of actions to minimize future vulnerability to hazards.

Nor'easter - An extra-tropical cyclone producing gale-force winds and precipitation in the form of heavy snow or rain.

Peak Ground Acceleration (PGA) - The greatest amplitude of acceleration measured for a single frequency on an earthquake accelerogram. The maximum horizontal ground motion generated by an earthquake. The measure of this motion is the acceleration of gravity (equal to 32 feet per second squared, or 980 centimeter per second squared), and generally expressed as a percentage of gravity.

Potentially active fault - A fault showing evidence of movement within the last 1.6 million years (750,000 years according to the U.S. Geological Survey) but before about 11,000 years ago, and that is capable of generating damaging earthquakes.

Probability - A statistical measure of the likelihood that a hazard event will occur.

Replacement value - The cost of rebuilding a structure. This is usually expressed in terms of cost per square foot, and reflects the present-day cost of labor and materials to construct a building of a particular size, type and quality.

Retrofit - Any change made to an existing structure to reduce or eliminate damage to that structure from flooding, erosion, high winds, earthquakes, or other hazards

Richter scale - A numerical scale of earthquake magnitude devised by seismologist C.F. Richter in 1935. Seismologists no longer use this magnitude scale because of limitations in how it measures large earthquakes, and prefer instead to use moment magnitude as a measure of the energy released during an earthquake.

Risk - The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Seismicity - Describes the likelihood of an area being subject to earthquakes.

Tectonic plate - Torsionally rigid, thin segments of the earth's lithosphere that may be assumed to move horizontally and adjoin other plates. It is the friction between plate boundaries that cause seismic activity.

Topographic - Characterizes maps that show natural features and indicate the physical shape of the land using contour lines. These maps may also include manmade features.

Tornado - A violently rotating column of air extending from a thunderstorm to the ground.

Tsunami - Great sea wave produced by a submarine earthquake, landslide, or volcanic eruption.

Vulnerability - Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power – if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.

Vulnerability assessment - The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment should address impacts of hazard events on the existing and future built environment.

Wildfire - An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.

Zone - A geographical area shown on a Flood Insurance Rate Map.

100-year flood – A flood that has a 1-percent chance of being equaled or exceeded in any given year. This flood event is also referred to as the base flood. The term "100-year flood" can be misleading; it is not the flood that will occur once every 100 years. Rather, it is the flood elevation that has a 1- percent chance of being equaled or exceeded each year. Therefore, the 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management to determine the need for flood insurance.

500-year flood – A flood that has a 0.2-percent chance of being equaled or exceeded in any one year.

HAZUS Models

After a detailed review of the hazard profiles in Chapter 3, loss estimate calculations for an earthquake scenario was completed using the HAZUS-MH model for a scenario on the Newport-Inglewood Fault and the Puente Hills Fault.



HAZUS-MH: Earthquake Event Report

Region Name: *City of Cerritos*

Earthquake Scenario: *Newport Inglewood 1*

Print Date: *October 21, 2015*

Disclaimer:

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

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General Description of the Region

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

California

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 8.88 square miles and contains 11 census tracts. There are over 15 thousand households in the region and has a total population of 51,483 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 17 thousand buildings in the region with a total building replacement value (excluding contents) of 4,388 (millions of dollars). Approximately 98.00 % of the buildings (and 77.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 363 and 78 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 17 thousand buildings in the region which have an aggregate total replacement value of 4,388 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 97% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 124 beds. There are 23 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to HPL facilities, there are 0 dams identified within the region. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 13 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 441.00 (millions of dollars). This inventory includes over 50 kilometers of highways, 30 bridges, 509 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	30	106.00
	Segments	2	247.80
	Tunnels	0	0.00
	Subtotal		353.80
Railways	Bridges	0	0.00
	Facilities	0	0.00
	Segments	1	10.10
	Tunnels	0	0.00
	Subtotal		10.10
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		0.00
Bus	Facilities	0	0.00
	Subtotal		0.00
Ferry	Facilities	0	0.00
	Subtotal		0.00
Port	Facilities	0	0.00
	Subtotal		0.00
Airport	Facilities	0	0.00
	Runways	0	0.00
	Subtotal		0.00
Total			363.80

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	5.10
	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		5.10
Waste Water	Distribution Lines	NA	3.10
	Facilities	1	78.60
	Pipelines	0	0.00
	Subtotal		81.60
Natural Gas	Distribution Lines	NA	2.00
	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		2.00
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		0.00
Electrical Power	Facilities	0	0.00
	Subtotal		0.00
Communication	Facilities	0	0.00
	Subtotal		0.00
	Total		88.80

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Newport Inglewood 1
Type of Earthquake	Source
Fault Name	Newport-Inglewood
Historical Epicenter ID #	183
Probabilistic Return Period	NA
Longitude of Epicenter	-118.14
Latitude of Epicenter	33.78
Earthquake Magnitude	7.10
Depth (Km)	0.00
Rupture Length (Km)	50.58
Rupture Orientation (degrees)	0.00
Attenuation Function	WUS Shallow Crustal Event - Extensional

Building Damage

Building Damage

HAZUS estimates that about 3,636 buildings will be at least moderately damaged. This is over 21.00 % of the total number of buildings in the region. There are an estimated 90 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	67	1.03	69	0.97	89	2.77	44	12.89	13	14.34
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.01	0	0.04	0	0.05
Industrial	16	0.25	16	0.23	23	0.72	12	3.41	4	3.85
Other Residential	46	0.72	52	0.73	33	1.02	12	3.43	3	3.67
Religion	2	0.03	2	0.03	2	0.07	1	0.32	0	0.36
Single Family	6,343	97.96	6,998	98.04	3,059	95.41	271	79.90	71	77.73
Total	6,475		7,138		3,206		340		91	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	6,337	97.88	7023	98.38	3,043	94.89	255	75.02	70	77.15
Steel	15	0.24	17	0.24	31	0.96	17	5.13	6	6.13
Concrete	14	0.22	17	0.24	18	0.56	10	2.87	3	3.10
Precast	20	0.31	21	0.29	30	0.93	14	4.25	4	4.09
RM	84	1.30	54	0.76	72	2.26	34	9.91	4	4.78
URM	3	0.05	4	0.06	6	0.20	4	1.20	3	2.88
MH	1	0.01	2	0.03	6	0.19	5	1.61	2	1.86
Total	6,475		7,138		3,206		340		91	

*Note:

RM Reinforced Masonry
 URM Unreinforced Masonry
 MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 124 hospital beds available for use. On the day of the earthquake, the model estimates that only 71 hospital beds (58.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 93.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	1	0	0	1
Schools	23	0	0	0
EOCs	0	0	0	0
Police Stations	1	0	0	0
Fire Stations	1	0	0	0

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component	Locations/ Segments	Number of Locations_			With Functionality > 50 %	
			With at Least Mod. Damage	With Complete Damage		After Day 1	After Day 7
Highway	Segments	2	0	0		2	2
	Bridges	30	2	0		28	29
	Tunnels	0	0	0		0	0
Railways	Segments	1	0	0		1	1
	Bridges	0	0	0		0	0
	Tunnels	0	0	0		0	0
	Facilities	0	0	0		0	0
Light Rail	Segments	0	0	0		0	0
	Bridges	0	0	0		0	0
	Tunnels	0	0	0		0	0
	Facilities	0	0	0		0	0
Bus	Facilities	0	0	0		0	0
Ferry	Facilities	0	0	0		0	0
Port	Facilities	0	0	0		0	0
Airport	Facilities	0	0	0		0	0
	Runways	0	0	0		0	0

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	1	0	0	1
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	255	156	39
Waste Water	153	123	31
Natural Gas	102	132	33
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	15,389	3,689	0	0	0	0
Electric Power		1,705	924	311	49	3

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 3 ignitions that will burn about 0.02 sq. mi 0.22 % of the region's total area.) The model also estimates that the fires will displace about 75 people and burn about 7 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 31.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates (121 households to be displaced due to the earthquake. Of these, 24 people (out of a total population of 51,483 will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1:Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2:Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3:Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4:Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	3	1	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	5	1	0	0
	Single Family	52	7	0	0
Total		63	9	1	1
2 PM	Commercial	176	45	7	13
	Commuting	0	0	0	0
	Educational	26	6	1	2
	Hotels	0	0	0	0
	Industrial	11	3	0	1
	Other-Residential	1	0	0	0
	Single Family	8	1	0	0
Total		222	56	9	16
5 PM	Commercial	125	32	5	9
	Commuting	9	12	20	4
	Educational	5	1	0	0
	Hotels	0	0	0	0
	Industrial	7	2	0	1
	Other-Residential	2	0	0	0
	Single Family	20	3	0	0
Total		168	50	25	14

Economic Loss

The total economic loss estimated for the earthquake is 492.83 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 463.43 (millions of dollars); 10 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 54 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.36	16.08	0.88	0.22	17.54
	Capital-Related	0.00	0.16	12.90	0.55	0.09	13.69
	Rental	4.40	0.83	8.03	0.51	0.10	13.86
	Relocation	0.49	0.02	0.50	0.06	0.05	1.12
	Subtotal	4.90	1.37	37.51	1.99	0.45	46.21
Capital Stock Loses							
	Structural	30.29	1.06	27.67	5.78	1.27	66.06
	Non_Structural	155.48	6.44	65.06	18.98	4.10	250.06
	Content	49.42	1.58	31.10	13.19	1.84	97.12
	Inventory	0.00	0.00	1.76	2.20	0.01	3.98
	Subtotal	235.19	9.07	125.60	40.15	7.22	417.22
	Total	240.09	10.44	163.10	42.14	7.67	463.43

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	247.76	\$0.00	0.00
	Bridges	106.00	\$9.04	8.53
	Tunnels	0.00	\$0.00	0.00
	Subtotal	353.80	9.00	
Railways	Segments	10.09	\$0.00	0.00
	Bridges	0.00	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	10.10	0.00	
Light Rail	Segments	0.00	\$0.00	0.00
	Bridges	0.00	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Bus	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Ferry	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Port	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Airport	Facilities	0.00	\$0.00	0.00
	Runways	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
	Total	363.80	9.00	

Table 14: Utility System Economic Losses
 (Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Line	5.10	\$0.70	13.76
	Subtotal	5.10	\$0.70	
Waste Water	Pipelines	0.00	\$0.00	0.00
	Facilities	78.60	\$18.51	23.55
	Distribution Line	3.10	\$0.55	18.14
	Subtotal	81.65	\$19.07	
Natural Gas	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Line	2.00	\$0.59	29.08
	Subtotal	2.04	\$0.59	
Oil Systems	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
Electrical Power	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
Communication	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
	Total	88.78	\$20.36	

Table 15. Indirect Economic Impact with outside aid
 (Employment as # of people and Income in millions of \$)

	LOSS	Total	%
First Year			
Employment Impact	0	0.00	
Income Impact	(4)	-0.47	
Second Year			
Employment Impact	0	0.00	
Income Impact	(12)	-1.43	
Third Year			
Employment Impact	0	0.00	
Income Impact	(15)	-1.85	
Fourth Year			
Employment Impact	0	0.00	
Income Impact	(15)	-1.85	
Fifth Year			
Employment Impact	0	0.00	
Income Impact	(15)	-1.85	
Years 6 to 15			
Employment Impact	0	0.00	
Income Impact	(15)	-1.85	

Appendix A: County Listing for the Region

Los Angeles, CA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Los Angeles	51,483	3,391	996	4,388
Total State		51,483	3,391	996	4,388
Total Region		51,483	3,391	996	4,388



HAZUS-MH: Earthquake Event Report

Region Name: *City of Cerritos*

Earthquake Scenario: *PuenteHills*

Print Date: *October 21, 2015*

Disclaimer:

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

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General Description of the Region

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

California

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 8.88 square miles and contains 11 census tracts. There are over 15 thousand households in the region and has a total population of 51,483 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 17 thousand buildings in the region with a total building replacement value (excluding contents) of 4,388 (millions of dollars). Approximately 98.00 % of the buildings (and 77.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 363 and 78 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 17 thousand buildings in the region which have an aggregate total replacement value of 4,388 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 97% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 124 beds. There are 23 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to HPL facilities, there are 0 dams identified within the region. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 13 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 441.00 (millions of dollars). This inventory includes over 50 kilometers of highways, 30 bridges, 509 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	30	106.00
	Segments	2	247.80
	Tunnels	0	0.00
	Subtotal		353.80
Railways	Bridges	0	0.00
	Facilities	0	0.00
	Segments	1	10.10
	Tunnels	0	0.00
	Subtotal		10.10
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		0.00
Bus	Facilities	0	0.00
	Subtotal		0.00
Ferry	Facilities	0	0.00
	Subtotal		0.00
Port	Facilities	0	0.00
	Subtotal		0.00
Airport	Facilities	0	0.00
	Runways	0	0.00
	Subtotal		0.00
Total			363.80

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	5.10
	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		5.10
Waste Water	Distribution Lines	NA	3.10
	Facilities	1	78.60
	Pipelines	0	0.00
	Subtotal		81.60
Natural Gas	Distribution Lines	NA	2.00
	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		2.00
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		0.00
Electrical Power	Facilities	0	0.00
	Subtotal		0.00
Communication	Facilities	0	0.00
	Subtotal		0.00
	Total		88.80

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	PuenteHills
Type of Earthquake	Source
Fault Name	Puente Hills blind thrust (new)
Historical Epicenter ID #	537
Probabilistic Return Period	NA
Longitude of Epicenter	-118.04
Latitude of Epicenter	33.93
Earthquake Magnitude	7.10
Depth (Km)	5.00
Rupture Length (Km)	41.02
Rupture Orientation (degrees)	0.00
Attenuation Function	WUS Shallow Crustal Event - Non Extensional

Building Damage

Building Damage

HAZUS estimates that about 6,190 buildings will be at least moderately damaged. This is over 36.00 % of the total number of buildings in the region. There are an estimated 236 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	33	0.89	56	0.77	98	1.89	66	8.53	29	12.13
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.01	0	0.03	0	0.05
Industrial	7	0.18	12	0.17	25	0.48	18	2.38	9	3.70
Other Residential	25	0.67	51	0.70	46	0.89	17	2.19	6	2.71
Religion	1	0.03	2	0.03	3	0.05	2	0.20	1	0.27
Single Family	3,642	98.22	7,229	98.34	5,008	96.68	671	86.66	192	81.13
Total	3,708		7,352		5,181		774		236	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	3,645	98.31	7261	98.77	4,997	96.46	638	82.41	186	78.87
Steel	8	0.23	13	0.18	31	0.60	23	3.02	10	4.31
Concrete	7	0.19	14	0.19	20	0.39	14	1.80	6	2.51
Precast	7	0.18	14	0.19	32	0.62	25	3.17	11	4.81
RM	39	1.04	45	0.61	88	1.70	63	8.09	15	6.31
URM	1	0.03	3	0.04	6	0.12	6	0.71	5	2.10
MH	0	0.01	2	0.02	6	0.11	6	0.79	3	1.07
Total	3,708		7,352		5,181		774		236	

*Note:

RM Reinforced Masonry
 URM Unreinforced Masonry
 MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 124 hospital beds available for use. On the day of the earthquake, the model estimates that only 49 hospital beds (40.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 87.00% of the beds will be back in service. By 30 days, 99.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	1	0	0	0
Schools	23	0	0	0
EOCs	0	0	0	0
Police Stations	1	0	0	0
Fire Stations	1	0	0	0

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component	Locations/ Segments	Number of Locations_			With Functionality > 50 %	
			With at Least Mod. Damage	With Complete Damage		After Day 1	After Day 7
Highway	Segments	2	0	0		2	2
	Bridges	30	2	0		28	28
	Tunnels	0	0	0		0	0
Railways	Segments	1	0	0		1	1
	Bridges	0	0	0		0	0
	Tunnels	0	0	0		0	0
	Facilities	0	0	0		0	0
Light Rail	Segments	0	0	0		0	0
	Bridges	0	0	0		0	0
	Tunnels	0	0	0		0	0
	Facilities	0	0	0		0	0
Bus	Facilities	0	0	0		0	0
Ferry	Facilities	0	0	0		0	0
Port	Facilities	0	0	0		0	0
Airport	Facilities	0	0	0		0	0
	Runways	0	0	0		0	0

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	1	0	0	1
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	255	257	64
Waste Water	153	203	51
Natural Gas	102	217	54
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	15,389	10,678	0	0	0	0
Electric Power		11,122	6,833	2,763	523	15

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 6 ignitions that will burn about 0.03 sq. mi 0.33 % of the region's total area.) The model also estimates that the fires will displace about 137 people and burn about 15 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 31.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates (274 households to be displaced due to the earthquake. Of these, 55 people (out of a total population of 51,483 will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1:Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2:Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3:Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4:Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	7	2	0	1
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	1	0	0	0
	Industrial	3	1	0	0
	Other-Residential	10	2	0	1
	Single Family	99	15	1	1
	Total	119	21	2	3
2 PM	Commercial	351	100	16	32
	Commuting	0	0	1	0
	Educational	43	12	2	4
	Hotels	0	0	0	0
	Industrial	22	6	1	2
	Other-Residential	1	0	0	0
	Single Family	15	2	0	0
	Total	433	121	20	39
5 PM	Commercial	243	69	11	22
	Commuting	18	24	40	8
	Educational	9	2	0	1
	Hotels	0	0	0	0
	Industrial	14	4	1	1
	Other-Residential	4	1	0	0
	Single Family	39	6	0	0
	Total	326	106	53	32

Economic Loss

The total economic loss estimated for the earthquake is 813.78 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 770.37 (millions of dollars); 9 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 54 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.69	23.49	1.42	0.31	25.92
	Capital-Related	0.00	0.31	18.68	0.89	0.13	20.00
	Rental	8.13	1.40	11.84	0.81	0.15	22.34
	Relocation	0.93	0.03	0.73	0.09	0.07	1.85
	Subtotal	9.06	2.44	54.74	3.21	0.66	70.11
Capital Stock Loses							
	Structural	53.97	1.68	46.44	9.87	1.86	113.82
	Non_Structural	260.00	10.37	108.69	35.06	6.18	420.30
	Content	76.01	2.48	52.86	24.65	2.80	158.80
	Inventory	0.00	0.00	3.24	4.08	0.02	7.34
	Subtotal	389.98	14.54	211.24	73.65	10.86	700.26
	Total	399.04	16.98	265.98	76.86	11.52	770.37

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	247.76	\$0.00	0.00
	Bridges	106.00	\$13.14	12.40
	Tunnels	0.00	\$0.00	0.00
	Subtotal	353.80	13.10	
Railways	Segments	10.09	\$0.00	0.00
	Bridges	0.00	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	10.10	0.00	
Light Rail	Segments	0.00	\$0.00	0.00
	Bridges	0.00	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Bus	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Ferry	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Port	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Airport	Facilities	0.00	\$0.00	0.00
	Runways	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
	Total	363.80	13.10	

Table 14: Utility System Economic Losses
 (Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Line	5.10	\$1.16	22.67
	Subtotal	5.10	\$1.16	
Waste Water	Pipelines	0.00	\$0.00	0.00
	Facilities	78.60	\$27.22	34.63
	Distribution Line	3.10	\$0.91	29.89
	Subtotal	81.65	\$28.13	
Natural Gas	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Line	2.00	\$0.98	47.92
	Subtotal	2.04	\$0.98	
Oil Systems	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
Electrical Power	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
Communication	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
	Total	88.78	\$30.26	

Table 15. Indirect Economic Impact with outside aid
 (Employment as # of people and Income in millions of \$)

	LOSS	Total	%
First Year			
Employment Impact	0	0.00	
Income Impact	(6)	-0.80	
Second Year			
Employment Impact	0	0.00	
Income Impact	(20)	-2.42	
Third Year			
Employment Impact	0	0.00	
Income Impact	(25)	-3.12	
Fourth Year			
Employment Impact	0	0.00	
Income Impact	(25)	-3.12	
Fifth Year			
Employment Impact	0	0.00	
Income Impact	(25)	-3.12	
Years 6 to 15			
Employment Impact	0	0.00	
Income Impact	(25)	-3.12	

Appendix A: County Listing for the Region

Los Angeles, CA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Los Angeles	51,483	3,391	996	4,388
Total State		51,483	3,391	996	4,388
Total Region		51,483	3,391	996	4,388

B REGULATIONS

The Disaster Mitigation Act of 2000 (P.L. 106-390) facilitates a new and revitalized approach to mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions (Section 409) and replacing them with a new set of mitigation plan requirements (Section 322). This new section emphasizes the need for state, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. The following pages provide a description of the Disaster Mitigation Act of 2000, as well as the Interim Final Rule for mitigation planning.

PUBLIC LAW 106-390—OCT. 30, 2000

DISASTER MITIGATION ACT OF 2000

**Public Law 106-390
106th Congress
An Act**

Oct. 30, 2000

[H.R. 707]

To amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act to authorize a program for predisaster mitigation, to streamline the administration of disaster relief, to control the Federal costs of disaster assistance, and for other purposes.

Disaster
Mitigation Act of
2000.

42 USC 5121
note.

*Be it enacted by the Senate and House of Representatives of
the United States of America in Congress assembled,*

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) **SHORT TITLE.**—This Act may be cited as the “Disaster Mitigation Act of 2000”.

(b) **TABLE OF CONTENTS.**—The table of contents of this Act is as follows:

Sec. 1. Short title; table of contents.

TITLE I—PREDISASTER HAZARD MITIGATION

Sec. 101. Findings and purpose.
Sec. 102. Predisaster hazard mitigation.
Sec. 103. Interagency task force.
Sec. 104. Mitigation planning; minimum standards for public and private structures.

TITLE II—STREAMLINING AND COST REDUCTION

Sec. 201. Technical amendments.
Sec. 202. Management costs.
Sec. 203. Public notice, comment, and consultation requirements.
Sec. 204. State administration of hazard mitigation grant program.
Sec. 205. Assistance to repair, restore, reconstruct, or replace damaged facilities.
Sec. 206. Federal assistance to individuals and households.
Sec. 207. Community disaster loans.
Sec. 208. Report on State management of small disasters initiative.
Sec. 209. Study regarding cost reduction.

TITLE III—MISCELLANEOUS

Sec. 301. Technical correction of short title.
Sec. 302. Definitions.
Sec. 303. Fire management assistance.
Sec. 304. Disaster grant closeout procedures.
Sec. 305. Public safety officer benefits for certain Federal and State employees.
Sec. 306. Buy American.
Sec. 307. Treatment of certain real property.
Sec. 308. Study of participation by Indian tribes in emergency management.

**TITLE I—PREDISASTER HAZARD
MITIGATION**

42 USC 5133
note.

SEC. 101. FINDINGS AND PURPOSE.

(a) **FINDINGS.**—Congress finds that—

- (1) natural disasters, including earthquakes, tsunamis, tornadoes, hurricanes, flooding, and wildfires, pose great danger to human life and to property throughout the United States;
- (2) greater emphasis needs to be placed on—
 - (A) identifying and assessing the risks to States and local governments (including Indian tribes) from natural disasters;
 - (B) implementing adequate measures to reduce losses from natural disasters; and
 - (C) ensuring that the critical services and facilities of communities will continue to function after a natural disaster;
- (3) expenditures for postdisaster assistance are increasing without commensurate reductions in the likelihood of future losses from natural disasters;
- (4) in the expenditure of Federal funds under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.), high priority should be given to mitigation of hazards at the local level; and
- (5) with a unified effort of economic incentives, awareness and education, technical assistance, and demonstrated Federal support, States and local governments (including Indian tribes) will be able to—
 - (A) form effective community-based partnerships for hazard mitigation purposes;
 - (B) implement effective hazard mitigation measures that reduce the potential damage from natural disasters;
 - (C) ensure continued functionality of critical services;
 - (D) leverage additional non-Federal resources in meeting natural disaster resistance goals; and
 - (E) make commitments to long-term hazard mitigation efforts to be applied to new and existing structures.

(b) PURPOSE.—The purpose of this title is to establish a national disaster hazard mitigation program—

- (1) to reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters; and
- (2) to provide a source of predisaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster.

SEC. 102. PREDISASTER HAZARD MITIGATION.

(a) IN GENERAL.—Title II of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5131 et seq.) is amended by adding at the end the following:

“SEC. 203. PREDISASTER HAZARD MITIGATION.

“(a) DEFINITION OF SMALL IMPOVERISHED COMMUNITY.—In this section, the term ‘small impoverished community’ means a community of 3,000 or fewer individuals that is economically disadvantaged, as determined by the State in which the community is located and based on criteria established by the President.

President.
42 USC 5133.

“(b) ESTABLISHMENT OF PROGRAM.—The President may establish a program to provide technical and financial assistance to States and local governments to assist in the implementation of

predisaster hazard mitigation measures that are cost-effective and are designed to reduce injuries, loss of life, and damage and destruction of property, including damage to critical services and facilities under the jurisdiction of the States or local governments.

“(c) APPROVAL BY PRESIDENT.—If the President determines that a State or local government has identified natural disaster hazards in areas under its jurisdiction and has demonstrated the ability to form effective public-private natural disaster hazard mitigation partnerships, the President, using amounts in the National Predisaster Mitigation Fund established under subsection (i) (referred to in this section as the ‘Fund’), may provide technical and financial assistance to the State or local government to be used in accordance with subsection (e).

“(d) STATE RECOMMENDATIONS.—

“(1) IN GENERAL.—

“(A) RECOMMENDATIONS.—The Governor of each State may recommend to the President not fewer than five local governments to receive assistance under this section.

“(B) DEADLINE FOR SUBMISSION.—The recommendations under subparagraph (A) shall be submitted to the President not later than October 1, 2001, and each October 1st thereafter or such later date in the year as the President may establish.

“(C) CRITERIA.—In making recommendations under subparagraph (A), a Governor shall consider the criteria specified in subsection (g).

“(2) USE.—

“(A) IN GENERAL.—Except as provided in subparagraph (B), in providing assistance to local governments under this section, the President shall select from local governments recommended by the Governors under this subsection.

“(B) EXTRAORDINARY CIRCUMSTANCES.—In providing assistance to local governments under this section, the President may select a local government that has not been recommended by a Governor under this subsection if the President determines that extraordinary circumstances justify the selection and that making the selection will further the purpose of this section.

“(3) EFFECT OF FAILURE TO NOMINATE.—If a Governor of a State fails to submit recommendations under this subsection in a timely manner, the President may select, subject to the criteria specified in subsection (g), any local governments of the State to receive assistance under this section.

“(e) USES OF TECHNICAL AND FINANCIAL ASSISTANCE.—

“(1) IN GENERAL.—Technical and financial assistance provided under this section—

“(A) shall be used by States and local governments principally to implement predisaster hazard mitigation measures that are cost-effective and are described in proposals approved by the President under this section; and

“(B) may be used—

“(i) to support effective public-private natural disaster hazard mitigation partnerships;

“(ii) to improve the assessment of a community’s vulnerability to natural hazards; or

President.

“(iii) to establish hazard mitigation priorities, and an appropriate hazard mitigation plan, for a community.

“(2) DISSEMINATION.—A State or local government may use not more than 10 percent of the financial assistance received by the State or local government under this section for a fiscal year to fund activities to disseminate information regarding cost-effective mitigation technologies.

“(f) ALLOCATION OF FUNDS.—The amount of financial assistance made available to a State (including amounts made available to local governments of the State) under this section for a fiscal year—

“(1) shall be not less than the lesser of—

“(A) \$500,000; or

“(B) the amount that is equal to 1.0 percent of the total funds appropriated to carry out this section for the fiscal year;

“(2) shall not exceed 15 percent of the total funds described in paragraph (1)(B); and

“(3) shall be subject to the criteria specified in subsection (g).

“(g) CRITERIA FOR ASSISTANCE AWARDS.—In determining whether to provide technical and financial assistance to a State or local government under this section, the President shall take into account—

“(1) the extent and nature of the hazards to be mitigated;

“(2) the degree of commitment of the State or local government to reduce damages from future natural disasters;

“(3) the degree of commitment by the State or local government to support ongoing non-Federal support for the hazard mitigation measures to be carried out using the technical and financial assistance;

“(4) the extent to which the hazard mitigation measures to be carried out using the technical and financial assistance contribute to the mitigation goals and priorities established by the State;

“(5) the extent to which the technical and financial assistance is consistent with other assistance provided under this Act;

“(6) the extent to which prioritized, cost-effective mitigation activities that produce meaningful and definable outcomes are clearly identified;

“(7) if the State or local government has submitted a mitigation plan under section 322, the extent to which the activities identified under paragraph (6) are consistent with the mitigation plan;

“(8) the opportunity to fund activities that maximize net benefits to society;

“(9) the extent to which assistance will fund mitigation activities in small impoverished communities; and

“(10) such other criteria as the President establishes in consultation with State and local governments.

“(h) FEDERAL SHARE.—

“(1) IN GENERAL.—Financial assistance provided under this section may contribute up to 75 percent of the total cost of mitigation activities approved by the President.

“(2) SMALL IMPOVERISHED COMMUNITIES.—Notwithstanding paragraph (1), the President may contribute up to 90 percent of the total cost of a mitigation activity carried out in a small impoverished community.

“(i) NATIONAL PREDISASTER MITIGATION FUND.—

“(1) ESTABLISHMENT.—The President may establish in the Treasury of the United States a fund to be known as the ‘National Predisaster Mitigation Fund’, to be used in carrying out this section.

“(2) TRANSFERS TO FUND.—There shall be deposited in the Fund—

“(A) amounts appropriated to carry out this section, which shall remain available until expended; and

“(B) sums available from gifts, bequests, or donations of services or property received by the President for the purpose of predisaster hazard mitigation.

“(3) EXPENDITURES FROM FUND.—Upon request by the President, the Secretary of the Treasury shall transfer from the Fund to the President such amounts as the President determines are necessary to provide technical and financial assistance under this section.

“(4) INVESTMENT OF AMOUNTS.—

“(A) IN GENERAL.—The Secretary of the Treasury shall invest such portion of the Fund as is not, in the judgment of the Secretary of the Treasury, required to meet current withdrawals. Investments may be made only in interest-bearing obligations of the United States.

“(B) ACQUISITION OF OBLIGATIONS.—For the purpose of investments under subparagraph (A), obligations may be acquired—

“(i) on original issue at the issue price; or

“(ii) by purchase of outstanding obligations at the market price.

“(C) SALE OF OBLIGATIONS.—Any obligation acquired by the Fund may be sold by the Secretary of the Treasury at the market price.

“(D) CREDITS TO FUND.—The interest on, and the proceeds from the sale or redemption of, any obligations held in the Fund shall be credited to and form a part of the Fund.

“(E) TRANSFERS OF AMOUNTS.—

“(i) IN GENERAL.—The amounts required to be transferred to the Fund under this subsection shall be transferred at least monthly from the general fund of the Treasury to the Fund on the basis of estimates made by the Secretary of the Treasury.

“(ii) ADJUSTMENTS.—Proper adjustment shall be made in amounts subsequently transferred to the extent prior estimates were in excess of or less than the amounts required to be transferred.

“(j) LIMITATION ON TOTAL AMOUNT OF FINANCIAL ASSISTANCE.—The President shall not provide financial assistance under this section in an amount greater than the amount available in the Fund.

“(k) MULTIHAZARD ADVISORY MAPS.—

“(1) DEFINITION OF MULTIHAZARD ADVISORY MAP.—In this subsection, the term ‘multihazard advisory map’ means a map

on which hazard data concerning each type of natural disaster is identified simultaneously for the purpose of showing areas of hazard overlap.

“(2) DEVELOPMENT OF MAPS.—In consultation with States, local governments, and appropriate Federal agencies, the President shall develop multihazard advisory maps for areas, in not fewer than five States, that are subject to commonly recurring natural hazards (including flooding, hurricanes and severe winds, and seismic events). President.

“(3) USE OF TECHNOLOGY.—In developing multihazard advisory maps under this subsection, the President shall use, to the maximum extent practicable, the most cost-effective and efficient technology available.

“(4) USE OF MAPS.—

“(A) ADVISORY NATURE.—The multihazard advisory maps shall be considered to be advisory and shall not require the development of any new policy by, or impose any new policy on, any government or private entity.

“(B) AVAILABILITY OF MAPS.—The multihazard advisory maps shall be made available to the appropriate State and local governments for the purposes of—

“(i) informing the general public about the risks of natural hazards in the areas described in paragraph (2);

“(ii) supporting the activities described in subsection (e); and

“(iii) other public uses.

“(l) REPORT ON FEDERAL AND STATE ADMINISTRATION.—Not later than 18 months after the date of the enactment of this section, the President, in consultation with State and local governments, shall submit to Congress a report evaluating efforts to implement this section and recommending a process for transferring greater authority and responsibility for administering the assistance program established under this section to capable States. Deadline.

“(m) TERMINATION OF AUTHORITY.—The authority provided by this section terminates December 31, 2003.”.

(b) CONFORMING AMENDMENT.—Title II of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5131 et seq.) is amended by striking the title heading and inserting the following:

“TITLE II—DISASTER PREPAREDNESS AND MITIGATION ASSISTANCE”.

SEC. 103. INTERAGENCY TASK FORCE.

Title II of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5131 et seq.) (as amended by section 102(a)) is amended by adding at the end the following:

“SEC. 204. INTERAGENCY TASK FORCE.

42 USC 5134.

“(a) IN GENERAL.—The President shall establish a Federal interagency task force for the purpose of coordinating the implementation of predisaster hazard mitigation programs administered by the Federal Government.

“(b) CHAIRPERSON.—The Director of the Federal Emergency Management Agency shall serve as the chairperson of the task force.

“(c) MEMBERSHIP.—The membership of the task force shall include representatives of—
 “(1) relevant Federal agencies;
 “(2) State and local government organizations (including Indian tribes); and
 “(3) the American Red Cross.”.

SEC. 104. MITIGATION PLANNING; MINIMUM STANDARDS FOR PUBLIC AND PRIVATE STRUCTURES.

(a) IN GENERAL.—Title III of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5141 et seq.) is amended by adding at the end the following:

42 USC 5165.

“SEC. 322. MITIGATION PLANNING.

“(a) REQUIREMENT OF MITIGATION PLAN.—As a condition of receipt of an increased Federal share for hazard mitigation measures under subsection (e), a State, local, or tribal government shall develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government.

“(b) LOCAL AND TRIBAL PLANS.—Each mitigation plan developed by a local or tribal government shall—

- “(1) describe actions to mitigate hazards, risks, and vulnerabilities identified under the plan; and
- “(2) establish a strategy to implement those actions.

“(c) STATE PLANS.—The State process of development of a mitigation plan under this section shall—

- “(1) identify the natural hazards, risks, and vulnerabilities of areas in the State;
- “(2) support development of local mitigation plans;
- “(3) provide for technical assistance to local and tribal governments for mitigation planning; and
- “(4) identify and prioritize mitigation actions that the State will support, as resources become available.

“(d) FUNDING.—

“(1) IN GENERAL.—Federal contributions under section 404 may be used to fund the development and updating of mitigation plans under this section.

“(2) MAXIMUM FEDERAL CONTRIBUTION.—With respect to any mitigation plan, a State, local, or tribal government may use an amount of Federal contributions under section 404 not to exceed 7 percent of the amount of such contributions available to the government as of a date determined by the government.

“(e) INCREASED FEDERAL SHARE FOR HAZARD MITIGATION MEASURES.—

“(1) IN GENERAL.—If, at the time of the declaration of a major disaster, a State has in effect an approved mitigation plan under this section, the President may increase to 20 percent, with respect to the major disaster, the maximum percentage specified in the last sentence of section 404(a).

“(2) FACTORS FOR CONSIDERATION.—In determining whether to increase the maximum percentage under paragraph (1), the President shall consider whether the State has established—

President.

- “(A) eligibility criteria for property acquisition and other types of mitigation measures;
- “(B) requirements for cost effectiveness that are related to the eligibility criteria;
- “(C) a system of priorities that is related to the eligibility criteria; and
- “(D) a process by which an assessment of the effectiveness of a mitigation action may be carried out after the mitigation action is complete.

“SEC. 323. MINIMUM STANDARDS FOR PUBLIC AND PRIVATE STRUCTURES.”

42 USC 5165a.

“(a) IN GENERAL.—As a condition of receipt of a disaster loan or grant under this Act—

- “(1) the recipient shall carry out any repair or construction to be financed with the loan or grant in accordance with applicable standards of safety, decency, and sanitation and in conformity with applicable codes, specifications, and standards; and
- “(2) the President may require safe land use and construction practices, after adequate consultation with appropriate State and local government officials.

“(b) EVIDENCE OF COMPLIANCE.—A recipient of a disaster loan or grant under this Act shall provide such evidence of compliance with this section as the President may require by regulation.”.

(b) LOSSES FROM STRAIGHT LINE WINDS.—The President shall increase the maximum percentage specified in the last sentence of section 404(a) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5170c(a)) from 15 percent to 20 percent with respect to any major disaster that is in the State of Minnesota and for which assistance is being provided as of the date of the enactment of this Act, except that additional assistance provided under this subsection shall not exceed \$6,000,000. The mitigation measures assisted under this subsection shall be related to losses in the State of Minnesota from straight line winds.

President.

(c) CONFORMING AMENDMENTS.—

- (1) Section 404(a) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5170c(a)) is amended
 - (A) in the second sentence, by striking “section 409” and inserting “section 322”; and
 - (B) in the third sentence, by striking “The total” and inserting “Subject to section 322, the total”.

- (2) Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5176) is repealed.

TITLE II—STREAMLINING AND COST REDUCTION

SEC. 201. TECHNICAL AMENDMENTS.

Section 311 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5154) is amended in subsections (a)(1), (b), and (c) by striking “section 803 of the Public Works and Economic Development Act of 1965” each place it appears

and inserting “section 209(c)(2) of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3149(c)(2))”.

SEC. 202. MANAGEMENT COSTS.

(a) IN GENERAL.—Title III of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5141 et seq.) (as amended by section 104(a)) is amended by adding at the end the following:

42 USC 5165b.

Regulations.

Deadline.

42 USC 5165b
note.

42 USC 5165c.

President.

“SEC. 324. MANAGEMENT COSTS.”

“(a) DEFINITION OF MANAGEMENT COST.—In this section, the term ‘management cost’ includes any indirect cost, any administrative expense, and any other expense not directly chargeable to a specific project under a major disaster, emergency, or disaster preparedness or mitigation activity or measure.

“(b) ESTABLISHMENT OF MANAGEMENT COST RATES.—Notwithstanding any other provision of law (including any administrative rule or guidance), the President shall by regulation establish management cost rates, for grantees and subgrantees, that shall be used to determine contributions under this Act for management costs.

“(c) REVIEW.—The President shall review the management cost rates established under subsection (b) not later than 3 years after the date of establishment of the rates and periodically thereafter.”.

(b) APPLICABILITY.—

(1) IN GENERAL.—Subject to paragraph (2), subsections (a) and (b) of section 324 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (as added by subsection (a)) shall apply to major disasters declared under that Act on or after the date of the enactment of this Act.

(2) INTERIM AUTHORITY.—Until the date on which the President establishes the management cost rates under section 324 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (as added by subsection (a)), section 406(f) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172(f)) (as in effect on the day before the date of the enactment of this Act) shall be used to establish management cost rates.

SEC. 203. PUBLIC NOTICE, COMMENT, AND CONSULTATION REQUIREMENTS.

Title III of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5141 et seq.) (as amended by section 202(a)) is amended by adding at the end the following:

“SEC. 325. PUBLIC NOTICE, COMMENT, AND CONSULTATION REQUIREMENTS.”

“(a) PUBLIC NOTICE AND COMMENT CONCERNING NEW OR MODIFIED POLICIES.—

“(1) IN GENERAL.—The President shall provide for public notice and opportunity for comment before adopting any new or modified policy that—

“(A) governs implementation of the public assistance program administered by the Federal Emergency Management Agency under this Act; and

“(B) could result in a significant reduction of assistance under the program.

“(2) APPLICATION.—Any policy adopted under paragraph (1) shall apply only to a major disaster or emergency declared on or after the date on which the policy is adopted.

“(b) CONSULTATION CONCERNING INTERIM POLICIES.—

“(1) IN GENERAL.—Before adopting any interim policy under the public assistance program to address specific conditions that relate to a major disaster or emergency that has been declared under this Act, the President, to the maximum extent practicable, shall solicit the views and recommendations of grantees and subgrantees with respect to the major disaster or emergency concerning the potential interim policy, if the interim policy is likely—

“(A) to result in a significant reduction of assistance to applicants for the assistance with respect to the major disaster or emergency; or

“(B) to change the terms of a written agreement to which the Federal Government is a party concerning the declaration of the major disaster or emergency.

“(2) NO LEGAL RIGHT OF ACTION.—Nothing in this subsection confers a legal right of action on any party.

“(c) PUBLIC ACCESS.—The President shall promote public access to policies governing the implementation of the public assistance program.”.

President.

SEC. 204. STATE ADMINISTRATION OF HAZARD MITIGATION GRANT PROGRAM.

Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5170c) is amended by adding at the end the following:

“(c) PROGRAM ADMINISTRATION BY STATES.—

“(1) IN GENERAL.—A State desiring to administer the hazard mitigation grant program established by this section with respect to hazard mitigation assistance in the State may submit to the President an application for the delegation of the authority to administer the program.

“(2) CRITERIA.—The President, in consultation and coordination with States and local governments, shall establish criteria for the approval of applications submitted under paragraph (1). The criteria shall include, at a minimum—

“(A) the demonstrated ability of the State to manage the grant program under this section;

“(B) there being in effect an approved mitigation plan under section 322; and

“(C) a demonstrated commitment to mitigation activities.

“(3) APPROVAL.—The President shall approve an application submitted under paragraph (1) that meets the criteria established under paragraph (2).

President.

“(4) WITHDRAWAL OF APPROVAL.—If, after approving an application of a State submitted under paragraph (1), the President determines that the State is not administering the hazard mitigation grant program established by this section in a manner satisfactory to the President, the President shall withdraw the approval.

“(5) AUDITS.—The President shall provide for periodic audits of the hazard mitigation grant programs administered by States under this subsection.”.

President.

SEC. 205. ASSISTANCE TO REPAIR, RESTORE, RECONSTRUCT, OR REPLACE DAMAGED FACILITIES.

(a) **CONTRIBUTIONS.**—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (a) and inserting the following:

“(a) **CONTRIBUTIONS.**—

“(1) **IN GENERAL.**—The President may make contributions—

“(A) to a State or local government for the repair, restoration, reconstruction, or replacement of a public facility damaged or destroyed by a major disaster and for associated expenses incurred by the government; and

“(B) subject to paragraph (3), to a person that owns or operates a private nonprofit facility damaged or destroyed by a major disaster for the repair, restoration, reconstruction, or replacement of the facility and for associated expenses incurred by the person.

“(2) **ASSOCIATED EXPENSES.**—For the purposes of this section, associated expenses shall include—

“(A) the costs of mobilizing and employing the National Guard for performance of eligible work;

“(B) the costs of using prison labor to perform eligible work, including wages actually paid, transportation to a worksite, and extraordinary costs of guards, food, and lodging; and

“(C) base and overtime wages for the employees and extra hires of a State, local government, or person described in paragraph (1) that perform eligible work, plus fringe benefits on such wages to the extent that such benefits were being paid before the major disaster.

“(3) **CONDITIONS FOR ASSISTANCE TO PRIVATE NONPROFIT FACILITIES.**—

“(A) **IN GENERAL.**—The President may make contributions to a private nonprofit facility under paragraph (1)(B) only if—

“(i) the facility provides critical services (as defined by the President) in the event of a major disaster; or

“(ii) the owner or operator of the facility—

“(I) has applied for a disaster loan under section 7(b) of the Small Business Act (15 U.S.C. 636(b)); and

“(II)(aa) has been determined to be ineligible for such a loan; or

“(bb) has obtained such a loan in the maximum amount for which the Small Business Administration determines the facility is eligible.

“(B) **DEFINITION OF CRITICAL SERVICES.**—In this paragraph, the term ‘critical services’ includes power, water (including water provided by an irrigation organization or facility), sewer, wastewater treatment, communications, and emergency medical care.

“(4) **NOTIFICATION TO CONGRESS.**—Before making any contribution under this section in an amount greater than \$20,000,000, the President shall notify—

“(A) the Committee on Environment and Public Works of the Senate;

“(B) the Committee on Transportation and Infrastructure of the House of Representatives;

“(C) the Committee on Appropriations of the Senate; and

“(D) the Committee on Appropriations of the House of Representatives.”

(b) FEDERAL SHARE.—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (b) and inserting the following:

“(b) FEDERAL SHARE.—

“(1) MINIMUM FEDERAL SHARE.—Except as provided in paragraph (2), the Federal share of assistance under this section shall be not less than 75 percent of the eligible cost of repair, restoration, reconstruction, or replacement carried out under this section.

“(2) REDUCED FEDERAL SHARE.—The President shall promulgate regulations to reduce the Federal share of assistance under this section to not less than 25 percent in the case of the repair, restoration, reconstruction, or replacement of any eligible public facility or private nonprofit facility following an event associated with a major disaster—

“(A) that has been damaged, on more than one occasion within the preceding 10-year period, by the same type of event; and

“(B) the owner of which has failed to implement appropriate mitigation measures to address the hazard that caused the damage to the facility.”

(c) LARGE IN-LIEU CONTRIBUTIONS.—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (c) and inserting the following:

“(c) LARGE IN-LIEU CONTRIBUTIONS.—

“(1) FOR PUBLIC FACILITIES.—

“(A) IN GENERAL.—In any case in which a State or local government determines that the public welfare would not best be served by repairing, restoring, reconstructing, or replacing any public facility owned or controlled by the State or local government, the State or local government may elect to receive, in lieu of a contribution under subsection (a)(1)(A), a contribution in an amount equal to 75 percent of the Federal share of the Federal estimate of the cost of repairing, restoring, reconstructing, or replacing the facility and of management expenses.

“(B) AREAS WITH UNSTABLE SOIL.—In any case in which a State or local government determines that the public welfare would not best be served by repairing, restoring, reconstructing, or replacing any public facility owned or controlled by the State or local government because soil instability in the disaster area makes repair, restoration, reconstruction, or replacement infeasible, the State or local government may elect to receive, in lieu of a contribution under subsection (a)(1)(A), a contribution in an amount equal to 90 percent of the Federal share of the Federal estimate of the cost of repairing, restoring, reconstructing, or replacing the facility and of management expenses.

“(C) USE OF FUNDS.—Funds contributed to a State or local government under this paragraph may be used—

President.
Regulations.

“(i) to repair, restore, or expand other selected public facilities;

“(ii) to construct new facilities; or

“(iii) to fund hazard mitigation measures that the State or local government determines to be necessary to meet a need for governmental services and functions in the area affected by the major disaster.

“(D) LIMITATIONS.—Funds made available to a State or local government under this paragraph may not be used for—

“(i) any public facility located in a regulatory floodway (as defined in section 59.1 of title 44, Code of Federal Regulations (or a successor regulation)); or

“(ii) any uninsured public facility located in a special flood hazard area identified by the Director of the Federal Emergency Management Agency under the National Flood Insurance Act of 1968 (42 U.S.C. 4001 et seq.).

“(2) FOR PRIVATE NONPROFIT FACILITIES.—

“(A) IN GENERAL.—In any case in which a person that owns or operates a private nonprofit facility determines that the public welfare would not best be served by repairing, restoring, reconstructing, or replacing the facility, the person may elect to receive, in lieu of a contribution under subsection (a)(1)(B), a contribution in an amount equal to 75 percent of the Federal share of the Federal estimate of the cost of repairing, restoring, reconstructing, or replacing the facility and of management expenses.

“(B) USE OF FUNDS.—Funds contributed to a person under this paragraph may be used—

“(i) to repair, restore, or expand other selected private nonprofit facilities owned or operated by the person;

“(ii) to construct new private nonprofit facilities to be owned or operated by the person; or

“(iii) to fund hazard mitigation measures that the person determines to be necessary to meet a need for the person’s services and functions in the area affected by the major disaster.

“(C) LIMITATIONS.—Funds made available to a person under this paragraph may not be used for—

“(i) any private nonprofit facility located in a regulatory floodway (as defined in section 59.1 of title 44, Code of Federal Regulations (or a successor regulation)); or

“(ii) any uninsured private nonprofit facility located in a special flood hazard area identified by the Director of the Federal Emergency Management Agency under the National Flood Insurance Act of 1968 (42 U.S.C. 4001 et seq.).”.

(d) ELIGIBLE COST.—

(1) IN GENERAL.—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (e) and inserting the following:

“(e) ELIGIBLE COST.—

“(1) DETERMINATION.—

“(A) IN GENERAL.—For the purposes of this section, the President shall estimate the eligible cost of repairing, restoring, reconstructing, or replacing a public facility or private nonprofit facility—

“(i) on the basis of the design of the facility as the facility existed immediately before the major disaster; and

“(ii) in conformity with codes, specifications, and standards (including floodplain management and hazard mitigation criteria required by the President or under the Coastal Barrier Resources Act (16 U.S.C. 3501 et seq.)) applicable at the time at which the disaster occurred.

“(B) COST ESTIMATION PROCEDURES.—

“(i) IN GENERAL.—Subject to paragraph (2), the President shall use the cost estimation procedures established under paragraph (3) to determine the eligible cost under this subsection.

“(ii) APPLICABILITY.—The procedures specified in this paragraph and paragraph (2) shall apply only to projects the eligible cost of which is equal to or greater than the amount specified in section 422.

“(2) MODIFICATION OF ELIGIBLE COST.—

“(A) ACTUAL COST GREATER THAN CEILING PERCENTAGE OF ESTIMATED COST.—In any case in which the actual cost of repairing, restoring, reconstructing, or replacing a facility under this section is greater than the ceiling percentage established under paragraph (3) of the cost estimated under paragraph (1), the President may determine that the eligible cost includes a portion of the actual cost of the repair, restoration, reconstruction, or replacement that exceeds the cost estimated under paragraph (1).

“(B) ACTUAL COST LESS THAN ESTIMATED COST.—

“(i) GREATER THAN OR EQUAL TO FLOOR PERCENTAGE OF ESTIMATED COST.—In any case in which the actual cost of repairing, restoring, reconstructing, or replacing a facility under this section is less than 100 percent of the cost estimated under paragraph (1), but is greater than or equal to the floor percentage established under paragraph (3) of the cost estimated under paragraph (1), the State or local government or person receiving funds under this section shall use the excess funds to carry out cost-effective activities that reduce the risk of future damage, hardship, or suffering from a major disaster.

“(ii) LESS THAN FLOOR PERCENTAGE OF ESTIMATED COST.—In any case in which the actual cost of repairing, restoring, reconstructing, or replacing a facility under this section is less than the floor percentage established under paragraph (3) of the cost estimated under paragraph (1), the State or local government or person receiving assistance under this section shall reimburse the President in the amount of the difference.

“(C) NO EFFECT ON APPEALS PROCESS.—Nothing in this paragraph affects any right of appeal under section 423.

“(3) EXPERT PANEL.—

“(A) ESTABLISHMENT.—Not later than 18 months after the date of the enactment of this paragraph, the President, acting through the Director of the Federal Emergency Management Agency, shall establish an expert panel, which shall include representatives from the construction industry and State and local government.

“(B) DUTIES.—The expert panel shall develop recommendations concerning—

“(i) procedures for estimating the cost of repairing, restoring, reconstructing, or replacing a facility consistent with industry practices; and

“(ii) the ceiling and floor percentages referred to in paragraph (2).

“(C) REGULATIONS.—Taking into account the recommendations of the expert panel under subparagraph (B), the President shall promulgate regulations that establish—

“(i) cost estimation procedures described in subparagraph (B)(i); and

“(ii) the ceiling and floor percentages referred to in paragraph (2).

“(D) REVIEW BY PRESIDENT.—Not later than 2 years after the date of promulgation of regulations under subparagraph (C) and periodically thereafter, the President shall review the cost estimation procedures and the ceiling and floor percentages established under this paragraph.

“(E) REPORT TO CONGRESS.—Not later than 1 year after the date of promulgation of regulations under subparagraph (C), 3 years after that date, and at the end of each 2-year period thereafter, the expert panel shall submit to Congress a report on the appropriateness of the cost estimation procedures.

“(4) SPECIAL RULE.—In any case in which the facility being repaired, restored, reconstructed, or replaced under this section was under construction on the date of the major disaster, the cost of repairing, restoring, reconstructing, or replacing the facility shall include, for the purposes of this section, only those costs that, under the contract for the construction, are the owner's responsibility and not the contractor's responsibility.”.

(2) **EFFECTIVE DATE.**—The amendment made by paragraph (1) takes effect on the date of the enactment of this Act and applies to funds appropriated after the date of the enactment of this Act, except that paragraph (1) of section 406(e) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (as amended by paragraph (1)) takes effect on the date on which the cost estimation procedures established under paragraph (3) of that section take effect.

(e) **CONFORMING AMENDMENT.**—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (f).

SEC. 206. FEDERAL ASSISTANCE TO INDIVIDUALS AND HOUSEHOLDS.

(a) **IN GENERAL.**—Section 408 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5174) is amended to read as follows:

President.

Deadline.

Deadline.

42 USC 5172
note.

“SEC. 408. FEDERAL ASSISTANCE TO INDIVIDUALS AND HOUSEHOLDS.**“(a) IN GENERAL.—**

“(1) PROVISION OF ASSISTANCE.—In accordance with this section, the President, in consultation with the Governor of a State, may provide financial assistance, and, if necessary, direct services, to individuals and households in the State who, as a direct result of a major disaster, have necessary expenses and serious needs in cases in which the individuals and households are unable to meet such expenses or needs through other means.

“(2) RELATIONSHIP TO OTHER ASSISTANCE.—Under paragraph (1), an individual or household shall not be denied assistance under paragraph (1), (3), or (4) of subsection (c) solely on the basis that the individual or household has not applied for or received any loan or other financial assistance from the Small Business Administration or any other Federal agency.

“(b) HOUSING ASSISTANCE.—

“(1) ELIGIBILITY.—The President may provide financial or other assistance under this section to individuals and households to respond to the disaster-related housing needs of individuals and households who are displaced from their predisaster primary residences or whose predisaster primary residences are rendered uninhabitable as a result of damage caused by a major disaster.

“(2) DETERMINATION OF APPROPRIATE TYPES OF ASSISTANCE.—

“(A) IN GENERAL.—The President shall determine appropriate types of housing assistance to be provided under this section to individuals and households described in subsection (a)(1) based on considerations of cost effectiveness, convenience to the individuals and households, and such other factors as the President may consider appropriate.

President.

“(B) MULTIPLE TYPES OF ASSISTANCE.—One or more types of housing assistance may be made available under this section, based on the suitability and availability of the types of assistance, to meet the needs of individuals and households in the particular disaster situation.

“(c) TYPES OF HOUSING ASSISTANCE.—**“(1) TEMPORARY HOUSING.—****“(A) FINANCIAL ASSISTANCE.—**

“(i) IN GENERAL.—The President may provide financial assistance to individuals or households to rent alternate housing accommodations, existing rental units, manufactured housing, recreational vehicles, or other readily fabricated dwellings.

“(ii) AMOUNT.—The amount of assistance under clause (i) shall be based on the fair market rent for the accommodation provided plus the cost of any transportation, utility hookups, or unit installation not provided directly by the President.

“(B) DIRECT ASSISTANCE.—

“(i) IN GENERAL.—The President may provide temporary housing units, acquired by purchase or lease, directly to individuals or households who, because of a lack of available housing resources, would be unable

to make use of the assistance provided under subparagraph (A).

“(ii) PERIOD OF ASSISTANCE.—The President may not provide direct assistance under clause (i) with respect to a major disaster after the end of the 18-month period beginning on the date of the declaration of the major disaster by the President, except that the President may extend that period if the President determines that due to extraordinary circumstances an extension would be in the public interest.

“(iii) COLLECTION OF RENTAL CHARGES.—After the end of the 18-month period referred to in clause (ii), the President may charge fair market rent for each temporary housing unit provided.

“(2) REPAIRS.—

“(A) IN GENERAL.—The President may provide financial assistance for—

“(i) the repair of owner-occupied private residences, utilities, and residential infrastructure (such as a private access route) damaged by a major disaster to a safe and sanitary living or functioning condition; and

“(ii) eligible hazard mitigation measures that reduce the likelihood of future damage to such residences, utilities, or infrastructure.

“(B) RELATIONSHIP TO OTHER ASSISTANCE.—A recipient of assistance provided under this paragraph shall not be required to show that the assistance can be met through other means, except insurance proceeds.

“(C) MAXIMUM AMOUNT OF ASSISTANCE.—The amount of assistance provided to a household under this paragraph shall not exceed \$5,000, as adjusted annually to reflect changes in the Consumer Price Index for All Urban Consumers published by the Department of Labor.

“(3) REPLACEMENT.—

“(A) IN GENERAL.—The President may provide financial assistance for the replacement of owner-occupied private residences damaged by a major disaster.

“(B) MAXIMUM AMOUNT OF ASSISTANCE.—The amount of assistance provided to a household under this paragraph shall not exceed \$10,000, as adjusted annually to reflect changes in the Consumer Price Index for All Urban Consumers published by the Department of Labor.

“(C) APPLICABILITY OF FLOOD INSURANCE REQUIREMENT.—With respect to assistance provided under this paragraph, the President may not waive any provision of Federal law requiring the purchase of flood insurance as a condition of the receipt of Federal disaster assistance.

“(4) PERMANENT HOUSING CONSTRUCTION.—The President may provide financial assistance or direct assistance to individuals or households to construct permanent housing in insular areas outside the continental United States and in other remote locations in cases in which—

“(A) no alternative housing resources are available; and

“(B) the types of temporary housing assistance described in paragraph (1) are unavailable, infeasible, or not cost-effective.

“(d) TERMS AND CONDITIONS RELATING TO HOUSING ASSISTANCE.—

“(1) SITES.—

“(A) IN GENERAL.—Any readily fabricated dwelling provided under this section shall, whenever practicable, be located on a site that—

“(i) is complete with utilities; and

“(ii) is provided by the State or local government, by the owner of the site, or by the occupant who was displaced by the major disaster.

“(B) SITES PROVIDED BY THE PRESIDENT.—A readily fabricated dwelling may be located on a site provided by the President if the President determines that such a site would be more economical or accessible.

“(2) DISPOSAL OF UNITS.—

“(A) SALE TO OCCUPANTS.—

“(i) IN GENERAL.—Notwithstanding any other provision of law, a temporary housing unit purchased under this section by the President for the purpose of housing disaster victims may be sold directly to the individual or household who is occupying the unit if the individual or household lacks permanent housing.

“(ii) SALE PRICE.—A sale of a temporary housing unit under clause (i) shall be at a price that is fair and equitable.

“(iii) DEPOSIT OF PROCEEDS.—Notwithstanding any other provision of law, the proceeds of a sale under clause (i) shall be deposited in the appropriate Disaster Relief Fund account.

“(iv) HAZARD AND FLOOD INSURANCE.—A sale of a temporary housing unit under clause (i) shall be made on the condition that the individual or household purchasing the housing unit agrees to obtain and maintain hazard and flood insurance on the housing unit.

“(v) USE OF GSA SERVICES.—The President may use the services of the General Services Administration to accomplish a sale under clause (i).

“(B) OTHER METHODS OF DISPOSAL.—If not disposed of under subparagraph (A), a temporary housing unit purchased under this section by the President for the purpose of housing disaster victims—

“(i) may be sold to any person; or

“(ii) may be sold, transferred, donated, or otherwise made available directly to a State or other governmental entity or to a voluntary organization for the sole purpose of providing temporary housing to disaster victims in major disasters and emergencies if, as a condition of the sale, transfer, or donation, the State, other governmental agency, or voluntary organization agrees—

“(I) to comply with the nondiscrimination provisions of section 308; and

“(II) to obtain and maintain hazard and flood insurance on the housing unit.

“(e) FINANCIAL ASSISTANCE TO ADDRESS OTHER NEEDS.—

“(1) MEDICAL, DENTAL, AND FUNERAL EXPENSES.—The President, in consultation with the Governor of a State, may provide financial assistance under this section to an individual or household in the State who is adversely affected by a major disaster to meet disaster-related medical, dental, and funeral expenses.

“(2) PERSONAL PROPERTY, TRANSPORTATION, AND OTHER EXPENSES.—The President, in consultation with the Governor of a State, may provide financial assistance under this section to an individual or household described in paragraph (1) to address personal property, transportation, and other necessary expenses or serious needs resulting from the major disaster.

“(f) STATE ROLE.—

“(1) FINANCIAL ASSISTANCE TO ADDRESS OTHER NEEDS.—

“(A) GRANT TO STATE.—Subject to subsection (g), a Governor may request a grant from the President to provide financial assistance to individuals and households in the State under subsection (e).

“(B) ADMINISTRATIVE COSTS.—A State that receives a grant under subparagraph (A) may expend not more than 5 percent of the amount of the grant for the administrative costs of providing financial assistance to individuals and households in the State under subsection (e).

“(2) ACCESS TO RECORDS.—In providing assistance to individuals and households under this section, the President shall provide for the substantial and ongoing involvement of the States in which the individuals and households are located, including by providing to the States access to the electronic records of individuals and households receiving assistance under this section in order for the States to make available any additional State and local assistance to the individuals and households.

“(g) COST SHARING.—

“(1) FEDERAL SHARE.—Except as provided in paragraph (2), the Federal share of the costs eligible to be paid using assistance provided under this section shall be 100 percent.

“(2) FINANCIAL ASSISTANCE TO ADDRESS OTHER NEEDS.—In the case of financial assistance provided under subsection (e)—

“(A) the Federal share shall be 75 percent; and

“(B) the non-Federal share shall be paid from funds made available by the State.

“(h) MAXIMUM AMOUNT OF ASSISTANCE.—

“(1) IN GENERAL.—No individual or household shall receive financial assistance greater than \$25,000 under this section with respect to a single major disaster.

“(2) ADJUSTMENT OF LIMIT.—The limit established under paragraph (1) shall be adjusted annually to reflect changes in the Consumer Price Index for All Urban Consumers published by the Department of Labor.

“(i) RULES AND REGULATIONS.—The President shall prescribe rules and regulations to carry out this section, including criteria, standards, and procedures for determining eligibility for assistance.”

(b) CONFORMING AMENDMENT.—Section 502(a)(6) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5192(a)(6)) is amended by striking “temporary housing”.

President.

(c) ELIMINATION OF INDIVIDUAL AND FAMILY GRANT PROGRAMS.—Section 411 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5178) is repealed.

(d) EFFECTIVE DATE.—The amendments made by this section take effect 18 months after the date of the enactment of this Act.

42 USC 5174
note.

SEC. 207. COMMUNITY DISASTER LOANS.

Section 417 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5184) is amended—

(1) by striking “(a) The President” and inserting the following:

“(a) IN GENERAL.—The President”;

(2) by striking “The amount” and inserting the following:

“(b) AMOUNT.—The amount”;

(3) by striking “Repayment” and inserting the following:

“(c) REPAYMENT.—

“(1) CANCELLATION.—Repayment”;

(4) by striking “(b) Any loans” and inserting the following:

“(d) EFFECT ON OTHER ASSISTANCE.—Any loans”;

(5) in subsection (b) (as designated by paragraph (2))—

(A) by striking “and shall” and inserting “shall”; and

(B) by inserting before the period at the end the following: “, and shall not exceed \$5,000,000”; and

(6) in subsection (c) (as designated by paragraph (3)), by adding at the end the following:

“(2) CONDITION ON CONTINUING ELIGIBILITY.—A local government shall not be eligible for further assistance under this section during any period in which the local government is in arrears with respect to a required repayment of a loan under this section.”.

SEC. 208. REPORT ON STATE MANAGEMENT OF SMALL DISASTERS INITIATIVE.

42 USC 5121
note.

Deadline.

Not later than 3 years after the date of the enactment of this Act, the President shall submit to Congress a report describing the results of the State Management of Small Disasters Initiative, including—

(1) identification of any administrative or financial benefits of the initiative; and

(2) recommendations concerning the conditions, if any, under which States should be allowed the option to administer parts of the assistance program under section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172).

SEC. 209. STUDY REGARDING COST REDUCTION.

42 USC 5121
note.
Deadline.

Not later than 3 years after the date of the enactment of this Act, the Director of the Congressional Budget Office shall complete a study estimating the reduction in Federal disaster assistance that has resulted and is likely to result from the enactment of this Act.

TITLE III—MISCELLANEOUS

SEC. 301. TECHNICAL CORRECTION OF SHORT TITLE.

The first section of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 note) is amended to read as follows:

“SECTION 1. SHORT TITLE.

“This Act may be cited as the ‘Robert T. Stafford Disaster Relief and Emergency Assistance Act’.”.

SEC. 302. DEFINITIONS.

Section 102 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5122) is amended—

(1) in each of paragraphs (3) and (4), by striking “the Northern” and all that follows through “Pacific Islands” and inserting “and the Commonwealth of the Northern Mariana Islands”;

(2) by striking paragraph (6) and inserting the following:

“(6) LOCAL GOVERNMENT.—The term ‘local government’ means—

“(A) a county, municipality, city, town, township, local public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government;

“(B) an Indian tribe or authorized tribal organization, or Alaska Native village or organization; and

“(C) a rural community, unincorporated town or village, or other public entity, for which an application for assistance is made by a State or political subdivision of a State.”;

(3) in paragraph (9), by inserting “irrigation,” after “utility.”.

SEC. 303. FIRE MANAGEMENT ASSISTANCE.

(a) IN GENERAL.—Section 420 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5187) is amended to read as follows:

“SEC. 420. FIRE MANAGEMENT ASSISTANCE.

“(a) IN GENERAL.—The President is authorized to provide assistance, including grants, equipment, supplies, and personnel, to any State or local government for the mitigation, management, and control of any fire on public or private forest land or grassland that threatens such destruction as would constitute a major disaster.

President.

“(b) COORDINATION WITH STATE AND TRIBAL DEPARTMENTS OF FORESTRY.—In providing assistance under this section, the President shall coordinate with State and tribal departments of forestry.

“(c) ESSENTIAL ASSISTANCE.—In providing assistance under this section, the President may use the authority provided under section 403.

“(d) RULES AND REGULATIONS.—The President shall prescribe such rules and regulations as are necessary to carry out this section.”

“(b) EFFECTIVE DATE.—The amendment made by subsection (a) takes effect 1 year after the date of the enactment of this Act.

SEC. 304. DISASTER GRANT CLOSEOUT PROCEDURES.

Title VII of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5101 et seq.) is amended by adding at the end the following:

“SEC. 705. DISASTER GRANT CLOSEOUT PROCEDURES.

“(a) STATUTE OF LIMITATIONS.—

“(1) IN GENERAL.—Except as provided in paragraph (2), no administrative action to recover any payment made to a State or local government for disaster or emergency assistance under this Act shall be initiated in any forum after the date that is 3 years after the date of transmission of the final expenditure report for the disaster or emergency.

“(2) FRAUD EXCEPTION.—The limitation under paragraph (1) shall apply unless there is evidence of civil or criminal fraud.

“(b) REBUTTAL OF PRESUMPTION OF RECORD MAINTENANCE.—

“(1) IN GENERAL.—In any dispute arising under this section after the date that is 3 years after the date of transmission of the final expenditure report for the disaster or emergency, there shall be a presumption that accounting records were maintained that adequately identify the source and application of funds provided for financially assisted activities.

“(2) AFFIRMATIVE EVIDENCE.—The presumption described in paragraph (1) may be rebutted only on production of affirmative evidence that the State or local government did not maintain documentation described in that paragraph.

“(3) INABILITY TO PRODUCE DOCUMENTATION.—The inability of the Federal, State, or local government to produce source documentation supporting expenditure reports later than 3 years after the date of transmission of the final expenditure report shall not constitute evidence to rebut the presumption described in paragraph (1).

“(4) RIGHT OF ACCESS.—The period during which the Federal, State, or local government has the right to access source documentation shall not be limited to the required 3-year retention period referred to in paragraph (3), but shall last as long as the records are maintained.

“(c) BINDING NATURE OF GRANT REQUIREMENTS.—A State or local government shall not be liable for reimbursement or any other penalty for any payment made under this Act if—

“(1) the payment was authorized by an approved agreement specifying the costs;

“(2) the costs were reasonable; and

“(3) the purpose of the grant was accomplished.”.

SEC. 305. PUBLIC SAFETY OFFICER BENEFITS FOR CERTAIN FEDERAL AND STATE EMPLOYEES.

(a) IN GENERAL.—Section 1204 of the Omnibus Crime Control and Safe Streets Act of 1968 (42 U.S.C. 3796b) is amended by striking paragraph (7) and inserting the following:

“(7) ‘public safety officer’ means—

“(A) an individual serving a public agency in an official capacity, with or without compensation, as a law enforcement officer, as a firefighter, or as a member of a rescue squad or ambulance crew;

“(B) an employee of the Federal Emergency Management Agency who is performing official duties of the Agency in an area, if those official duties—

“(i) are related to a major disaster or emergency that has been, or is later, declared to exist with respect to the area under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.); and

“(ii) are determined by the Director of the Federal Emergency Management Agency to be hazardous duties; or

“(C) an employee of a State, local, or tribal emergency management or civil defense agency who is performing official duties in cooperation with the Federal Emergency Management Agency in an area, if those official duties—

“(i) are related to a major disaster or emergency that has been, or is later, declared to exist with respect to the area under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.); and

“(ii) are determined by the head of the agency to be hazardous duties.”

42 USC 3796b
note.

(b) EFFECTIVE DATE.—The amendment made by subsection (a) applies only to employees described in subparagraphs (B) and (C) of section 1204(7) of the Omnibus Crime Control and Safe Streets Act of 1968 (as amended by subsection (a)) who are injured or who die in the line of duty on or after the date of the enactment of this Act.

42 USC 5206.

SEC. 306. BUY AMERICAN.

(a) COMPLIANCE WITH BUY AMERICAN ACT.—No funds authorized to be appropriated under this Act or any amendment made by this Act may be expended by an entity unless the entity, in expending the funds, complies with the Buy American Act (41 U.S.C. 10a et seq.).

(b) DEBARMENT OF PERSONS CONVICTED OF FRAUDULENT USE OF “MADE IN AMERICA” LABELS.—

Deadline.

(1) IN GENERAL.—If the Director of the Federal Emergency Management Agency determines that a person has been convicted of intentionally affixing a label bearing a “Made in America” inscription to any product sold in or shipped to the United States that is not made in America, the Director shall determine, not later than 90 days after determining that the person has been so convicted, whether the person should be debarred from contracting under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.).

(2) DEFINITION OF DEBAR.—In this subsection, the term “debar” has the meaning given the term in section 2393(c) of title 10, United States Code.

SEC. 307. TREATMENT OF CERTAIN REAL PROPERTY.

(a) IN GENERAL.—Notwithstanding the National Flood Insurance Act of 1968 (42 U.S.C. 4001 et seq.), the Flood Disaster

Protection Act of 1973 (42 U.S.C. 4002 et seq.), or any other provision of law, or any flood risk zone identified, delineated, or established under any such law (by flood insurance rate map or otherwise), the real property described in subsection (b) shall not be considered to be, or to have been, located in any area having special flood hazards (including any floodway or floodplain).

(b) REAL PROPERTY.—The real property described in this subsection is all land and improvements on the land located in the Maple Terrace Subdivisions in the City of Sycamore, DeKalb County, Illinois, including—

- (1) Maple Terrace Phase I;
- (2) Maple Terrace Phase II;
- (3) Maple Terrace Phase III Unit 1;
- (4) Maple Terrace Phase III Unit 2;
- (5) Maple Terrace Phase III Unit 3;
- (6) Maple Terrace Phase IV Unit 1;
- (7) Maple Terrace Phase IV Unit 2; and
- (8) Maple Terrace Phase IV Unit 3.

(c) REVISION OF FLOOD INSURANCE RATE LOT MAPS.—As soon as practicable after the date of the enactment of this Act, the Director of the Federal Emergency Management Agency shall revise the appropriate flood insurance rate lot maps of the agency to reflect the treatment under subsection (a) of the real property described in subsection (b).

SEC. 308. STUDY OF PARTICIPATION BY INDIAN TRIBES IN EMERGENCY MANAGEMENT.

42 USC 5121
note.

(a) DEFINITION OF INDIAN TRIBE.—In this section, the term “Indian tribe” has the meaning given the term in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450b).

(b) STUDY.—

(1) IN GENERAL.—The Director of the Federal Emergency Management Agency shall conduct a study of participation by Indian tribes in emergency management.

(2) REQUIRED ELEMENTS.—The study shall—

(A) survey participation by Indian tribes in training, predisaster and postdisaster mitigation, disaster preparedness, and disaster recovery programs at the Federal and State levels; and

(B) review and assess the capacity of Indian tribes to participate in cost-shared emergency management programs and to participate in the management of the programs.

(3) CONSULTATION.—In conducting the study, the Director shall consult with Indian tribes.

(c) REPORT.—Not later than 1 year after the date of the enactment of this Act, the Director shall submit a report on the study under subsection (b) to—

Deadline.

(1) the Committee on Environment and Public Works of the Senate;

(2) the Committee on Transportation and Infrastructure of the House of Representatives;

(3) the Committee on Appropriations of the Senate; and

(4) the Committee on Appropriations of the House of Representatives.

Approved October 30, 2000.

LEGISLATIVE HISTORY—H.R. 707 (S. 1691):

HOUSE REPORTS: No. 106-40 (Comm. on Transportation and Infrastructure).

SENATE REPORTS: No. 106-295 accompanying S. 1691 (Comm. on Environment and Public Works).

CONGRESSIONAL RECORD:

Vol. 145 (1999): Mar. 4, considered and passed House.

Vol. 146 (2000): July 19, considered and passed Senate, amended.

Oct. 3, House concurred in Senate amendment with an amendment.

Oct. 5, Senate concurred in House amendment with an amendment.

Oct. 10, House concurred in Senate amendment.





Federal Register

Tuesday,
February 26, 2002

Part III

Federal Emergency Management Agency

44 CFR Parts 201 and 206
Hazard Mitigation Planning and Hazard Mitigation Grant Program; Interim Final Rule

FEDERAL EMERGENCY MANAGEMENT AGENCY**44 CFR Parts 201 and 206**

RIN 3067–AD22

Hazard Mitigation Planning and Hazard Mitigation Grant Program**AGENCY:** Federal Emergency Management Agency.**ACTION:** Interim final rule.

SUMMARY: This rule addresses State mitigation planning, identifies new local mitigation planning requirements, authorizes Hazard Mitigation Grant Program (HMGP) funds for planning activities, and increases the amount of HMGP funds available to States that develop a comprehensive, enhanced mitigation plan. This rule also requires that repairs or construction funded by a disaster loan or grant must be carried out in accordance with applicable standards and says that FEMA may require safe land use and construction practices as a condition of grantees receiving disaster assistance under the Stafford Act.

DATES: *Effective Date:* February 26, 2002.

Comment Date: We will accept written comments through April 29, 2002.

ADDRESSES: Please send written comments to the Rules Docket Clerk, Office of the General Counsel, Federal Emergency Management Agency, 500 C Street, SW., room 840, Washington, DC 20472, (facsimile) 202–646–4536, or (email) rules@fema.gov.

FOR FURTHER INFORMATION CONTACT: Margaret E. Lawless, Federal Insurance and Mitigation Administration, Federal Emergency Management Agency, 500 C Street, SW., Washington, DC, 20472, 202–646–3027, (facsimile) 202–646–3104, or (email) margaret.lawless@fema.gov.

SUPPLEMENTARY INFORMATION:**Introduction**

Throughout the preamble and the rule the terms “we”, “our” and “us” refer to FEMA.

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S.C. 5165, enacted under § 104 the Disaster Mitigation Act of 2000, (DMA 2000) P.L. 106–390, provides new and revitalized approaches to mitigation planning. This section: (1) Continues the requirement for a Standard State Mitigation plan as a condition of disaster assistance; (2) provides for States to receive an increased

percentage of HMGP funds (from 15 to 20 percent of the total estimated eligible Federal assistance) if, at the time of the declaration of a major disaster, they have in effect a FEMA-approved Enhanced State Mitigation Plan that meets the factors listed in this rule; (3) establishes a new requirement for local mitigation plans; and (4) authorizes up to 7 percent of the HMGP funds available to a State to be used for development of State, tribal, and local mitigation plans. We will give Indian tribal governments the opportunity to fulfill the requirements of § 322 either as a grantee or a subgrantee. An Indian tribal government may choose to apply for HMGP funding directly to us and would then serve as a grantee, meeting the State level responsibilities, or it may apply through the State, meeting the local government or subgrantee responsibilities.

Section 322, in concert with other sections of the Act, provides a significant opportunity to reduce the Nation’s disaster losses through mitigation planning. In addition, implementation of planned, pre-identified, cost-effective mitigation measures will streamline the disaster recovery process. The Act provides a framework for linking pre- and post-disaster mitigation planning and initiatives with public and private interests to ensure an integrated, comprehensive approach to disaster loss reduction. The language in the Act, taken as a whole, emphasizes the importance of strong State and local planning processes and comprehensive program management at the State level. The new planning criteria also support State administration of the HMGP, and contemplate a significant State commitment to mitigation activities, comprehensive State mitigation planning, and strong program management.

The planning process also provides a link between State and local mitigation programs. Both State level and local plans should address strategies for incorporating post-disaster early mitigation implementation strategies and sustainable recovery actions. We also recognize that governments are involved in a range of planning activities and that mitigation plans may be linked to or reference hazardous materials and other non-natural hazard plans. Improved mitigation planning will result in a better understanding of risks and vulnerabilities, as well as to expedite implementation of measures and activities to reduce those risks, both pre- and post-disaster.

Section 409 of the Stafford Act, 42 U.S.C. 5176, which required mitigation

plans and the use of minimum codes and standards, was repealed by the DMA 2000. These issues are now addressed in two separate sections of the law: mitigation planning is in section 322 of the Act, and minimum codes and standards are in section 323 of the Act. We previously implemented section 409 through 44 CFR Part 206, Subpart M. Since current law now distinguishes the planning from the codes and standards in separate sections, we will address them in different sections of the CFR. We address the new planning regulations in Part 201 to reflect the broader relevance of planning to all FEMA mitigation programs, while the minimum standards remain in Part 206, Federal Disaster Assistance, Subpart M. The regulations implementing the Hazard Mitigation Grant Program are in Part 206, Subpart N. This rule also contains changes to Subpart N, to reflect the new planning criteria identified in section 322 of the Act.

The administration is considering changes to FEMA’s mitigation programs in the President’s Budget for FY 2003. However, States and localities still would be required to have plans in effect, which meet the minimum requirements under this rule, as a condition of receiving mitigation assistance after November 1, 2003.

Implementation Strategy. States must have an approved hazard mitigation plan in order to receive Stafford Act assistance, excluding assistance provided pursuant to emergency provisions. These regulations provide criteria for the new two-tiered State mitigation plan process: Standard State Mitigation Plans, which allow a State to receive HMGP funding based on 15 percent of the total estimated eligible Stafford Act disaster assistance, and Enhanced State Mitigation Plans, which allow a State to receive HMGP funds based on 20 percent of the total estimated eligible Stafford Act disaster assistance. Enhanced State Mitigation Plans must demonstrate that the State has developed a comprehensive mitigation program, that it effectively uses available mitigation funding, and that it is capable of managing the increased funding. All State Mitigation Plans must be reviewed, revised, and re-approved by FEMA every three years. An important requirement of the legislation is that we must approve a completed enhanced plan *before* a disaster declaration, in order for the State to be eligible for the increased funding.

We will no longer require States to revise their mitigation plan after every disaster declaration, as under former

section 409 of the Act, 42 U.S.C. 5176. We recommend, however, that States consider revising their plan if a disaster or other circumstances significantly affect its mitigation priorities. States with existing mitigation plans, approved under former section 409, will continue to be eligible for the 15 percent HMGP funding until November 1, 2003, when all State mitigation plans must meet the requirements of these regulations. If State plans are not revised and approved to meet the Standard State Mitigation Plan requirements by that time, they will be ineligible for Stafford Act assistance, excluding emergency assistance.

Indian tribal governments may choose to apply directly to us for HMGP funding, and would therefore be responsible for having an approved State level mitigation plan, and would act as the grantee. If an Indian tribal government chooses to apply for HMGP grants through the State, they would be responsible for having an approved local level mitigation plan, and would serve as a subgrantee accountable to the State as grantee.

This rule also establishes local planning criteria so that these jurisdictions can actively begin the hazard mitigation planning process. This requirement is to encourage the development of comprehensive mitigation plans before disaster events. Section 322 requires local governments to have an approved local mitigation plan to be eligible to receive an HMGP project grant; however, this requirement will not fully take effect until November 1, 2003. FEMA Regional Directors may grant an exception to this requirement in extenuating circumstances. Until November 1, 2003, local governments will be able to receive HMGP project grant funds and may prepare a mitigation plan concurrently with implementation of their project grant. We anticipate that the Predisaster Mitigation program authorized by section 203 of the Act, 42 U.S.C. 5133, will also support this local mitigation planning by making funds available for the development of comprehensive local mitigation plans. Managing States that we approve under new criteria established under section 404 of the Act, 42 U.S.C. 5170c(c), as amended by section 204 of DMA 2000 will have approval authority for local mitigation plans. This provision does not apply to States that we approved under the Managing State program in effect before enactment of DMA 2000.

Our goal is for State and local governments to develop comprehensive and integrated plans that are coordinated through appropriate State,

local, and regional agencies, as well as non-governmental interest groups. To the extent feasible and practicable, we would also like to consolidate the planning requirements for different FEMA mitigation programs. This will ensure that one local plan will meet the minimum requirements for all of the different FEMA mitigation programs, such as the Flood Mitigation Assistance Program (authorized by sections 553 and 554 of the National Flood Insurance Reform Act of 1994, 42 U.S.C. 4104c and 42 U.S.C. 4104d), the Community Rating System (authorized by section 541 of the National Flood Insurance Reform Act of 1994, 42 U.S.C. 4022), the Pre-Disaster Mitigation Program (authorized by section 203 of the Stafford Act), the Hazard Mitigation Grant Program (authorized by section 404 of the Stafford Act), and the mitigation activities that are based upon the provisions of section 323 and subsections 406(b) and (e) of the Stafford Act. The mitigation plans may also serve to integrate documents and plans produced under other emergency management programs. State level plans should identify overall goals and priorities, incorporating the more specific local risk assessments, when available, and including projects identified through the local planning process.

Under section 322(d), up to 7 percent of the available HMGP funds may now be used for planning, and we encourage States to use these funds for local plan development. In a memorandum to FEMA Regional Directors dated December 21, 2000, we announced that this provision of section 322 was effective for disasters declared on or after October 30, 2000, the date on which the Disaster Mitigation Act of 2000 became law. Regional Directors are encouraging States to make these funds immediately available to local and Indian tribal governments, although the funds can be used for plan development and review at the State level as well.

As discussed earlier in this Supplementary Information, subsection 323(a) of the Stafford Act, 42 U.S.C. 5166(a), requires as a precondition to receiving disaster assistance under the Act that State and local governments, as well as eligible private nonprofit entities, must agree to carry out repair and reconstruction activities "in accordance with applicable standards of safety, decency, and sanitation and in conformity with applicable codes, specifications, and standards." In addition, that subsection authorizes the President (FEMA, by virtue of Executive Order 12148, as amended) to "require safe land use and construction practices,

after adequate consultation with appropriate State and local officials" in the course of the use of Federal disaster assistance by eligible applicants to repair and restore disaster-damaged facilities.

At the same time that we implement the planning mandates of section 322 of the Stafford Act, we are also implementing the Minimum Standards for Public and Private Structures provision of section 323 of the Act. This rule appears at Subpart M of Part 206 of Title 44 of the Code of Federal Regulations. As mentioned earlier, the section 322 planning regulations are in Part 201, while Part 206, Subpart M includes only the minimum codes and standards regulations mandated in § 323. The rule to implement § 323 of the Act reinforces the link between pre-disaster planning, building and construction standards, and post-disaster reconstruction efforts.

We encourage comments on this interim final rule, and we will make every effort to involve all interested parties prior to the development of the Final Rule.

Justification for Interim Final Rule

In general, FEMA publishes a rule for public comment before issuing a final rule, under the Administrative Procedure Act, 5 U.S.C. 533 and 44 CFR 1.12. The Administrative Procedure Act, however, provides an exception from that general rule where the agency for good cause finds the procedures for comment and response contrary to public interest. Section 322 of the Stafford Act allows States to receive increased post-disaster grant funding for projects designed to reduce future disaster losses. States will only be eligible for these increased funds if they have a FEMA-approved Enhanced State Mitigation Plan.

This interim final rule provides the criteria for development and approval of these plans, as well as criteria for local mitigation plans required by this legislation. In order for State and local governments to be positioned to receive these mitigation funds as soon as possible, these regulations must be in effect. The public benefit of this rule will be to assist States and communities assess their risks and identify activities to strengthen the larger community and the built environment in order to become less susceptible to disasters. Planning serves as the vital foundation to saving lives and protecting properties, having integrated plans in place can serve to both streamline recovery efforts and lessen potential future damages. Therefore, we believe it is contrary to the public interest to delay

the benefits of this rule. In accordance with the Administrative Procedure Act, 5 U.S.C. 553(d)(3), we find that there is good cause for the interim final rule to take effect immediately upon publication in the **Federal Register** in order to meet the needs of States and communities by identifying criteria for mitigation plans in order to reduce risks nationwide, establish criteria for minimum codes and standards in post-disaster reconstruction, and to allow States to adjust their mitigation plans to receive the increase in mitigation funding.

In addition, we believe that, under the circumstances, delaying the effective date of this rule until after the comment period would not further the public interest. Prior to this rulemaking, FEMA hosted a meeting where interested parties provided comments and suggestions on how we could implement these planning requirements. Participants in this meeting included representatives from the National Emergency Management Association, the Association of State Floodplain Managers, the National Governors' Association, the International Association of Emergency Managers, the National Association of Development Organizations, the American Public Works Association, the National League of Cities, the National Association of Counties, the National Conference of State Legislatures, the International City/County Management Association, and the Bureau of Indian Affairs. We took comments and suggestions provided at this meeting into account in developing this interim final rule. Therefore, we find that prior notice and comment on this rule would not further the public interest. We actively encourage and solicit comments on this interim final rule from interested parties, and we will consider them in preparing the final rule. For these reasons, we believe we have good cause to publish an interim final rule.

National Environmental Policy Act

44 CFR 10.8(d)(2)(ii) excludes this rule from the preparation of an environmental assessment or environmental impact statement, where the rule relates to actions that qualify for categorical exclusion under 44 CFR 10.8(d)(2)(iii), such as the development of plans under this section.

Executive Order 12866, Regulatory Planning and Review

We have prepared and reviewed this rule under the provisions of E.O. 12866, Regulatory Planning and Review. Under Executive Order 12866, 58 FR 51735, October 4, 1993, a significant regulatory

action is subject to OMB review and the requirements of the Executive Order. The Executive Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

The purpose of this rule is to implement section 322 of the Stafford Act which addresses mitigation planning at the State, tribal, and local levels, identifies new local planning requirements, allows Hazard Mitigation Grant Program (HMGP) funds for planning activities, and increases the amount of HMGP funds available to States that develop a comprehensive, enhanced mitigation plan. The rule identifies local mitigation planning requirements before approval of project grants, and requires our approval of an Enhanced State Mitigation plan as a condition for increased mitigation funding. The rule also implements section 323 of the Stafford Act, which requires that repairs or construction funded by disaster loans or grants must comply with applicable standards and safe land use and construction practices. As such the rule itself will not have an effect on the economy of more than \$100,000,000.

Therefore, this rule is a significant regulatory action and is not an economically significant rule under Executive Order 12866. The Office of Management and Budget (OMB) has reviewed this rule under Executive Order 12866.

Executive Order 12898, Environmental Justice

Under Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 FR 7629, February 16, 1994, we incorporate environmental justice into our policies and programs. The Executive Order requires each Federal agency to conduct its programs, policies, and activities that substantially affect human health or the

environment, in a manner that ensures that those programs, policies, and activities do not have the effect of excluding persons from participation in our programs, denying persons the benefits of our programs, or subjecting persons to discrimination because of their race, color, or national origin.

No action that we can anticipate under the final rule will have a disproportionately high or adverse human health and environmental effect on any segment of the population. Section 322 focuses specifically on mitigation planning to: Identify the natural hazards, risks, and vulnerabilities of areas in States, localities, and tribal areas; support development of local mitigation plans; provide for technical assistance to local and tribal governments for mitigation planning; and identify and prioritize mitigation actions that the State will support, as resources become available. Section 323 requires compliance with applicable codes and standards in repair and construction, and use of safe land use and construction standards. Accordingly, the requirements of Executive Order 12898 do not apply to this interim final rule.

Paperwork Reduction Act of 1995

As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) and concurrent with the publication of this interim final rule, we have submitted a request for review and approval of a new collection of information, which is contained in this interim final rule. Under the Paperwork Reduction Act of 1995, a person may not be penalized for failing to comply with an information collection that does not display a currently valid Office of Management and Budget (OMB) control number. The request was submitted to OMB for approval under the emergency processing procedures in OMB regulation 5 CFR 1320.1. OMB has approved this collection of information for use through August 31, 2002, under OMB Number 3067-0297.

We expect to follow this emergency request with a request for OMB approval to continue the use of the collection of information for a term of three years. The request will be processed under OMB's normal clearance procedures in accordance with provisions of OMB regulation 5 CFR 1320.10. To help us with the timely processing of the emergency and normal clearance submissions to OMB, we invite the general public to comment on the collection of information. This notice and request for comments complies with the provisions of the Paperwork

Reduction Act of 1995 (44 U.S.C. 3506(c)(2)(A)).

Collection of Information

Title: State/Local/Tribal Hazard Mitigation Plans under Section 322 of the Disaster Mitigation Act of 2000.

Abstract: Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by Section 104 of the Disaster Mitigation Act of 2000, provides new and revitalized approaches to mitigation planning. To obtain Federal assistance, new planning provisions require that each state, local, and tribal government prepare a hazard mitigation plan to include sections that describe the planning process, an assessment of the risks, a mitigation strategy, and identification of the plan maintenance and updating process. The Act provides a framework for linking pre- and post-disaster mitigation planning and initiatives with public and

private interests to ensure an integrated, comprehensive approach to disaster loss reduction. Under Section 322 there is a two-tiered State mitigation plan process. State mitigation plans must be reviewed, revised, and submitted to us every 3 years.

(1) A *Standard State Mitigation Plan* must be approved by us in order for States to be eligible to receive Hazard Mitigation Grant Program (HMGP) funding based on 15 percent of the total estimated eligible Federal disaster assistance. This plan demonstrates the State's goals, priorities, and commitment to reduce risks from natural hazards and serves as a guide for State and local decision makers as they commit resources to reducing the effects of natural hazards.

(2) An *Enhanced State Mitigation Plan* must be approved by us for a State to be eligible to receive HMGP funds based on 20 percent of the total

estimated eligible Federal disaster assistance. This plan must be approved by us within the 3 years prior to the current major disaster declaration. It must demonstrate that a State has developed a comprehensive mitigation program, is effectively using available mitigation funding, and is capable of managing the increased funding.

To be eligible to receive HMGP project grants, *local governments* must develop Local Mitigation Plans that include a risk assessment and mitigation strategy to reduce potential losses and target resources. Plans must be reviewed, revised, and submitted to us for approval every 5 years.

To receive HMGP project grants, *tribal governments* may apply as a grantee or subgrantee, and will be required to meet the planning requirements of a State or local government.

Estimated Total Annual Burden:

Type of collection/forms	No. of respondents	Hours per response	Annual burden hours
Update state or tribal mitigation plans (standard state mitigation plans)	18	320	5,760
State review of local plans	500 local plans	8	4,000
States develop Enhanced State Mitigation Plans	7	100	700
Local or tribal governments develop mitigation plans	500 local plans	300	150,000
Total burden	160,460

Comments: We are soliciting written comments to: (a) Evaluate whether the proposed data collection is necessary for the proper performance of the agency, including whether the information shall have practical utility; (b) evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information; (c) obtain recommendations to enhance the quality, utility, and clarity of the information to be collected; and (d) evaluate the extent to which automated, electronic, mechanical, or other technological collection techniques may further reduce the respondents' burden. FEMA will accept comments through April 29, 2002.

Addressee: Interested persons should submit written comments to Muriel B. Anderson, Chief, Records Management Section, Program Services and Systems Branch, Facilities Management and Services Division, Administration and Resource Planning Directorate, Federal Emergency Management Agency, 500 C Street, Street, SW., Washington, DC 20472.

FOR FURTHER INFORMATION CONTACT: You may obtain copies of the OMB paperwork clearance package by

contacting Ms. Anderson at (202) 646-2625 (voice), (202) 646-3347 (facsimile), or by e-mail at muriel.anderson@fema.gov.

Executive Order 13132, Federalism

Executive Order 13132, Federalism, dated August 4, 1999, sets forth principles and criteria that agencies must adhere to in formulating and implementing policies that have federalism implications, that is, regulations that have substantial direct effects on the States, or on the distribution of power and responsibilities among the various levels of government. Federal agencies must closely examine the statutory authority supporting any action that would limit the policymaking discretion of the States, and to the extent practicable, must consult with State and local officials before implementing any such action.

We have reviewed this rule under E.O. 13132 and have concluded that the rule does not have federalism implications as defined by the Executive Order. We have determined that the rule does not significantly affect the rights, roles, and responsibilities of States, and involves no preemption of State law nor

does it limit State policymaking discretion.

However, we have consulted with State and local officials. In order to assist us in the development of this rule, we hosted a meeting to allow interested parties an opportunity to provide their perspectives on the legislation and options for implementation of § 322. Stakeholders who attended the meeting included representatives from the National Emergency Management Association, the Association of State Floodplain Managers, the National Governors' Association, the International Association of Emergency Managers, the National Association of Development Organizations, the American Public Works Association, the National League of Cities, the National Association of Counties, the National Conference of State Legislatures, the International City/County Management Association, and the Bureau of Indian Affairs. We received valuable input from all parties at the meeting, which we took into account in the development of this rule. Additionally, we actively encourage and solicit comments on this interim final rule from interested parties, and we will

consider them in preparing the final rule.

Executive Order 13175, Consultation and Coordination With Indian Tribal Governments

We have reviewed this interim final rule under Executive Order 13175, which became effective on February 6, 2001. Under the Hazard Mitigation Grant Program (HMGP), Indian tribal governments will have the option to apply for grants directly to us and to serve as “grantee”, carrying out “State” roles. If they choose this option, tribal governments may submit either a State-level Standard Mitigation Plan for the 15 percent HMGP funding or a State-level Enhanced Mitigation Plan for 20 percent HMGP funding. In either case, Indian tribal governments would be able to spend up to 7 percent of those funds on planning. Before developing this rule, we met with representatives from State and local governments and the Bureau of Indian Affairs, to discuss the new planning opportunities and requirements of § 322 of the Stafford Act. We received valuable input from all parties, which helped us to develop this interim final rule.

In reviewing the interim final rule, we find that it does not have “tribal implications” as defined in Executive Order 13175 because it will not have a substantial direct effect on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes. Moreover, the interim final rule does not impose substantial direct compliance costs on tribal governments, nor does it preempt tribal law, impair treaty rights or limit the self-governing powers of tribal governments.

Congressional Review of Agency Rulemaking

We have sent this interim final rule to the Congress and to the General Accounting Office under the Congressional Review of Agency Rulemaking Act, Public Law 104–121. The rule is not a “major rule” within the meaning of that Act. It is an administrative action in support of normal day-to-day mitigation planning activities required by section 322 and compliance under section 323 of the Stafford Act, as enacted in DMA 2000.

The rule will not result in a major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions. It will not have “significant adverse effects” on competition, employment, investment,

productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises. This final rule is subject to the information collection requirements of the Paperwork Reduction Act, and OMB has assigned Control No. 3067–0297. The rule is not an unfunded Federal mandate within the meaning of the Unfunded Mandates Reform Act of 1995, Public Law 104–4, and any enforceable duties that we impose are a condition of Federal assistance or a duty arising from participation in a voluntary Federal program.

List of Subjects in 44 CFR Part 201 and Part 206

Administrative practice and procedure, Disaster assistance, Grant programs, Mitigation planning, Reporting and recordkeeping requirements.

Accordingly, Amend 44 CFR, Subchapter D—Disaster Assistance, as follows:

1. Add Part 201 to read as follows:

PART 201—MITIGATION PLANNING

Sec.

- 201.1 Purpose.
- 201.2 Definitions.
- 201.3 Responsibilities.
- 201.4 Standard State Mitigation Plans.
- 201.5 Enhanced State Mitigation Plans.
- 201.6 Local Mitigation Plans.

Authority: Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121–5206; Reorganization Plan No. 3 of 1978, 43 FR 41943, 3 CFR, 1978 Comp., p. 329; E.O. 12127, 44 FR 19367, 3 CFR, 1979 Comp., p. 376; E.O. 12148, 44 FR 43239, 3 CFR, 1979 Comp., p. 412; and E.O. 12673, 54 FR 12571, 3 CFR, 1989 Comp., p. 214.

§ 201.1 Purpose.

(a) The purpose of this part is to provide information on the policies and procedures for mitigation planning as required by the provisions of section 322 of the Stafford Act, 42 U.S.C. 5165.

(b) The purpose of mitigation planning is for State, local, and Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources.

§ 201.2 Definitions.

Grantee means the government to which a grant is awarded, which is accountable for the use of the funds provided. The grantee is the entire legal entity even if only a particular component of the entity is designated in the grant award document. Generally,

the State is the grantee. However, after a declaration, an Indian tribal government may choose to be a grantee, or may act as a subgrantee under the State. An Indian tribal government acting as grantee will assume the responsibilities of a “state”, as described in this part, for the purposes of administering the grant.

Hazard mitigation means any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.

Hazard Mitigation Grant Program means the program authorized under section 404 of the Stafford Act, 42 U.S.C. 5170c and implemented at 44 CFR Part 206, Subpart N, which authorizes funding for certain mitigation measures identified through the evaluation of natural hazards conducted under section 322 of the Stafford Act 42 U.S.C. 5165.

Indian tribal government means any Federally recognized governing body of an Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of Interior acknowledges to exist as an Indian tribe under the Federally Recognized Tribe List Act of 1994, 25 U.S.C. 479a. This does not include Alaska Native corporations, the ownership of which is vested in private individuals.

Local government is any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

Managing State means a State to which FEMA has delegated the authority to administer and manage the HMGP under the criteria established by FEMA pursuant to 42 U.S.C. 5170c(c). FEMA may also delegate authority to tribal governments to administer and manage the HMGP as a Managing State.

Regional Director is a director of a regional office of FEMA, or his/her designated representative.

Small and impoverished communities means a community of 3,000 or fewer individuals that is identified by the State as a rural community, and is not a remote area within the corporate boundaries of a larger city; is economically disadvantaged, by having an average per capita annual income of residents not exceeding 80 percent of national, per capita income, based on

best available data; the local unemployment rate exceeds by one percentage point or more, the most recently reported, average yearly national unemployment rate; and any other factors identified in the State Plan in which the community is located.

The Stafford Act refers to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93–288, as amended (42 U.S.C. 5121–5206).

State is any State of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

State Hazard Mitigation Officer is the official representative of State government who is the primary point of contact with FEMA, other Federal agencies, and local governments in mitigation planning and implementation of mitigation programs and activities required under the Stafford Act.

Subgrantee means the government or other legal entity to which a subgrant is awarded and which is accountable to the grantee for the use of the funds provided. Subgrantees can be a State agency, local government, private non-profit organizations, or Indian tribal government. Indian tribal governments acting as a subgrantee are accountable to the State grantee.

§ 201.3 Responsibilities.

(a) *General*. This section identifies the key responsibilities of FEMA, States, and local/tribal governments in carrying out section 322 of the Stafford Act, 42 U.S.C. 5165.

(b) *FEMA*. The key responsibilities of the Regional Director are to:

(1) Oversee all FEMA related pre- and post-disaster hazard mitigation programs and activities;

(2) Provide technical assistance and training to State, local, and Indian tribal governments regarding the mitigation planning process;

(3) Review and approve all Standard and Enhanced State Mitigation Plans;

(4) Review and approve all local mitigation plans, unless that authority has been delegated to the State in accordance with § 201.6(d);

(5) Conduct reviews, at least once every three years, of State mitigation activities, plans, and programs to ensure that mitigation commitments are fulfilled, and when necessary, take action, including recovery of funds or denial of future funds, if mitigation commitments are not fulfilled.

(c) *State*. The key responsibilities of the State are to coordinate all State and

local activities relating to hazard evaluation and mitigation and to:

(1) Prepare and submit to FEMA a Standard State Mitigation Plan following the criteria established in § 201.4 as a condition of receiving Stafford Act assistance (except emergency assistance).

(2) In order to be considered for the 20 percent HMGP funding, prepare and submit an Enhanced State Mitigation Plan in accordance with § 201.5, which must be reviewed and updated, if necessary, every three years from the date of the approval of the previous plan.

(3) At a minimum, review and, if necessary, update the Standard State Mitigation Plan by November 1, 2003 and every three years from the date of the approval of the previous plan in order to continue program eligibility.

(4) Make available the use of up to the 7 percent of HMGP funding for planning in accordance with § 206.434.

(5) Provide technical assistance and training to local governments to assist them in applying for HMGP planning grants, and in developing local mitigation plans.

(6) For Managing States that have been approved under the criteria established by FEMA pursuant to 42 U.S.C. 5170c(c), review and approve local mitigation plans in accordance with § 201.6(d).

(d) *Local governments*. The key responsibilities of local governments are to:

(1) Prepare and adopt a jurisdiction-wide natural hazard mitigation plan as a condition of receiving project grant funds under the HMGP, in accordance with § 201.6.

(2) At a minimum, review and, if necessary, update the local mitigation plan every five years from date of plan approval to continue program eligibility.

(e) *Indian tribal governments*. Indian tribal governments will be given the option of applying directly to us for Hazard Mitigation Grant Program funding, or they may choose to apply through the State. If they apply directly to us, they will assume the responsibilities of the State, or grantee, and if they apply through the State, they will assume the responsibilities of the local government, or subgrantee.

§ 201.4 Standard State Mitigation Plans.

(a) *Plan requirement*. By November 1, 2003, States must have an approved Standard State Mitigation plan meeting the requirements of this section, in order to receive assistance under the Stafford Act, although assistance authorized under disasters declared prior to November 1, 2003 will continue

to be made available. In any case, emergency assistance provided under 42 U.S.C. 5170a, 5170b, 5173, 5174, 5177, 5179, 5180, 5182, 5183, 5184, 5192 will not be affected. The mitigation plan is the demonstration of the State's commitment to reduce risks from natural hazards and serves as a guide for State decision makers as they commit resources to reducing the effects of natural hazards. States may choose to include the requirements of the HMGP Administrative Plan in their mitigation plan.

(b) *Planning process*. An effective planning process is essential in developing and maintaining a good plan. The mitigation planning process should include coordination with other State agencies, appropriate Federal agencies, interested groups, and be integrated to the extent possible with other ongoing State planning efforts as well as other FEMA mitigation programs and initiatives.

(c) *Plan content*. To be effective the plan must include the following elements:

(1) Description of the *planning process* used to develop the plan, including how it was prepared, who was involved in the process, and how other agencies participated.

(2) *Risk assessments* that provide the factual basis for activities proposed in the strategy portion of the mitigation plan. Statewide risk assessments must characterize and analyze natural hazards and risks to provide a statewide overview. This overview will allow the State to compare potential losses throughout the State and to determine their priorities for implementing mitigation measures under the strategy, and to prioritize jurisdictions for receiving technical and financial support in developing more detailed local risk and vulnerability assessments. The risk assessment shall include the following:

(i) An overview of the type and location of all natural hazards that can affect the State, including information on previous occurrences of hazard events, as well as the probability of future hazard events, using maps where appropriate;

(ii) An overview and analysis of the State's vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments as well as the State risk assessment. The State shall describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events. State owned critical or operated facilities located in the

identified hazard areas shall also be addressed;

(iii) An overview and analysis of potential losses to the identified vulnerable structures, based on estimates provided in local risk assessments as well as the State risk assessment. The State shall estimate the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities located in the identified hazard areas.

(3) A *Mitigation Strategy* that provides the State's blueprint for reducing the losses identified in the risk assessment. This section shall include:

(i) A description of State goals to guide the selection of activities to mitigate and reduce potential losses.

(ii) A discussion of the State's pre- and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including: an evaluation of State laws, regulations, policies, and programs related to hazard mitigation as well as to development in hazard-prone areas; a discussion of State funding capabilities for hazard mitigation projects; and a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.

(iii) An identification, evaluation, and prioritization of cost-effective, environmentally sound, and technically feasible mitigation actions and activities the State is considering and an explanation of how each activity contributes to the overall mitigation strategy. This section should be linked to local plans, where specific local actions and projects are identified.

(iv) Identification of current and potential sources of Federal, State, local, or private funding to implement mitigation activities.

(4) A section on the *Coordination of Local Mitigation Planning* that includes the following:

(i) A description of the State process to support, through funding and technical assistance, the development of local mitigation plans.

(ii) A description of the State process and timeframe by which the local plans will be reviewed, coordinated, and linked to the State Mitigation Plan.

(iii) Criteria for prioritizing communities and local jurisdictions that would receive planning and project grants under available funding programs, which should include consideration for communities with the highest risks, repetitive loss properties, and most intense development pressures. Further, that for non-planning grants, a principal criterion for prioritizing grants shall be the extent to which benefits are maximized according

to a cost benefit review of proposed projects and their associated costs.

(5) A *Plan Maintenance Process* that includes:

(i) An established method and schedule for monitoring, evaluating, and updating the plan.

(ii) A system for monitoring implementation of mitigation measures and project closeouts.

(iii) A system for reviewing progress on achieving goals as well as activities and projects identified in the Mitigation Strategy.

(6) A *Plan Adoption Process*. The plan must be formally adopted by the State prior to submittal to us for final review and approval.

(7) *Assurances*. The plan must include assurances that the State will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c). The State will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).

(d) *Review and updates*. Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities and resubmitted for approval to the appropriate Regional Director every three years. The Regional review will be completed within 45 days after receipt from the State, whenever possible. We also encourage a State to review its plan in the post-disaster timeframe to reflect changing priorities, but it is not required.

§ 201.5 Enhanced State Mitigation Plans.

(a) A State with a FEMA approved Enhanced State Mitigation Plan at the time of a disaster declaration is eligible to receive increased funds under the HMGp, based on twenty percent of the total estimated eligible Stafford Act disaster assistance. The Enhanced State Mitigation Plan must demonstrate that a State has developed a comprehensive mitigation program, that the State effectively uses available mitigation funding, and that it is capable of managing the increased funding. In order for the State to be eligible for the 20 percent HMGp funding, FEMA must have approved the plan within three years prior to the disaster declaration.

(b) Enhanced State Mitigation Plans must include all elements of the Standard State Mitigation Plan identified in § 201.4, as well as document the following:

(1) Demonstration that the plan is integrated to the extent practicable with other State and/or regional planning

initiatives (comprehensive, growth management, economic development, capital improvement, land development, and/or emergency management plans) and FEMA mitigation programs and initiatives that provide guidance to State and regional agencies.

(2) Documentation of the State's project implementation capability, identifying and demonstrating the ability to implement the plan, including:

(i) Established eligibility criteria for multi-hazard mitigation measures.

(ii) A system to determine the cost effectiveness of mitigation measures, consistent with OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, and to rank the measures according to the State's eligibility criteria.

(iii) Demonstration that the State has the capability to effectively manage the HMGp as well as other mitigation grant programs, including a record of the following:

(A) Meeting HMGp and other mitigation grant application timeframes and submitting complete, technically feasible, and eligible project applications with appropriate supporting documentation;

(B) Preparing and submitting accurate environmental reviews and benefit-cost analyses;

(C) Submitting complete and accurate quarterly progress and financial reports on time; and

(D) Completing HMGp and other mitigation grant projects within established performance periods, including financial reconciliation.

(iv) A system and strategy by which the State will conduct an assessment of the completed mitigation actions and include a record of the effectiveness (actual cost avoidance) of each mitigation action.

(3) Demonstration that the State effectively uses existing mitigation programs to achieve its mitigation goals.

(4) Demonstration that the State is committed to a comprehensive state mitigation program, which might include any of the following:

(i) A commitment to support local mitigation planning by providing workshops and training, State planning grants, or coordinated capability development of local officials, including Emergency Management and Floodplain Management certifications.

(ii) A statewide program of hazard mitigation through the development of legislative initiatives, mitigation councils, formation of public/private

partnerships, and/or other executive actions that promote hazard mitigation.

(iii) The State provides a portion of the non-Federal match for HMGMP and/or other mitigation projects.

(iv) To the extent allowed by State law, the State requires or encourages local governments to use a current version of a nationally applicable model building code or standard that addresses natural hazards as a basis for design and construction of State sponsored mitigation projects.

(v) A comprehensive, multi-year plan to mitigate the risks posed to existing buildings that have been identified as necessary for post-disaster response and recovery operations.

(vi) A comprehensive description of how the State integrates mitigation into its post-disaster recovery operations.

(c) *Review and updates.* (1) A State must review and revise its plan to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities, and resubmit it for approval to the appropriate Regional Director every three years. The Regional review will be completed within 45 days after receipt from the State, whenever possible.

(2) In order for a State to be eligible for the 20 percent HMGMP funding, the Enhanced State Mitigation plan must be approved by FEMA within the three years prior to the current major disaster declaration.

§ 201.6 Local Mitigation Plans.

The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans will also serve as the basis for the State to provide technical assistance and to prioritize project funding.

(a) *Plan requirement.* (1) For disasters declared after November 1, 2003, a local government must have a mitigation plan approved pursuant to this section in order to receive HMGMP project grants. Until November 1, 2003, local mitigation plans may be developed concurrent with the implementation of the project grant.

(2) Regional Directors may grant an exception to the plan requirement in extraordinary circumstances, such as in a small and impoverished community, when justification is provided. In these cases, a plan will be completed within 12 months of the award of the project grant. If a plan is not provided within this timeframe, the project grant will be terminated, and any costs incurred after

notice of grant's termination will not be reimbursed by FEMA.

(3) Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan. State-wide plans will not be accepted as multi-jurisdictional plans.

(b) *Planning process.* An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

(c) *Plan content.* The plan shall include the following:

(1) Documentation of the *planning process* used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

(2) A *risk assessment* that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment shall include:

(i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

(ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of:

(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;

(B) An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section

and a description of the methodology used to prepare the estimate;

(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

(iii) For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

(3) A *mitigation strategy* that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:

(i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

(ii) A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

(iii) An action plan describing how the actions identified in paragraph (c)(2)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

(iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

(4) A *plan maintenance process* that includes:

(i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

(ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

(iii) Discussion on how the community will continue public participation in the plan maintenance process.

(5) *Documentation* that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

(d) *Plan review.* (1) Plans must be submitted to the State Hazard Mitigation Officer for initial review and coordination. The State will then send the plan to the appropriate FEMA Regional Office for formal review and approval.

(2) The Regional review will be completed within 45 days after receipt from the State, whenever possible.

(3) Plans must be reviewed, revised if appropriate, and resubmitted for approval within five years in order to continue to be eligible for HMGP project grant funding.

(4) Managing States that have been approved under the criteria established by FEMA pursuant to 42 U.S.C. 5170c(c) will be delegated approval authority for local mitigation plans, and the review will be based on the criteria in this part. Managing States will review the plans within 45 days of receipt of the plans, whenever possible, and provide a copy of the approved plans to the Regional Office.

PART 206—FEDERAL DISASTER ASSISTANCE FOR DISASTERS DECLARED ON OR AFTER NOVEMBER 23, 1988

2. The authority citation for part 206 is revised to read as follows:

Authority: Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121–5206; Reorganization Plan No. 3 of 1978, 43 FR 41943, 3 CFR, 1978 Comp., p. 329; E.O. 12127, 44 FR 19367, 3 CFR, 1979 Comp., p. 376; E.O. 12148, 44 FR 43239, 3 CFR, 1979 Comp., p. 412; and E.O. 12673, 54 FR 12571, 3 CFR, 1989 Comp., p. 214.

2a. Revise Part 206, Subpart M to read as follows:

Subpart M—Minimum Standards

Sec.
206.400 General.
206.401 Local standards.
206.402 Compliance.

§ 206.400 General.

(a) As a condition of the receipt of any disaster assistance under the Stafford Act, the applicant shall carry out any repair or construction to be financed with the disaster assistance in accordance with applicable standards of safety, decency, and sanitation and in conformity with applicable codes, specifications and standards.

(b) Applicable codes, specifications, and standards shall include any disaster resistant building code that meets the minimum requirements of the National Flood Insurance Program (NFIP) as well as being substantially equivalent to the recommended provisions of the National Earthquake Hazards Reduction

Program (NEHRP). In addition, the applicant shall comply with any requirements necessary in regards to Executive Order 11988, Floodplain Management, Executive Order 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction, and any other applicable Executive orders.

(c) In situations where there are no locally applicable standards of safety, decency and sanitation, or where there are no applicable local codes, specifications and standards governing repair or construction activities, or where the Regional Director determines that otherwise applicable codes, specifications, and standards are inadequate, then the Regional Director may, after consultation with appropriate State and local officials, require the use of nationally applicable codes, specifications, and standards, as well as safe land use and construction practices in the course of repair or construction activities.

(d) The mitigation planning process that is mandated by section 322 of the Stafford Act and 44 CFR part 201 can assist State and local governments in determining where codes, specifications, and standards are inadequate, and may need to be upgraded.

§ 206.401 Local standards.

The cost of repairing or constructing a facility in conformity with minimum codes, specifications and standards may be eligible for reimbursement under section 406 of the Stafford Act, as long as such codes, specifications and standards meet the criteria that are listed at 44 CFR 206.226(b).

§ 206.402 Compliance.

A recipient of disaster assistance under the Stafford Act must document for the Regional Director its compliance with this subpart following the completion of any repair or construction activities.

Subpart N—Hazard Mitigation Grant Program

3. Revise § 206.431 to read as follows:

§ 206.431 Definitions.

Activity means any mitigation measure, project, or action proposed to reduce risk of future damage, hardship, loss or suffering from disasters.

Applicant means a State agency, local government, Indian tribal government, or eligible private nonprofit organization, submitting an application to the grantee for assistance under the HMGP.

Enhanced State Mitigation Plan is the hazard mitigation plan approved under 44 CFR part 201 as a condition of receiving increased funding under the HMGP.

Grant application means the request to FEMA for HMGP funding, as outlined in § 206.436, by a State or tribal government that will act as grantee.

Grant award means total of Federal and non-Federal contributions to complete the approved scope of work.

Grantee means the government to which a grant is awarded and which is accountable for the use of the funds provided. The grantee is the entire legal entity even if only a particular component of the entity is designated in the grant award document. Generally, the State is the grantee. However, an Indian tribal government may choose to be a grantee, or it may act as a subgrantee under the State. An Indian tribal government acting as a grantee will assume the responsibilities of a “state”, under this subpart, for the purposes of administering the grant.

Indian tribal government means any Federally recognized governing body of an Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of Interior acknowledges to exist as an Indian tribe under the Federally Recognized Tribe List Act of 1994, 25 U.S.C. 479a. This does not include Alaska Native corporations, the ownership of which is vested in private individuals.

Local Mitigation Plan is the hazard mitigation plan required of a local or Indian tribal government acting as a subgrantee as a condition of receiving a project subgrant under the HMGP as outlined in 44 CFR 201.6.

Standard State Mitigation Plan is the hazard mitigation plan approved under 44 CFR part 201, as a condition of receiving Stafford Act assistance as outlined in § 201.4.

State Administrative Plan for the Hazard Mitigation Grant Program means the plan developed by the State to describe the procedures for administration of the HMGP.

Subgrant means an award of financial assistance under a grant by a grantee to an eligible subgrantee.

Subgrant application means the request to the grantee for HMGP funding by the eligible subgrantee, as outlined in § 206.436.

Subgrantee means the government or other legal entity to which a subgrant is awarded and which is accountable to the grantee for the use of the funds provided. Subgrantees can be a State agency, local government, private nonprofit organizations, or Indian tribal government as outlined in § 206.433.

Indian tribal governments acting as a subgrantee are accountable to the State grantee.

4. Revise § 206.432(b) to read as follows:

§ 206.432 Federal grant assistance.

* * * * *

(b) *Amounts of assistance.* The total of Federal assistance under this subpart shall not exceed either 15 or 20 percent of the total estimated Federal assistance (excluding administrative costs) provided for a major disaster under 42 U.S.C. 5170b, 5172, 5173, 5174, 5177, 5178, 5183, and 5201 as follows:

(1) *Fifteen (15) percent.* Effective November 1, 2003, a State with an approved Standard State Mitigation Plan, which meets the requirements outlined in 44 CFR 201.4, shall be eligible for assistance under the HMGP not to exceed 15 percent of the total estimated Federal assistance described in this paragraph. Until that date, existing, approved State Mitigation Plans will be accepted.

(2) *Twenty (20) percent.* A State with an approved Enhanced State Mitigation Plan, in effect prior to the disaster declaration, which meets the requirements outlined in 44 CFR 201.5 shall be eligible for assistance under the HMGP not to exceed 20 percent of the total estimated Federal assistance described in this paragraph.

(3) The estimates of Federal assistance under this paragraph (b) shall be based on the Regional Director's estimate of all eligible costs, actual grants, and appropriate mission assignments.

* * * * *

5. Section 206.434 is amended by redesignating paragraphs (b) through (g) as paragraphs (c) through (h), respectively; adding a new paragraph (b); revising redesignated paragraphs (c) introductory text and (c)(1); and revising redesignated paragraph (d) to read as follows:

§ 206.434 Eligibility.

* * * * *

(b) *Plan requirement.* (1) For all disasters declared on or after November 1, 2003, local and tribal government applicants for subgrants, must have an approved local mitigation plan in accordance with 44 CFR 201.6 prior to receipt of HMGP subgrant funding. Until November 1, 2003, local mitigation plans may be developed concurrent with the implementation of subgrants.

(2) Regional Directors may grant an exception to this requirement in extraordinary circumstances, such as in a small and impoverished community

when justification is provided. In these cases, a plan will be completed within 12 months of the award of the project grant. If a plan is not provided within this timeframe, the project grant will be terminated, and any costs incurred after notice of grant's termination will not be reimbursed by FEMA.

(c) *Minimum project criteria.* To be eligible for the Hazard Mitigation Grant Program, a project must:

(1) Be in conformance with the State Mitigation Plan and Local Mitigation Plan approved under 44 CFR part 201;

* * * * *

(d) *Eligible activities.* (1) *Planning.* Up to 7% of the State's HMGP grant may be used to develop State, tribal and/or local mitigation plans to meet the planning criteria outlined in 44 CFR part 201.

(2) *Types of projects.* Projects may be of any nature that will result in protection to public or private property. Eligible projects include, but are not limited to:

(i) Structural hazard control or protection projects;

(ii) Construction activities that will result in protection from hazards;

(iii) Retrofitting of facilities;

(iv) Property acquisition or relocation, as defined in paragraph (e) of this section;

(v) Development of State or local mitigation standards;

(vi) Development of comprehensive mitigation programs with implementation as an essential component;

(vii) Development or improvement of warning systems.

* * * * *

6. Revise § 206.435(a) to read as follows:

§ 206.435 Project identification and selection criteria.

(a) *Identification.* It is the State's responsibility to identify and select eligible hazard mitigation projects. All funded projects must be consistent with the State Mitigation Plan. Hazard Mitigation projects shall be identified and prioritized through the State, Indian tribal, and local planning process.

* * * * *

7. Revise § 206.436 to read as follows:

§ 206.436 Application procedures.

(a) *General.* This section describes the procedures to be used by the grantee in submitting an application for HMGP funding. Under the HMGP, the State or Indian tribal government is the grantee and is responsible for processing subgrants to applicants in accordance with 44 CFR part 13 and this part 206. Subgrantees are accountable to the grantee.

(b) *Governor's Authorized Representative.* The Governor's Authorized Representative serves as the grant administrator for all funds provided under the Hazard Mitigation Grant Program. The Governor's Authorized Representative's responsibilities as they pertain to procedures outlined in this section include providing technical advice and assistance to eligible subgrantees, and ensuring that all potential applicants are aware of assistance available and submission of those documents necessary for grant award.

(c) *Hazard mitigation application.*

Upon identification of mitigation measures, the State (Governor's Authorized Representative) will submit its Hazard Mitigation Grant Program application to the FEMA Regional Director. The application will identify one or more mitigation measures for which funding is requested. The application must include a Standard Form (SF) 424, Application for Federal Assistance, SF 424D, Assurances for Construction Programs, if appropriate, and an narrative statement. The narrative statement will contain any pertinent project management information not included in the State's administrative plan for Hazard Mitigation. The narrative statement will also serve to identify the specific mitigation measures for which funding is requested. Information required for each mitigation measure shall include the following:

(1) Name of the subgrantee, if any;
(2) State or local contact for the measure;

(3) Location of the project;
(4) Description of the measure;
(5) Cost estimate for the measure;
(6) Analysis of the measure's cost-effectiveness and substantial risk reduction, consistent with § 206.434(c);
(7) Work schedule;
(8) Justification for selection;
(9) Alternatives considered;
(10) Environmental information consistent with 44 CFR part 9, Floodplain Management and Protection of Wetlands, and 44 CFR part 10, Environmental Considerations.

(d) *Application submission time limit.* The State's application may be amended as the State identifies and selects local project applications to be funded. The State must submit all local HMGP applications and funding requests for the purpose of identifying new projects to the Regional Director within 12 months of the date of disaster declaration.

(e) *Extensions.* The State may request the Regional Director to extend the application time limit by 30 to 90 day

increments, not to exceed a total of 180 days. The grantee must include a justification in its request.

(f) *FEMA approval.* The application and supplement(s) will be submitted to the FEMA Regional Director for approval. FEMA has final approval authority for funding of all projects.

(g) *Indian tribal grantees.* Indian tribal governments may submit a SF 424 directly to the Regional Director.

Subpart H—Public Assistance Eligibility

* * * * *

8. Revise § 206.220 to read as follows:

§ 206.220 General.

This subpart provides policies and procedures for determinations of eligibility of applicants for public assistance, eligibility of work, and eligibility of costs for assistance under sections 402, 403, 406, 407, 418, 419,

421(d), 502, and 503 of the Stafford Act. Assistance under this subpart must also conform to requirements of 44 CFR part 201, Mitigation Planning, and 44 CFR part 206, subparts G—Public Assistance Project Administration, I—Public Assistance Insurance Requirements, J—Coastal Barrier Resources Act, and M—Minimum Standards. Regulations under 44 CFR part 9—Floodplain Management and 44 CFR part 10—Environmental Considerations, also apply to this assistance.

9. Section 206.226 is amended by redesignating paragraphs

(b) through (j) as paragraphs (c) through (k), respectively; adding a new paragraph (b); and revising redesignated paragraph (g)(5) to read as follows:

§ 206.226 Restoration of damaged facilities.

* * * * *

(b) *Mitigation planning.* In order to receive assistance under this section, as

of November 1, 2003, the State must have in place a FEMA approved State Mitigation Plan in accordance with 44 CFR part 201.

* * * * *

(g) * * *

(5) If relocation of a facility is not feasible or cost effective, the Regional Director shall disapprove Federal funding for the original location when he/she determines in accordance with 44 CFR parts 9, 10, 201, or subpart M of this part 206, that restoration in the original location is not allowed. In such cases, an alternative project may be applied for.

* * * * *

Dated: February 19, 2002.

Michael D. Brown,

General Counsel.

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Hazard Mitigation Assistance Unified Guidance

Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program,
and Flood Mitigation Assistance Program

July 12, 2013



FEMA

**Federal Emergency Management Agency
Department of Homeland Security
500 C Street, S.W.
Washington, DC 20472**

Titles of Opportunities:

- ◆ Hazard Mitigation Grant Program (HMGP)
- ◆ Pre-Disaster Mitigation (PDM) Program
- ◆ Flood Mitigation Assistance (FMA)

Funding Opportunity Numbers:

The Catalog of Federal Domestic Assistance (CFDA) numbers for the three Hazard Mitigation Assistance (HMA) programs are:

- ◆ 97.039 Hazard Mitigation Grant Program (HMGP)
- ◆ 97.047 Pre-Disaster Mitigation (PDM) Program
- ◆ 97.029 Flood Mitigation Assistance (FMA)

Federal Agency Name:

U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA)

Announcement Type:

Initial

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PART I. FUNDING OPPORTUNITY DESCRIPTION

Part I of the Hazard Mitigation Assistance (HMA) Unified Guidance introduces the three HMA programs and outlines the organization of the document.

The U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) HMA programs present a critical opportunity to reduce the risk to individuals and property from natural hazards while simultaneously reducing reliance on Federal disaster funds. On March 30, 2011, the President signed Presidential Policy Directive 8: National Preparedness (PPD-8), and the National Mitigation Framework was finalized in May 2013. The National Mitigation Framework comprises seven core capabilities, including Threats and Hazard Identification, Risk and Disaster Resilience Assessment, Planning, Community Resilience, Public Information and Warning, Long-term Vulnerability Reduction, and Operational Coordination. HMA programs provide funding for eligible activities that are consistent with the National Mitigation Framework's Long-term Vulnerability Reduction capability. HMA programs reduce community vulnerability to disasters and their effects, promote individual and community safety and resilience, and promote community vitality after an incident. Furthermore, HMA programs reduce response and recovery resource requirements in the wake of a disaster or incident, which results in a safer community that is less reliant on external financial assistance.

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects. This definition distinguishes actions that have a long-term impact from those that are more closely associated with immediate preparedness, response, and recovery activities. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage. Accordingly, States, Territories, Indian Tribal governments, and communities are encouraged to take advantage of funding that HMA programs provide in both the pre- and post-disaster timelines.

Together, these programs provide significant opportunities to reduce or eliminate potential losses to State, Indian Tribal government, and local assets through hazard mitigation planning and project grant funding. Each HMA program was authorized by separate legislative action, and as such, each program differs slightly in scope and intent.

The Hazard Mitigation Grant Program (HMGP) provides funds to States, Territories, Indian Tribal governments, local governments, and eligible private non-profits (PNPs) following a Presidential major disaster declaration. The Pre-Disaster Mitigation (PDM) Program and Flood Mitigation Assistance (FMA) programs provide funds annually to States, Territories, Indian Tribal governments, and local governments. Although the statutory origins of the programs

differ, both share the common goal of reducing the risk of loss of life and property due to natural hazards.

This guidance applies to HMGP funds available for disasters declared on or after the date of publication. The guidance in this document is subject to change based on new laws or regulations enacted after publication. This guidance is applicable to the PDM and FMA programs; the application cycles are announced via <http://www.grants.gov/>. For additional information, please contact FEMA.

State, Territory, or Indian Tribal governments are eligible Applicants for HMA programs. The Applicant is responsible for soliciting subapplications from eligible subapplicants, assisting in the preparation of them, and submitting eligible, complete applications to FEMA in priority order. HMA grant funds are awarded to Applicants. When funding is awarded, the Applicant then becomes the “Grantee” and is accountable for the use of the funds, responsible for administering the grant, and responsible for complying with program requirements and other applicable Federal, State, Territorial, and Indian Tribal laws and regulations. As the Grantee, the Applicant is also responsible for financial management of the program and overseeing all approved projects. In general, the “subapplicant” is a State-level agency, Indian Tribal government, local government, or other eligible entity that submits a subapplication for FEMA assistance to the Applicant. If HMA funding is awarded, the subapplicant becomes the “subgrantee” and is responsible for managing the subgrant and complying with program requirements and other applicable Federal, State, Territorial, Indian Tribal, and local laws and regulations. An Indian Tribal government may participate as either the Applicant/Grantee or the subapplicant/subgrantee (see [Part IV, A](#)). For **HMGP**, “subapplicant” has the same meaning given to the term “Applicant” in the HMGP regulations at Title 44 of the Code of Federal Regulations (CFR) Part 206.431.

A. Authorization and Appropriation

HMGP is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, U.S. Code (U.S.C.) 5170c. The key purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. HMGP is available, when authorized under a Presidential major disaster declaration, in the areas of the State requested by the Governor. Indian Tribal governments may also submit a request for a major disaster declaration within their impacted area. The amount of HMGP funding available to the Applicant is based upon the estimated total of Federal assistance, subject to the sliding scale formula outlined in 44 CFR Section 206.432(b) that FEMA provides for disaster recovery under the Presidential major disaster declaration. The formula provides for up to 15 percent of the first \$2 billion of estimated aggregate amounts of disaster assistance, up to 10 percent for amounts between \$2 billion and \$10 billion, and up to 7.5 percent for amounts between \$10 billion and \$35.333 billion. For States with enhanced

plans, the eligible assistance is up to 20 percent for estimated aggregate amounts of disaster assistance not to exceed \$35.333 billion.

The **PDM** Program is authorized by Section 203 of the Stafford Act, 42 U.S.C. 5133. The PDM Program is designed to assist States, Territories, Indian Tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters.

The **FMA** program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4104c, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).

The National Flood Insurance Fund (NFIF) provides the funding for the FMA program. The PDM and FMA programs are subject to the availability of appropriation funding, as well as any program-specific directive or restriction made with respect to such funds.

More information about each program can be found on the FEMA HMA Web site at <https://www.fema.gov/hazard-mitigation-assistance>.

B. Additional Program Information

This guidance consolidates the common requirements for all HMA programs and explains the unique elements of the programs in individual sections. Additionally, it provides information for Federal, State, Indian Tribal, and local officials on how to apply for HMA funding for a proposed mitigation activity.

The organization of this HMA Unified Guidance provides clarity and ease of use by presenting information common to all programs in general order of the grant life cycle. As a result, closely related topics may be presented in different sections of the guidance. This guidance is organized in the following manner:

- ◆ [Part I](#), Funding Opportunity Description, introduces the HMA programs;
- ◆ [Part II](#), Frontloading HMA Program Eligibility Requirements, provides general information to facilitate project scoping and the overall decision-making process;
- ◆ [Part III](#), Award Information, provides information about available funding and application deadlines;
- ◆ [Part IV](#), Eligibility Information, provides information about eligible Applicants and subapplicants, cost-sharing requirements, and other program requirements;
- ◆ [Part V](#), Application and Submission Information, provides information regarding application development including funding restrictions;

-
- ◆ [Part VI](#), Application Review Information, summarizes the FEMA review and selection process;
 - ◆ [Part VII](#), Award Administration Information, highlights grants management requirements from the time an award is made through closeout;
 - ◆ [Part VIII](#), FEMA Contacts, provides Regional and State contact information;
 - ◆ [Part IX](#), Additional Program Guidance, provides information that is unique to each program; and
 - ◆ [Part X](#), Appendices, includes acronyms, a glossary, additional resources, and referenced regulations and statutes.
 - ◆ Additional guidance for particular activity types is provided as an Addendum to this guidance. This additional guidance provides information specific to property acquisition and structure demolition or relocation, wildfire mitigation, safe room construction, mitigation reconstruction, and structure elevation projects.

B.1 Programmatic Changes

Although many of the specific requirements of each program remain the same, significant revisions to programmatic requirements included in this HMA Unified Guidance are:

- ◆ Per the Sandy Recovery Improvement Act of 2013 (SRIA), Indian Tribal governments can submit a request for a major disaster declaration within their impacted areas;
- ◆ A new [Part II](#) has been created to outline the importance of “frontloading” HMA program requirements in the project scoping and development process;
- ◆ The Biggert-Waters Flood Insurance Reform Act of 2012 eliminated the Repetitive Flood Claims and Severe Repetitive Loss programs and made the following significant changes to the FMA program:
 - The definitions of repetitive loss and severe repetitive loss properties have been modified ([Part IX, C.1](#));
 - There is no longer a State cap of \$10 million or a community cap of \$3.3 million for any 5-year period;
 - There is no longer a limit on in-kind contributions for the non-Federal cost share (previously limited to one-half of the non-Federal share);
 - Mitigation reconstruction is an eligible activity;
 - Cost-share requirements have changed to allow more Federal funds for properties with repetitive flood claims and severe repetitive loss properties ([Part IV, B](#));

-
- The development or update of mitigation plans shall not exceed \$50,000 Federal share to any Applicant or \$25,000 Federal share to any subapplicant ([Part V, E.3](#)); and
 - There is no longer a restriction that a planning grant can only be awarded not more than once every 5 years to a State or community.
 - ◆ For Duplication of Benefits (DOB), HMA does not require that property owners seek assistance from other sources (with the exception of insurance);
 - ◆ However, other assistance anticipated or received must be reported ([Part IV, C.4](#)). A Privacy Act notice is required to be provided to homeowners participating in mitigation projects;
 - ◆ For **HMGP**, the purchase and installation of stand-alone generators are eligible under regular HMGP funding if they protect a critical facility and meet all other program eligibility criteria ([Part IV, D.1.1](#));
 - ◆ For **HMGP** and the **PDM Program**, generators and/or related equipment purchases (e.g., generator hook-ups) that are not stand-alone are considered eligible when the generator and related equipment directly relates to the hazard being mitigated and is part of a more comprehensive project ([Part IV, D.1.1](#));
 - ◆ For non-structural retrofits, the elevation of utilities is an eligible activity ([Part IV, D.1.1](#));
 - ◆ FEMA Policy 104-008-01, “Hazard Mitigation Assistance for Wind Retrofit Projects for Existing Residential Buildings” dated November 16, 2012, has been incorporated ([Part IV, D.1.1](#)). With the release of this HMA Unified Guidance, the policy has been superseded;
 - ◆ A mitigation planning subgrant award can result in a mitigation plan adopted by the jurisdiction(s) and approved by FEMA or it can also include planning-related activities as outlined in 44 CFR Parts 201 and 206 ([Part IV, D.1.2](#));
 - ◆ FEMA Mitigation Planning Memorandum (MT-PL) #2 “Guidance For FEMA Regional Directors Regarding “Extraordinary Circumstances” under which an HMGP Project Grant may be awarded to Local Jurisdictions without an Approved Local Mitigation Plan” dated October 28, 2005, has been incorporated. With the release of this HMA Unified Guidance, the memo has been superseded;
 - ◆ For **PDM** and **FMA** project subgrants, the Region may apply extraordinary circumstances, when justification is provided, with concurrence received from FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) prior to granting an exception ([Part IV, D.5](#));
 - ◆ For the PDM Program, the Federal share to update a hazard mitigation plan has been reduced to \$300,000 ([Part V, E.2](#));
 - ◆ Applications must contain minimal information in order for FEMA to be able to make a general eligibility determination ([Part V, G.2](#));

-
- ◆ Applications or subapplications submitted to FEMA that do not contain the minimal eligibility criteria are subject to immediate denial ([Part V, G.2](#));
 - ◆ Greatest Savings to the Fund (GSTF) extends to properties under HMA ([Part V, I](#));
 - ◆ An expedited cost-effectiveness methodology (substantial damage waiver) is available for property acquisition projects when certain conditions are met under all HMA programs; this was previously limited to HMGP ([Part V, I](#));
 - ◆ FEMA Policy 108-024-01, “Consideration of Environmental Benefits in the Evaluation of Acquisition Projects under the Hazard Mitigation Assistance (HMA) Programs” dated June 18, 2013, has been incorporated ([Part V, I](#)). With the release of this HMA Unified Guidance, this policy has been incorporated;
 - ◆ Green open space and riparian area benefits can now be included in the project benefit cost ratio (BCR) once the project BCR reaches 0.75 or greater. The inclusion of environmental benefits in the project BCR is limited to acquisition-related activities;
 - ◆ FEMA recommends several HMA efficiencies to facilitate FEMA review and approval ([Part VI, A.5](#));
 - ◆ FEMA provides timelines for Applicants to comply with requests for information (RFI) ([Part VI, B.2.1](#));
 - ◆ FEMA clarifies the consideration of additional information in support of a subapplication ([Part VI, B.5](#));
 - ◆ FEMA clarifies that requests for Scope of Work Changes must address the need for the change through a revised scope, schedule, and budget ([Part VII, B.2](#));
 - ◆ FEMA clarifies when prior FEMA approval is needed for a budget change ([Part VII, B.3](#));
 - ◆ With the publication of this HMA Unified Guidance, the Period of Performance (POP) for the programs begins with the opening of the application period and ends no later than 36 months from the close of the application period. All requests to extend the grant POP beyond 12 months from the original grant POP termination date must be approved by FEMA Headquarters ([Part VII, B.4](#));
 - ◆ FEMA may elect to provide funding for certain projects in incremental amounts (Strategic Funds Management [SFM]) ([Part VII, B.5.1](#));
 - ◆ The Grantee must notify FEMA of each property for which settlement was completed in that quarter ([Part VII, C.2](#));
 - ◆ The HMGP final lock-in will be established 12 months after date of declaration. The final lock-in amount may be greater than or less than the previous calculations. Because the lock-in estimate is subject to change, FEMA will not obligate more than 75 percent of any estimate prior to the calculation of the final lock-in without concurrence of the Regional Administrator or Federal Coordinating Officer with Disaster Recovery Manager

Authority and the Office of Chief Financial Officer ([Part IX, A.3](#));

- ◆ With the release of this guidance, Section 1104 of the SRIA is incorporated as Advance Assistance in ([Part IX, A.9](#));
- ◆ Advance Assistance can be used to accelerate the implementation of the HMGP. Applicants may use Advance Assistance to develop mitigation strategies and obtain data to prioritize, select, and develop complete HMGP applications in a timely manner ([Part IX, A.9](#));
- ◆ For acquisition projects, clarifications were made regarding the purchase of vacant land, land already owned by an eligible entity, and outstanding tax liens (Addendum, Part A);
- ◆ FEMA will make a determination on the open space compatibility of access to a subsurface resource (e.g., mineral rights) on a case-by-case basis (Addendum, Part A);
- ◆ Acquisitions in Coastal Barrier Resource System (CBRS) units and Other Protected Areas (OPAs) are eligible under all HMA programs if the projects are otherwise eligible under the requirements in the 44 CFR and this guidance (Addendum, Part A);
- ◆ FEMA clarifies that the relevant event may vary under the HMA programs; however, pre-market value or current market value can be used at the Applicant's discretion for all HMA programs (Addendum, Part A);
- ◆ In accordance with Section 203(a)(1) of the Uniform Relocation Assistance and Real Property Acquisition Policies Act, the replacement housing allowance for homeowners may increase from \$22,500 to \$31,000 on October 1, 2014 (Addendum, Part A);
- ◆ With the release of this HMA Unified Guidance, certified clean is defined as a letter from the appropriate local, State, Indian Tribal, or Federal entity determining that no further remedial action is required to protect human health or the environment (Addendum, Part A);
- ◆ FEMA Policy MRR-2-08-1, “Wildfire Mitigation Policy for the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) Program,” dated September 8, 2008, has been incorporated. With the release of this HMA Unified Guidance, this policy has now been superseded (Addendum, Part B);
- ◆ FEMA urges communities to implement wildfire projects using the materials and technologies that are in accordance with the International Code Council, FEMA, U.S. Fire Administration, and the National Fire Protection Association (NFPA) Firewise recommendations, whenever applicable (Addendum, Part B);
- ◆ For wildfire projects, the application will include a narrative statement acknowledging the information required in the final operations and maintenance plan. The final operations and maintenance plans must be submitted to FEMA prior to project closeout (Addendum, Part B);

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- ◆ FEMA Interim Policy MRR-2-09-1, “Hazard Mitigation Assistance for Safe Rooms,” dated April 30, 2009, and FEMA Memorandum, subject “Waiver of Two Provisions of Mitigation Interim Policy MRR-2-09-1, “Hazard Mitigation Assistance for Safe Rooms,” dated February 07, 2012, have been incorporated. With the release of this HMA Unified Guidance both policies are now superseded (Addendum, Part C);
 - ◆ For safe room projects, costs associated with the acquisition of land for a community safe room are eligible costs (Addendum, Part C);
 - ◆ For safe room projects, FEMA will review final operations and maintenance plans during project closeout (Addendum, Part C); and
 - ◆ For safe room projects, costs associated with fire suppression sprinklers and heating, ventilation, and air-conditioning (HVAC) systems are an eligible cost (Addendum, Part C).

PART II. FRONTLOADING HMA PROGRAM ELIGIBILITY REQUIREMENTS

Part II provides general information on the importance of “frontloading” HMA Program eligibility requirements in the project scoping and the overall decision-making process. Project scoping and project development are two of the earliest steps in the overall project lifecycle (see [Figure 1](#)) and can have a significant impact on the course an application or subapplication takes through the HMA grant process.

Project scoping (as shown in [Figure 2](#)) is the process by which subapplicants develop effective mitigation alternatives based on a defined set of requirements that meet the stated purpose and need of the proposed project. Applicants are encouraged to include representatives of the whole community in planning and scoping the project to gain broad community participation and support.

The scoping process includes the identification and evaluation of technical feasibility, cost review, cost-effectiveness, and environmental and cultural resource considerations. Based on potential impacts to environmental and cultural resources, there may be a legal requirement to alter the project. The process results in the development of a preferred project alternative that is then documented through the preparation of the application or subapplication. Applicants and subapplicants should consider the whole range of program requirements at the beginning stages of project development. The incorporation of these considerations into the scoping process can increase the efficiency of program review and ensure that all HMA program requirements are addressed.

Figure 1: Overall Project Lifecycle

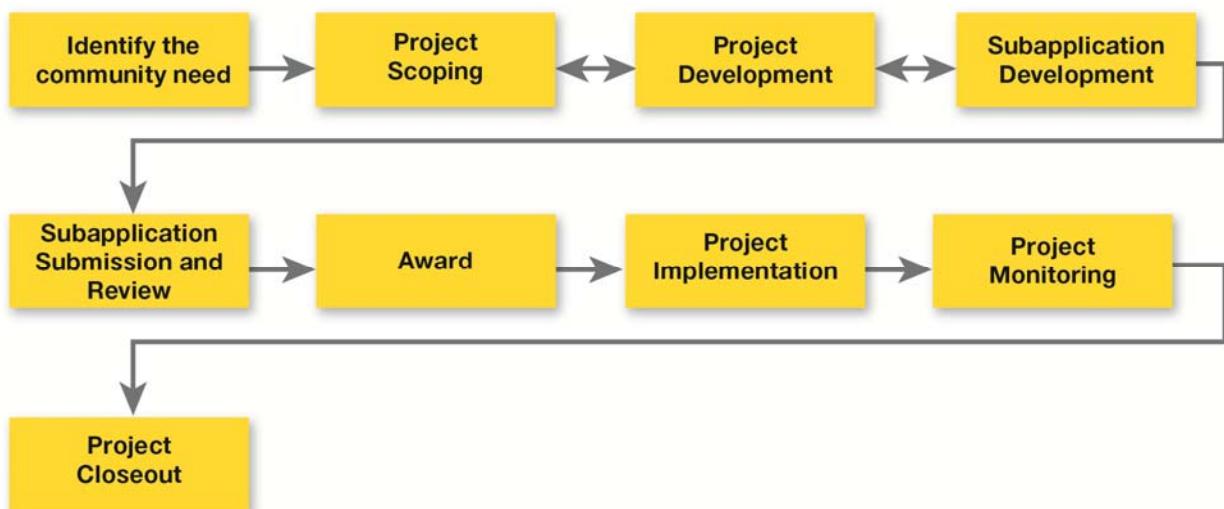
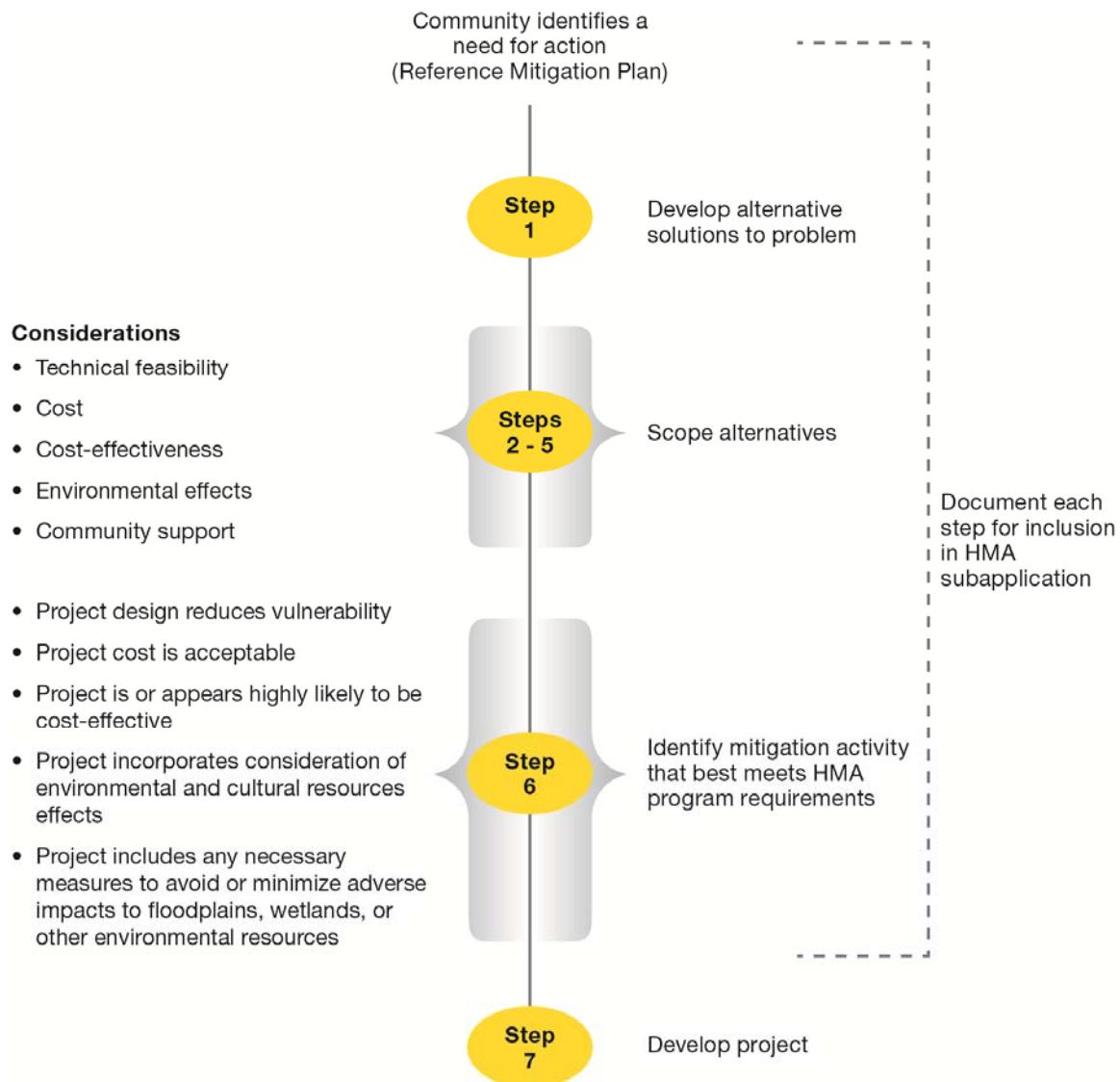


Figure 2: General Steps in Project Scoping Process



Addressing the following HMA program requirements at the earliest stage possible in the decision-making process is important because it can lead to enhanced project scoping as well as development and prevent delays later:

- ◆ Mitigation Planning;
- ◆ Technical Feasibility and Effectiveness;
- ◆ Floodplain Management and Protection of Wetlands;
- ◆ Environmental Planning and Historic Preservation Review and Compliance;
- ◆ Cost-Effectiveness; and
- ◆ Cost Review.

“Frontloading” of these requirements at the earliest point in the decision-making process increases the efficacy of the overall HMA Program. It also reduces the need for RFIs, which may result in quicker selections of projects for further review or approval. Additionally, early consideration of Advance Assistance, SFM, project monitoring, and project closeout in the decision-making process can facilitate the scoping and development of viable projects.

A. Mitigation Planning

Reviewing and incorporating information from the State, Indian Tribal, or local mitigation plan can help an Applicant or subapplicant facilitate the development of mitigation project alternatives. Linking the existing mitigation plan to project scoping can support the Applicant and the subapplicant in selecting the most appropriate mitigation activity that best addresses the identified hazard(s) while taking into account community priorities. In particular, the mitigation strategy section of the plan identifies a range of specific mitigation activities that can reduce vulnerability and includes information on the process that was used to identify, prioritize, and implement the range of mitigation actions considered. Another resource that may be useful in developing mitigation alternatives is the “Mitigation Ideas” guide available from the FEMA Library (see <http://www.fema.gov/library/viewRecord.do?id=6938>). It is important to reference the mitigation plan as potential project alternatives may have been considered during the planning process. If these alternatives were not considered during the mitigation planning process, please include this information in the next mitigation plan update. For more information on hazard mitigation planning, see [Part IV, D.1.2](#) (eligible activities), [Part V, H.2](#) (scope of work), [Part V, H.5.2](#) (cost estimate), or [Part X, C](#) (additional resources).

B. Technical Feasibility and Effectiveness

Mitigation projects submitted for the HMA grants must be both feasible and effective at mitigating the risks of the hazard for which the project was designed. The feasibility of the project is demonstrated through conformance with accepted engineering practices, established codes, standards, modeling techniques, or best practices. Effective mitigation measures funded under HMA should provide a long-term or permanent solution. Consideration of technical feasibility and effectiveness during the project scoping process facilitates project development. For more information on technical feasibility and effectiveness, see [Part VI, A.3](#) (application review criteria), [Part IV, D.4](#) (eligibility program requirements), or [Part V, J](#) (documentation).

C. Floodplain Management and Protection of Wetlands

HMA programs and grants must conform to 44 CFR Part 9, which incorporates the requirements of Executive Order (EO) 11988 (*Floodplain Management*) and EO 11990 (*Protection of Wetlands*). All proposed actions should be reviewed to determine if they are in the floodplain or a wetland. Any actions located in the 100-year floodplain (500-year for critical actions), or adversely increasing the base flood or adversely affecting a wetland, trigger the requirement to

complete the 8-step decision-making process outlined in 44 CFR Section 9.6, see [Part X](#), [Appendix J](#). As part of that process, FEMA must consider alternative locations to determine whether the floodplain or wetland is the only practicable location for that action. If the floodplain or wetland is the only practicable location, FEMA must avoid or must minimize adverse impacts to the floodplain or wetland. For more information on floodplain management and the protection of wetlands, see [Part IV, D.6.1](#) (general program requirements) and [Part X](#), [Appendix J](#) (8-Step Decision Making Process for Floodplain Management Considerations).

D. Environmental Planning and Historic Preservation Review and Compliance

HMA programs and grants must comply with all environmental and historic preservation (EHP) laws and with 44 CFR Part 10, which may include identifying alternate locations and, as necessary, modifying the project. See the EHP Checklist in [Part X, Appendix I](#). Completion of this list is not a substitute for environmental compliance. The front-loading of EHP into the decision-making process allows for development of mitigation measures that reduce or eliminate the proposed project's impact to the human environment; see [Figure 3](#) for an overview of frontloading the EHP and National Environmental Policy Act (NEPA) process. Moreover, compliance with all environmental laws and regulations is a condition of the grant. Two key considerations are whether the proposed project is located in an area that has endangered or threatened species or critical habitat and whether the proposed project might impact historic or cultural resources. If the project could result in adverse impacts to those resources, it might be necessary to change the scope of the project to avoid those impacts or incorporate mitigation measures to minimize the impacts to those resources. To determine whether any EHP issues may be associated with the proposed project, Applicants should review FEMA's HMA EHP Resources At-a-Glance Guide, located at <http://www.fema.gov/library/viewRecord.do?id=6976>. For more information on EHP, see [Part IV, D.6](#) (general program requirements), [Part V, K](#) (documentation), and [Part VI, A.4](#) (application review).

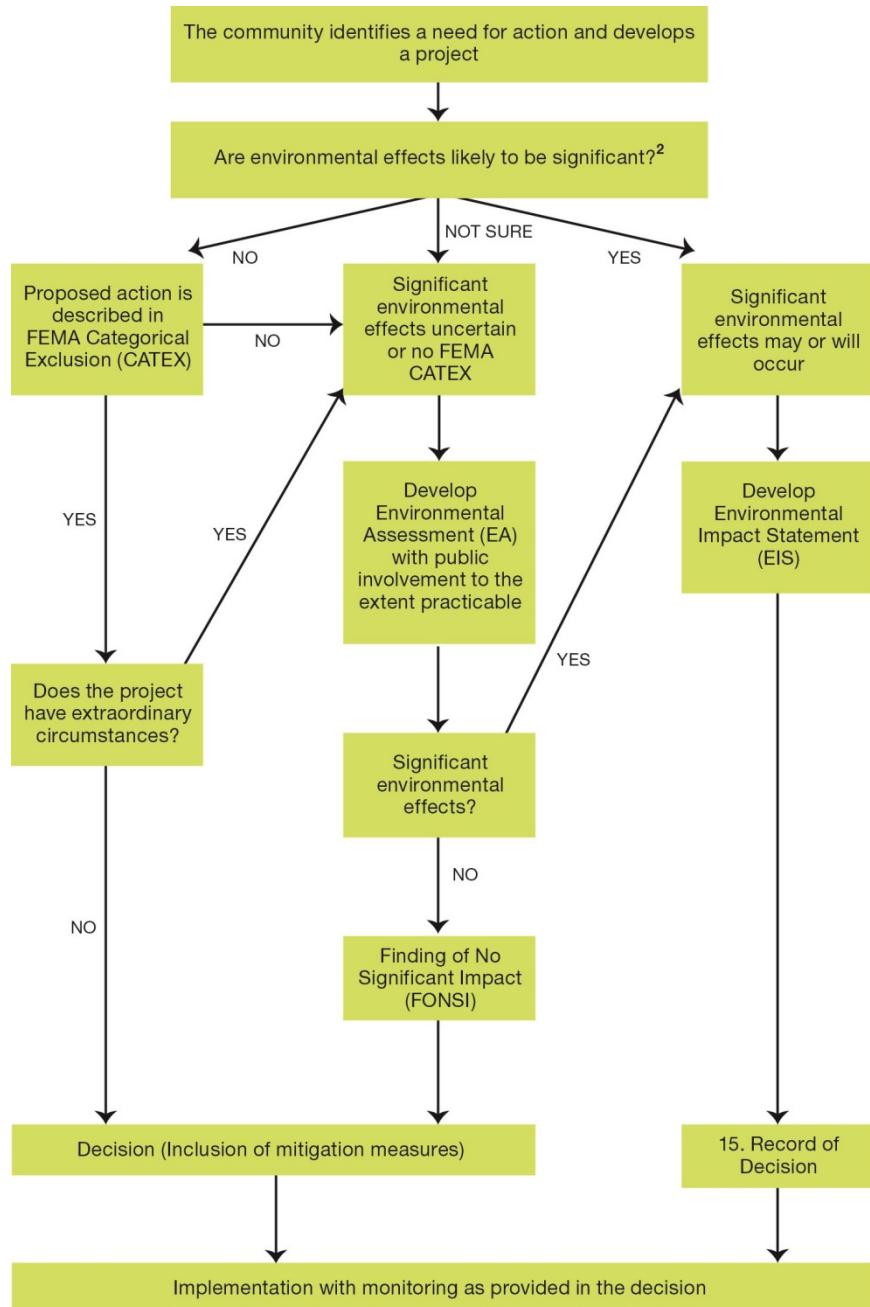
E. Cost-effectiveness

Mitigation activities are required by statute and regulation to be cost-effective or be in the interest of the NFIF. Consideration of the cost-effectiveness requirement at the earliest possible stage of the decision-making process can facilitate project scoping and improve project design. For more information on cost-effectiveness, see [Part IV, D.3](#) (general program requirements) and [Part V, I](#) (documentation).

F. Cost Review

All costs included in the subapplication should be reviewed to ensure that they are necessary, reasonable, and allocable consistent with the provisions of Office of Management and Budget (OMB) Circular A-87 and 2 CFR Part 225, Cost Principles for State, Local, and Indian Tribal

Figure 3: Frontloading EHP Considerations and the NEPA Process



Note: 1. *Significant new circumstances or information relevant to environmental concerns or substantial changes in the proposed action that are relevant to environmental concerns may necessitate preparation of a supplemental EIS following either the draft or final EIS or the Record of Decision (CEQ NEPA Regulations, 40 C.F.R. § 1502.9(c)).*

2. *Are other environmental and historical preservation laws/EOs triggered by this action? (e.g., ESA, MTBA, EO 11988, EO 1990, CAA, RCRA, CBRA, etc.) If so, coordinate with appropriate agencies as necessary.*

3. *Figure adapted from "A Citizen's Guide to the NEPA" by the Council on Environmental Quality*

Governments. Conducting this cost review at the earliest possible stage allows for improved project scoping and facilitates project development, which facilitates FEMA project review.

G. Project Development

Project scoping is not a separate, stand-alone process from project development. It can be considered the initial stage of project development, during which the details of mitigation activities are evaluated and developed. State, Local, and Indian Tribal governments that actively participate in and document their project scoping process put themselves in a greater position for success during project development. The information gathered in the scoping process serves as the basis for the development of a more detailed and robust technical design, cost, and environmental compliance components of the mitigation activity.

During the project development process, the subapplicant may encounter project considerations such as technical feasibility, cost-effectiveness, and EHP that necessitate the refinement or adjustment of the mitigation activity. When these situations are encountered, the reason for the refinement or re-scoping should be fully documented and included with the subapplication.

H. Advance Assistance

Section 1104 of the SRIA authorizes the use of Advance Assistance to accelerate the implementation of the HMGP. Applicants may use Advance Assistance to develop mitigation strategies and obtain data to prioritize, select, and develop complete HMGP applications in a timely manner. Using Advance Assistance can help Applicants develop eligible and complete applications that include a feasible project budget and an appropriate project milestone. See [Part IX, A.9](#) for additional information on Advance Assistance.

ADVANCE ASSISTANCE

Advance Assistance can be used to develop mitigation strategies and obtain data to prioritize, select, and develop complete HMGP applications. Consideration of Advance Assistance early in the decision-making process can help facilitate the development of a viable project, as well as project administration.

I. Strategic Funds Management

FEMA has implemented SFM. SFM, or incremental funding, is the concept of fiscal program management designed to provide funds as they are needed to implement approved HMGP activities. Through SFM, Applicant recovery and preparedness, communication and partnership, and the overall fiscal accuracy are expected to be improved. Considering SFM early in the decision-making process can help facilitate the development of a feasible project budget and

STRATEGIC FUNDS MANAGEMENT

SFM is a fiscal management approach designed to provide funds to the Grantee as needed to implement approved HMGP activities.

appropriate project milestones. At the beginning of an SFM project, FEMA and the State will work together to develop a work schedule.

See [Part VII, B.5.1](#) for additional information on SFM.

J. Project Monitoring

After a grant or subgrant is awarded, the Grantee and subgrantee are required to monitor and evaluate the progress of the mitigation activity in accordance with the:

- ◆ Approved original scope of work (SOW) and budget;
- ◆ Administrative requirements of 44 CFR Part 13; and
- ◆ Any applicable State requirements.

Sound project monitoring improves the efficiency of the project implementation process and the obligation of funds process. The satisfactory use of quarterly reporting facilitates project management and allows the Grantee, subgrantee, and FEMA to monitor obligations and any unliquidated funds. For additional information on project monitoring (reporting requirements) see [Part VII, C](#).

K. Closeout

Upon project completion, the Grantee and subgrantee are required to closeout the subgrant or grant in accordance 44 CFR Section 13.50 (Closeout). The project file should document that the:

- ◆ Approved SOW was fully implemented;
- ◆ All obligated funds were liquidated and in a manner consistent with the approved SOW;
- ◆ All environmental compliance measures or mitigations were implemented;
- ◆ The project was implemented in a manner consistent with the grant or subgrant agreement;
- ◆ Grantees submitted the required quarterly financial and performance reports; and
- ◆ The grant and subgrant were closed out in accordance with the provisions outlined in [Part VII, C](#) and [D](#) (subgrant and grant closeout).

For more information on closeout, see [Part VII, D](#).

PART III. AWARD INFORMATION

Funding under HMA programs is subject to the availability of appropriations (as well as any directive or restriction made with respect to such funds in the law) and, for HMGP, to the amount of FEMA disaster recovery assistance under the Presidential major disaster declaration.

For additional information about available funding for HMGP, see [Part IX, A.3](#); for the PDM Program, see [Part IX, B.1](#); and for FMA, see [Part IX, C](#).

PART IV. ELIGIBILITY INFORMATION

Part IV identifies common eligibility requirements for all HMA programs, such as eligible Applicants and subapplicants, cost-sharing requirements, restrictions on the use of HMA funds, activities that are eligible for HMA funding, and other program requirements. Additional program-specific requirements are found in [Part IX](#) of this guidance. Additional project-specific requirements can be found in the Addendum to this guidance. To be eligible for funding, Applicants and subapplicants must apply for funds as described in this guidance.

A. Eligible Applicants

Entities eligible to apply for HMA grants include the emergency management agency or a similar office of the 50 States (e.g., the office that has primary emergency management or floodplain management responsibility), the District of Columbia, American Samoa, Guam, the U.S. Virgin Islands, Puerto Rico, the Northern Mariana Islands, and Indian Tribal governments. Each State, Territory, Commonwealth, or Indian Tribal government shall designate one agency to serve as the Applicant for each HMA program. For the definition of the term Indian Tribal government refer to 44 CFR Section 206.431.

An Indian Tribal government may have the option to apply for HMA grants through the State as a subapplicant or directly to FEMA as an Applicant. The option for an Indian Tribal government to apply directly to FEMA reflects FEMA recognition that Indian Tribal governments are sovereign nations and share a government-to-government relationship with the United States. This choice is independent of a designation under other FEMA grants and programs, but is not available on a project-by-project basis within a single grant program. If an Indian Tribal government chooses to apply directly to FEMA and is awarded the grant, it bears the full responsibility of a Grantee for the purposes of administering the grant. For plan requirements relevant to the options to apply as a subapplicant or an Applicant, see [Part IV, D.5.1](#).

A.1 Eligible Subapplicants

All interested subapplicants must apply to the Applicant. [Table 1](#) identifies, in general, eligible subapplicants. For specific details regarding eligible subapplicants, refer to 44 CFR Section 206.434(a) for HMGP and 44 CFR Section 79.6(a) for FMA. For HMGP and the PDM Program, see 44 CFR Section 206.2(a)(16) for a definition of local governments.

Individuals and businesses are not eligible to apply for HMA funds; however, an eligible Applicant or subapplicant may apply for funding on behalf of individuals and businesses. For additional information about the eligibility of PNPs for HMGP, see Part IX, A.5.

Table 1: Eligible Subapplicants

Entity	HMGP	PDM	FMA
State agencies	✓	✓	✓
Indian Tribal governments	✓	✓	✓
Local governments/communities	✓	✓	✓
Private non-profit organizations (PNPs)	✓		

B. Cost Sharing

Under the HMA programs, the total cost to implement approved mitigation activities is generally funded by a combination of Federal and non-Federal sources. Both the Federal and the non-Federal cost shares must be for eligible costs used in direct support of the approved activities under this guidance and the grant award. Contributions of cash, third-party in-kind services, materials, or any combination thereof, may be accepted as part of the non-Federal cost share.

FEMA administers cost-sharing requirements consistent with 44 CFR Section 13.24 and 2 CFR Section 215.23. To meet cost-sharing requirements, the non-Federal contributions must be reasonable, allowable, allocable, and necessary under the grant program and must comply with all Federal requirements and regulations.

In general, HMA funds may be used to pay up to 75 percent of the eligible activity costs. The remaining 25 percent of eligible activity costs are derived from non-Federal sources. Exceptions to the 75 percent Federal and 25 percent non-Federal share (see [Table 2](#)) are as follows:

- ◆ **PDM Program** – Small impoverished communities may be eligible for up to a 90 percent Federal cost share. For information about small impoverished communities, see [Part IX, B.2.](#)
- ◆ **FMA**
 - FEMA may contribute up to 100 percent Federal cost share for severe repetitive loss properties or the expected savings to the NFIF for acquisition or relocation activities (the GSTF value for property acquisition may be offered to the property owner if the project is not cost-effective using pre-event or current market value);
 - FEMA may contribute up to 90 percent Federal cost share for repetitive loss properties; and
 - FEMA may contribute up to 75 percent Federal cost share for NFIP-insured properties.
- ◆ **Insular areas, including American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands** – FEMA automatically waives the non-Federal cost share when the non-Federal cost share for the entire grant is under \$200,000, not an individual subgrant. If the non-Federal cost share for the entire grant is \$200,000 or

greater, FEMA may waive all or part of the cost share, such a waiver is usually consistent with that provided for Public Assistance under the disaster declaration. If FEMA does not waive the cost share, the insular area must pay the entire cost-share amount, not only the amount over \$200,000.

Cost-share requirements also extend to management costs with the following exceptions:

- ◆ For **HMGP**, available HMGP management costs are calculated as a percentage of the Federal funds provided. There is no additional cost-share requirement for management costs.
- ◆ Under the **PDM Program**, only Indian Tribal Grantees meeting the definition of a small impoverished community are eligible for a non-Federal cost share of 10 percent for management costs.

See [Part IX, A.7](#) for further information about HMGP cost-share requirements and [Part V, E.4](#) for further information on funding restrictions for management costs.

HMA Federal funds, or funds used to meet HMA cost-share requirements, may not be used as a cost share for other Federal funds, for lobbying, or intervention in Federal regulatory or adjudicatory proceedings.

Table 2: Cost-Share Requirements

Programs	Mitigation Activity	Grantee Management Costs (Percent of Federal / Non-Federal Share)	Subgrantee Management Costs (Percent of Federal / Non-Federal Share)
HMGP	75/25	100/0	-/- ⁽¹⁾
PDM	75/25	75/25	75/25
PDM – subgrantee is small impoverished community	90/10	75/25	90/10
PDM – Tribal Grantee is small impoverished community	90/10	90/10	90/10
FMA – insured properties and planning grants	75/25	75/25	75/25
FMA – repetitive loss property ⁽²⁾	90/10	90/10	90/10
FMA – severe repetitive loss property ⁽²⁾	100/0	100/0	100/0

(1) Subapplicants should consult their State Hazard Mitigation Officer (SHMO) for the amount or percentage of HMGP subgrantee management cost funding their State has determined to be passed through to subgrantees.

(2) To be eligible for an increased Federal cost share a FEMA-approved State or Tribal (Standard or Enhanced) Mitigation Plan that addresses repetitive loss properties must be in effect at the time of grant award, and the property that is being submitted for consideration must be a repetitive loss property.

B.1 Federal Funds Allowed to Be Used as Non-Federal Cost Share

In general, the non-Federal cost-share requirement may not be met with funds from other Federal agencies; however, authorizing statutes explicitly allow some Federal funds to be used as a cost share for other Federal grants. Federal funds that are used to meet a non-Federal cost-share requirement must meet the purpose and eligibility requirements of both the Federal source program and the HMA grant program.

B.2 Increased Cost of Compliance as Non-Federal Cost Share

The NFIP Increased Cost of Compliance (ICC) claim payment from a flood event may be used to contribute to the non-Federal cost-share requirements so long as the claim is made within the timelines allowed by the NFIP. ICC payments can only be used for costs that are eligible for ICC benefits; for example, ICC cannot pay for property acquisition, but can pay for structure demolition or relocation. In addition, Federal funds cannot be provided where ICC funds are available; if the ICC payment exceeds the required non-Federal share, the Federal funding award will be reduced to the difference between the cost of the activity and the ICC payment.

If an ICC payment is being used as a subapplicant's non-Federal cost share, the NFIP policyholder must assign the claim to the subapplicant. However, only that part of the ICC benefit that pertains to the property can be assigned to the subapplicant. The NFIP policyholder can only assign the ICC benefit to the subapplicant; in no case can the policyholder assign the ICC benefit to another individual. Steps for the assignment of ICC coverage are available at <http://www.fema.gov/national-flood-insurance-program/steps-assignment-coverage-d-increased-cost-compliance-coverage>.

C. Restrictions

C.1 Non-Discrimination Compliance

In accordance with Section 308 of the Stafford Act and Title VI of the 1964 Civil Rights Act, all HMA programs are administered in an equitable and impartial manner, without discrimination on the grounds of race, color, religion, nationality, sex, age, disability, English proficiency, or economic status. In addition, Federal assistance distributed by State and local governments is to be implemented in compliance with all applicable laws.

Applicants and subapplicants must ensure that no discrimination is practiced. Applicants and subapplicants must consider fairness, equity, and equal access when prioritizing and selecting project subapplications to submit with their grant application. Subapplicants also must ensure fairness and equal access to property owners and individuals that benefit from mitigation activities.

C.2 Conflict of Interest

Applicants and subapplicants must avoid conflicts of interest. Subapplicants must comply with the procurement guidelines at 44 CFR Section 13.36, which require subapplicants to avoid situations in which local officials with oversight authority might benefit financially from the grant disbursement. Applicants must comply with guidelines for awarding and administering subgrants as stated in 44 CFR Section 13.37.

C.3 Duplication of Programs

FEMA will not provide assistance for activities for which it determines the primary or more specific authority lies with another Federal agency or program. Other programs and authorities should be examined before applying for HMA funding. HMA funds are not intended to be used as a substitute for other available program authorities. Available program authorities include other FEMA programs (e.g., Individual Assistance and Public Assistance) and programs under other Federal agencies, such as the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, and the Natural Resources Conservation Service. FEMA may disallow or recoup amounts that duplicate other authorities.

For additional information about Duplication of Programs for wildfire mitigation projects, see Addendum, Part B.2.

C.4 Duplication of Benefits

HMA funds cannot duplicate funds received by or available to Applicants or subapplicants from other sources for the same purpose. Examples of other sources include insurance claims, other assistance programs (including previous project or planning grants and subgrants from HMA programs), legal awards, or other benefits associated with properties or damage that are subject of litigation.

Because the availability of other sources of mitigation grant or loan assistance is subject to available information and the means of each individual Applicant, HMA does not require that property owners seek assistance from other sources (with the exception of insurance). However, it is the responsibility of the property owner to report other benefits received, any applications for other assistance, the availability of insurance proceeds, or the potential for other compensation, such as from pending legal claims for damages, relating to the property.

DUPLICATION OF BENEFITS

DOB is used to describe assistance that is from more than one source and that is used for the same purpose or activity. The purpose may apply to the entire project or only part of it.

DOB may apply when assistance for the same purpose:

- Has been received
- Will be received
- Is reasonably available from another source, such as insurance or legal settlements due to the property owners

Where the property owner has an insurance policy covering any loss to the property that relates to the proposed HMA project, the means are available for receiving compensation for a loss or, in the case of ICC, assistance toward a mitigation project. FEMA will generally require that the property owner file a claim prior to the receipt of HMA funds.

Information regarding other assistance received by properties in HMA projects may be shared under 5 U.S.C. 552a (b) of the Privacy Act of 1974. Uses may include sharing with custodians of property records, such as other Federal or other governmental agencies, insurance companies, or any public or private entity, for the purposes of ensuring that the property has not received money that is duplicative of any possible HMA grants received. When obtaining information from property owners about other sources of assistance, a Privacy Act statement must be distributed to each owner. For more information about the process of verifying potential duplication, access the HMA Tool for Identifying Duplication of Benefits at <http://www.fema.gov/library/viewRecord.do?id=6815> and for a copy of the Privacy Act statement (see Appendix F of that document).

For additional information on DOB for property acquisition and structure demolition or relocation projects, see Addendum Part A.11.4.

D. General Program Requirements

D.1 Eligible Activities

To be eligible, activities must meet all requirements referenced in this guidance. Eligible activities for HMA fall into the following categories:

- ◆ Mitigation projects (all HMA programs);
- ◆ Hazard mitigation planning (all HMA programs); and
- ◆ Management costs (all HMA programs).

[Table 3](#) summarizes eligible activities that may be funded by the HMA programs. Detailed descriptions of these activities follow the table in [Part IV](#), [D.1.1](#), [D.1.2](#), and [D.1.3](#).

The following activities are not eligible as stand-alone activities but are eligible when included as a functional component of eligible mitigation activities:

- ◆ For the **PDM Program**, generators and/or related equipment purchases (e.g., generator hook-ups), when the generator directly relates to the hazards being mitigated and is part of a larger project;
- ◆ Real property or easements purchases required for the completion of an eligible mitigation project; and
- ◆ Studies that are integral to the development and implementation of mitigation project, including hydrologic and hydraulic, engineering, or drainage studies.

Table 3: Eligible Activities by Program

Eligible Activities	HMGP	PDM	FMA
1. Mitigation Projects	✓	✓	✓
Property Acquisition and Structure Demolition	✓	✓	✓
Property Acquisition and Structure Relocation	✓	✓	✓
Structure Elevation	✓	✓	✓
Mitigation Reconstruction			✓
Dry Floodproofing of Historic Residential Structures	✓	✓	✓
Dry Floodproofing of Non-residential Structures	✓	✓	✓
Minor Localized Flood Reduction Projects	✓	✓	✓
Structural Retrofitting of Existing Buildings	✓	✓	
Non-structural Retrofitting of Existing Buildings and Facilities	✓	✓	✓
Safe Room Construction	✓	✓	
Wind Retrofit for One- and Two-Family Residences	✓	✓	
Infrastructure Retrofit	✓	✓	✓
Soil Stabilization	✓	✓	✓
Wildfire Mitigation	✓	✓	
Post-Disaster Code Enforcement	✓		
Generators	✓	✓	
5 Percent Initiative Projects	✓		
Advance Assistance	✓		
2. Hazard Mitigation Planning	✓	✓	✓
3. Management Costs	✓	✓	✓

Additional information regarding eligible projects for HMGP is included in [Part IX, A.8](#) and [A.9](#); and for FMA, see [Part IX, C.1](#).

Costs for eligible activities must be reasonable, allowable, allocable, and necessary as required by 2 CFR Part 225, Cost Principles for State, Local, and Indian Tribal Governments, 44 CFR Section 13.22, applicable program regulations, and this guidance.

D.1.1 Mitigation Projects

This section briefly describes the mitigation projects eligible under one or more of the three HMA programs. [Table 3](#) summarizes the eligibility of the following project types for each program:

- ◆ **Property Acquisition and Structure Demolition** – The voluntary acquisition of an existing at-risk structure and, typically, the underlying land, and conversion of the land to

open space through the demolition of the structure. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions. For property acquisition and structure demolition projects, see Addendum, Part A.

- ◆ **Property Acquisition and Structure Relocation** – The voluntary physical relocation of an existing structure to an area outside of a hazard-prone area, such as the Special Flood Hazard Area (SFHA) or a regulatory erosion zone and, typically, the acquisition of the underlying land. Relocation must conform to all applicable State and local regulations. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions. For property acquisition and structure relocation projects, see Addendum, Part A.
- ◆ **Structure Elevation** – Physically raising and/or retrofitting an existing structure to the Base Flood Elevation (BFE) or higher if required by FEMA or local ordinance. Elevation may be achieved through a variety of methods, including elevating on continuous foundation walls; elevating on open foundations, such as piles, piers, posts, or columns; and elevating on fill. Foundations must be designed to properly address all loads and be appropriately connected to the floor structure above, and utilities must be properly elevated as well. FEMA encourages Applicants and subapplicants to design all structure elevation projects in accordance with the American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI) 24-05, *Flood Resistant Design and Construction*. For additional information about structure elevation projects, see Addendum, Part E.
- ◆ **Mitigation Reconstruction** – The construction of an improved, elevated building on the same site where an existing building and/or foundation has been partially or completely demolished or destroyed. Mitigation reconstruction is only permitted for structures outside of the regulatory floodway or coastal high hazard area (Zone V) as identified by the existing best available flood hazard data. Activities that result in the construction of new living space at or above the BFE will only be considered when consistent with the mitigation reconstruction requirements.
- ◆ **Dry Floodproofing** – Techniques applied to keep structures dry by sealing the structure to keep floodwaters out. For all dry floodproofing activities, FEMA encourages Applicants and subapplicants to design all dry floodproofing projects in accordance with ASCE/SEI 24-05.
 - **Dry Floodproofing of Historic Residential Structures** is permissible only when other techniques that would mitigate to the BFE would cause the structure to lose its status as a Historic Structure, as defined in 44 CFR Section 59.1.
 - **Dry Floodproofing of Non-residential Structures** must be performed in accordance with NFIP Technical Bulletin (TB) 3-93, *Non-Residential Floodproofing*—

Requirements and Certification, and the requirements pertaining to dry floodproofing of non-residential structures found in 44 CFR Sections 60.3(b)(5) and (c)(4).

- ♦ **Generators** – Generators are emergency equipment that provide a secondary source of power. Generators and related equipment (e.g., hook-ups) are eligible provided that they are cost-effective, contribute to a long-term solution to the problem they are intended to address, and meet other program eligibility criteria.
 - **PDM Program:** Generators and/or related equipment purchases (e.g., generator hook-ups) are eligible when the generator directly relates to the hazards being mitigated and is part of a larger project.
 - **HMGP:** A permanently installed generator that is a stand-alone project can be considered under regular HMGP funding if the generator protects a critical facility. Critical facilities may include police and fire stations, hospitals, and water and sewer treatment facilities. A generator that is a component of a larger project (e.g., elevation of a lift station) can also be funded under regular HMGP funding and the use of aggregation is permitted. Portable generators are eligible provided that they meet all HMGP requirements as described in 44 CFR Section 206.434. Stand-alone generator projects that cannot be determined cost-effective via standard HMA benefit-cost methodology may be eligible under the 5 Percent Initiative. See [Part IX, A.10](#) for additional information about the 5 Percent Initiative.

GENERATORS

- Stand-alone generators and related equipment (e.g., generator hook-ups) are eligible under the 5 Percent Initiative.
- Stand-alone generators (including related equipment) are eligible for regular HMGP funding if the generator protects a critical facility and meets all other program eligibility criteria.
- Generators (including related equipment) that constitute a functional portion of an otherwise eligible mitigation measure are eligible for HMGP and PDM Program funding.
- Portable generators are eligible for HMGP regular funding and the 5 Percent Initiative if they meet all HMGP requirements as described in 44 CFR Section 206.434.

For additional information on generators please see the Frequently Asked Questions for Generators in [Part X, Appendix G](#).

HMA funds are not available as a substitute for emergency, temporary, or partial solutions under the Stafford Act Section 403, Essential Assistance (42 U.S.C. 5170b) and/or the Stafford Act, Title VI Emergency Preparedness (42 U.S.C. 5195).

- ♦ **Minor Localized Flood Reduction Projects** – Projects to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts, and stormwater management activities, such as creating retention and detention basins. These projects must not duplicate the flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.

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- Under the FMA program, minor localized flood reduction projects should benefit NFIP-insured properties. Projects will be prioritized based on the number of NFIP insured properties included in the project. Projects that do not include NFIP-insured properties will not be considered for funding. Documentation must be provided in the subapplication to verify the NFIP insurance requirement, which includes flood insurance policy and property locator numbers as appropriate.
 - ◆ **Structural Retrofitting of Existing Buildings** – Modifications to the structural elements of a building to reduce or eliminate the risk of future damage and to protect inhabitants. The structural elements of a building that are essential to protect to prevent damage include foundations, load-bearing walls, beams, columns, building envelope, structural floors and roofs, and the connections between these elements.
 - ◆ **Non-structural Retrofitting of Existing Buildings and Facilities** – Modifications to the non-structural elements of a building or facility to reduce or eliminate the risk of future damage and to protect inhabitants. Non-structural retrofits may include bracing of building contents to prevent earthquake damage or the elevation of utilities.
 - ◆ **Safe Room Construction** – Safe room construction projects are designed to provide immediate life-safety protection for people in public and private structures from tornado and severe wind events, including hurricanes. For HMA, the term “safe room” only applies to extreme wind (combined tornado and hurricane) residential, non-residential, and community safe rooms; tornado community safe rooms; and hurricane community safe rooms. This type of project includes retrofits of existing facilities or new safe room construction projects, and applies to both single and dual-use facilities. For additional information, see Addendum, Part C.
 - ◆ **Wind retrofit projects** – Wind retrofit projects of one and two-family residential buildings must be designed in conformance with the design criteria found in the *Wind Retrofit Guide for Residential Buildings* (FEMA P-804) published December 2010. This document is available in the FEMA Library at <http://www.fema.gov/library/viewRecord.do?id=4569>.
 - ◆ **Infrastructure Retrofit** – Measures to reduce risk to existing utility systems, roads, and bridges.
 - ◆ **Soil Stabilization** – Projects to reduce risk to structures or infrastructure from erosion and landslides, including installing geotextiles, stabilizing sod, installing vegetative buffer strips, preserving mature vegetation, decreasing slope angles, and stabilizing with rip rap and other means of slope anchoring. These projects must not duplicate the activities of other Federal agencies.
 - ◆ **Wildfire Mitigation** – Projects to mitigate at-risk structures and associated loss of life from the threat of future wildfire through:

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- **Defensible Space for Wildfire** – Projects creating perimeters around homes, structures, and critical facilities through the removal or reduction of flammable vegetation. For additional information, see Addendum, Part B.3.1.
 - **Application of Ignition-resistant Construction** – Projects that apply ignition-resistant techniques and/or non-combustible materials on new and existing homes, structures, and critical facilities. For additional information, see Addendum, Part B.3.2.
 - **Hazardous Fuels Reduction** – Projects that remove vegetative fuels proximate to at-risk structures that, if ignited, pose significant threat to human life and property, especially critical facilities. For additional information, see Addendum, Part B.3.3.
 - ◆ **Post-Disaster Code Enforcement** – Projects designed to support the post-disaster rebuilding effort by ensuring that sufficient expertise is on hand to ensure appropriate codes and standards, including NFIP local ordinance requirements, are used and enforced. For additional information, see [Part IX, A.8](#).
 - ◆ **Advance Assistance** – Section 1104 of the SRIA authorizes the use of Advance Assistance to accelerate the implementation of the Hazard Mitigation Grant Program (HMGP). Applicants may use Advance Assistance to develop mitigation strategies and obtain data to prioritize, select and develop complete HMGP applications in a timely manner. See [Part IX, A.9](#) for additional information on Advance Assistance.
 - ◆ **5 Percent Initiative Projects** – These projects, which are only available pursuant to an HMGP disaster, provide an opportunity to fund mitigation actions that are consistent with the goals and objectives of the State or Indian Tribal (Standard or Enhanced) and local mitigation plans and meet all HMGP program requirements, but for which it may be difficult to conduct a standard Benefit-Cost Analysis (BCA) to prove cost-effectiveness. For additional information, see [Part IX, A.10](#).

D.1.2 Hazard Mitigation Planning

Mitigation plans are the foundation for effective hazard mitigation. A mitigation plan is a demonstration of the commitment to reduce risks from natural hazards and serves as a strategic guide for decision-makers as they commit resources.

The mitigation planning process includes hazard identification and risk assessment leading to the development of a comprehensive mitigation strategy for reducing risks to life and property. The mitigation strategy section of the plan identifies a range of specific mitigation actions and projects being considered to reduce risks to new and existing buildings and infrastructure. This section includes an action plan describing how identified mitigation activities will be prioritized, implemented, and administered.

MITIGATION PLANNING-RELATED ACTIVITIES

Planning activities can include assessing risk and updating the mitigation strategy to reflect current disaster recovery goals.

Planning activities funded under HMA are designed to develop State, Indian Tribal, and local mitigation plans that meet the planning requirements outlined in 44 CFR Part 201. A mitigation planning subgrant award must result in a mitigation plan adopted by the jurisdiction(s) and approved by FEMA or it must result in a planning related activity approved by FEMA (e.g., incorporating new data into the Risk Assessment, or updating the Mitigation Strategy to reflect current disaster recovery goals) consistent with the requirements in 44 CFR Parts 201 and 206.

For **FMA**, funds shall only be used to support the flood hazard portion of State, Indian Tribal, or local mitigation plans to meet the criteria specified in 44 CFR Part 201. Funds are only available to support these activities in communities participating in the NFIP.

For links to mitigation planning and risk assessment resources, see [Part X, C.2](#).

D.1.2.1 Eligible Hazard Mitigation Planning-Related Activities

Eligible activities include but are not limited to:

- ◆ Update or enhance sections of the current FEMA-approved mitigation plan, such as:
 - Risk and vulnerability assessment based on new information, including supporting studies, such as economic analyses;
 - Mitigation strategy, specifically strengthening the linkage to mitigation action implementation, with emphasis on available HMA project grant funding; or
 - Incorporate climate adaptation, green building, or smart growth principles into the risk assessment and/or mitigation strategy.
- ◆ Integrate information from mitigation plans, specifically risk assessment or mitigation strategies, with other planning efforts, such as:
 - Disaster recovery strategy (pre- or post), preparedness, or response plans;
 - Comprehensive (e.g., land use, master) plans;
 - Capital improvement or economic development plans;
 - Resource management / conservation plans (i.e., storm water, open space); or
 - Other long-term community planning initiatives (i.e., transportation or housing).
- ◆ Building capability through delivery of technical assistance and training.
- ◆ Evaluation of adoption and/or implementation of ordinances that reduce risk and/or increase resilience.

D.1.2.2 Ineligible Hazard Mitigation Planning-Related Activities

The following is a list of activities considered ineligible as “stand alone” planning-related activities:

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- ◆ Hazard identification or mapping and related equipment for the implementation of mitigation activities (eligible under 5 Percent Initiative);
 - ◆ Geographic Information System (GIS) software, hardware, and data acquisition whose primary aim is mitigation (eligible under 5 Percent Initiative);
 - ◆ Public awareness or education campaigns about mitigation (eligible under 5 Percent Initiative);
 - ◆ Project scoping or development (also referred to as “project planning”), such as BCA, engineering feasibility studies, application development, construction design, or EHP data collection; and
 - ◆ Activities not resulting in a clearly defined product or product(s).

D.1.3 Management Costs

Management costs are any indirect costs and administrative expenses that are reasonably incurred by a Grantee or subgrantee in administering a grant or subgrant award.

Eligible Applicant or subapplicant management cost activities may include:

- ◆ Solicitation, review, and processing of subapplications and subgrant awards;
- ◆ Subapplication development and technical assistance to subapplicants regarding feasibility and effectiveness, BCA, and EHP documentation;
- ◆ Geocoding mitigation projects identified for further review by FEMA;
- ◆ Delivery of technical assistance (e.g., plan reviews, planning workshops, training) to support the implementation of mitigation activities;
- ◆ Managing grants (e.g., quarterly reporting, closeout);
- ◆ Technical monitoring (e.g., site visits, technical meetings);
- ◆ Purchase of equipment, per diem and travel expenses, and professional development that is directly related to the implementation of HMA programs; and
- ◆ Staff salary costs directly related to performing the activities listed above.

Management costs are only awarded in conjunction with project or planning grants and subgrants. For more information regarding management costs for HMGP, see [Part IX, A.4](#). For the **PDM Program and FMA**, FEMA may provide up to 25 percent of the Applicant’s anticipated management costs, upon the award and final approval of the first subgrant. The remaining management costs will be obligated as additional subgrants are awarded.

D.2 Ineligible Activities

The following list provides examples of activities that are not eligible for HMA funding:

- ◆ Projects that do not reduce the risk to people, structures, or infrastructure;
- ◆ Projects that are dependent on a contingent action in order to be effective and/or feasible (i.e., not a stand-alone mitigation project that solves a problem independently or constitutes a functional portion of a solution);
- ◆ Projects with the sole purpose of open space acquisition of unimproved land;
- ◆ Projects for which actual physical work such as groundbreaking, demolition, or construction of a raised foundation has occurred prior to award or final approval. Projects for which demolition and debris removal related to structures proposed for acquisition or mitigation reconstruction has already occurred may be eligible when such activities were initiated or completed under the FEMA Public Assistance program to alleviate a health or safety hazard as a result of a disaster;
- ◆ Projects that involve land that is contaminated with hazardous waste;
- ◆ Projects for preparedness activities or temporary measures (e.g., sandbags, bladders, geotubes);
- ◆ Projects that create revolving loan funds;
- ◆ Activities required as a result of negligence or intentional actions, or those intended to remedy a code violation, or the reimbursement of legal obligations such as those imposed by a legal settlement, court order, or State law;
- ◆ FEMA may, at its discretion, choose not to fund projects subject to ongoing litigation if such litigation may affect eligibility of the project or may substantially delay implementation of the project;
- ◆ All projects located in a CBRS Unit or in OPAs, other than property acquisition and structure demolition or relocation projects for open space under HMA. For details on property acquisition and structure demolition or relocation projects for open space within a CBRS Unit or OPAs see Addendum, Part A.2;
- ◆ Activities on Federal lands or associated with facilities owned by another Federal entity;
- ◆ Major flood control projects related to the construction, demolition, or repair of dams, dikes, levees, floodwalls, seawalls, groins, jetties, breakwaters, and erosion projects related to beach nourishment or re-nourishment;
- ◆ Projects for hazardous fuels reduction in excess of 2 miles from structures;
- ◆ Projects that address unmet needs from a disaster that are not related to mitigation;

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- ◆ Retrofitting facilities primarily used for religious purposes, such as places of worship (or other projects that solely benefit religious organizations). However, a place of worship may be included in a property acquisition and structure demolition or relocation project provided that the project benefits the entire community, such as when the whole neighborhood or community is being removed from the hazard area;
 - ◆ Activities that only address manmade hazards;
 - ◆ Projects that address, without an increase in the level of protection, operation, deferred or future maintenance, repairs, or replacement of existing structures, facilities, or infrastructure (e.g., dredging, debris removal, replacement of obsolete utility systems, bridges, and facility repair/rehabilitation);
 - ◆ Projects for the purpose of:
 - Landscaping for ornamentation (e.g., trees, shrubs);
 - Site remediation of hazardous materials (with the exception eligible activities, such as the abatement of asbestos and/or lead-based paint and the removal of household hazardous wastes to an approved landfill);
 - Water quality infrastructure;
 - Projects that primarily address ecological or agricultural issues;
 - Forest management;
 - Prescribed burning or clear-cutting;
 - Creation and maintenance of fire breaks, access roads, or staging areas;
 - Irrigation systems;
 - ◆ Studies not directly related to the design and implementation of a proposed mitigation project; and
 - ◆ Preparedness measures and response equipment (e.g., response training, electronic evacuation road signs, interoperable communications equipment).

All projects must also comply with any additional project-specific guidance provided in the Addendum.

D.3 Cost-effectiveness

Mitigation program authorizing statutes (Flood Mitigation Assistance at 42 U.S.C. 4104c, Pre-Disaster Hazard Mitigation at 42 U.S.C. 5133, and Hazard Mitigation at 42 U.S.C. 5170c) require that FEMA provide funding for mitigation measures that are cost-effective or are in the interest of the NFIF. FEMA has specified minimum project criteria via regulation (44 CFR Part 79 and 44 CFR Section 206.434), including that Applicants must demonstrate mitigation projects are cost-effective. The determination of cost-effectiveness is performed in a variety of ways. It

is typically demonstrated by the calculation of a BCR, dividing total annualized project benefits by total annualized project cost. Projects where benefits exceed costs are generally considered cost-effective (see [Part V, I](#) and [Part VI, A.2](#) for additional information).

D.4 Feasibility and Effectiveness

Mitigation projects funded by HMA must be both feasible and effective at mitigating the risks of the hazard(s) for which the project was designed. A project's feasibility is demonstrated through conformance with accepted engineering practices, established codes, standards, modeling techniques, or best practices. Effective mitigation measures funded under HMA provide a long-term or permanent solution to a risk from a natural hazard.

For additional information about the feasibility and effectiveness requirement for mitigation reconstruction projects, see the Addendum, Part D.3; for additional feasibility and effectiveness resources, see [Part X, C.5](#).

D.5 Hazard Mitigation Plan Requirement

In accordance with 44 CFR Part 201, all Applicants for the **PDM Program** and **FMA** must have a FEMA-approved State or Tribal (Standard or Enhanced) Mitigation Plan by the application deadline and at the time of obligation of the grant funds. The only exception is for a subapplication for a State or Indian Tribal (Standard or Enhanced) Mitigation Plan. In addition, all subapplicants for the **PDM Program** and **FMA** mitigation projects must have a FEMA-approved local or Indian Tribal mitigation plan by the application deadline and at the time of obligation of grant funds. There is no local or Indian Tribal mitigation plan requirement for any HMA program for a planning subgrant.

EXTRAORDINARY CIRCUMSTANCES EXCEPTION

- For **HMGP** project subgrants, the Regional Administrator may grant an exception to a local or Indian Tribal mitigation plan requirement in extraordinary circumstances when justification is provided.
- For the **PDM Program** and **FMA** project subgrants, the Region may apply extraordinary circumstances when justification is provided and with concurrence from FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) before granting an exception.

Applicants for **HMGP** funding must have a FEMA-approved State or Indian Tribal (Standard or Enhanced) Mitigation Plan at the time of the disaster declaration and at the time HMGP funding is obligated to the Grantee to receive an HMGP award. For **HMGP** project subgrants, the Regional Administrator may grant an exception to the local or Indian Tribal mitigation plan requirement in extraordinary circumstances, when justification is provided. If this exception is granted, a local or Indian Tribal mitigation plan must be approved by FEMA within 12 months of the award of the project subgrant to that community.

For **PDM** and **FMA** project subgrants, the Region may apply extraordinary circumstances when justification is provided and with concurrence from FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) prior to granting an exception. If this exception is granted, a local or Indian Tribal mitigation plan must be approved by FEMA within 12 months of the award of the project subgrant to that community.

For **HMGP**, **the PDM Program**, and **FMA**, extraordinary circumstances exist when a determination is made by the Applicant and FEMA that the proposed project is consistent with the priorities and strategies identified in the State or Indian Tribal (Standard or Enhanced) Mitigation Plan and that the jurisdiction meets at least one of the criteria below. If the jurisdiction does not meet at least one of the following criteria, the Region must coordinate with FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) for **HMGP** and coordinate and seek concurrence prior to granting an exception for the **PDM Program** and **FMA**:

- ◆ The jurisdiction meets the small impoverished community criteria (see [Part IX, B.2](#));
- ◆ The jurisdiction has been determined to have had insufficient capacity due to lack of available funding, staffing, or other necessary expertise to satisfy the mitigation planning requirement prior to the current disaster or application deadline;
- ◆ The jurisdiction has been determined to have been at low risk from hazards due to low frequency of occurrence or minimal damages from previous occurrences due to sparse development;
- ◆ The jurisdiction experienced significant disruption from a declared disaster or another event that impacts its ability to complete the mitigation planning process prior to award or final approval of a project grant; and
- ◆ The jurisdiction does not have a mitigation plan for reasons beyond the control of the State, Indian Tribal or local community, such as Disaster Relief Fund (DRF) restrictions that delay FEMA from awarding project grants prior to the expiration of the local or Indian Tribal mitigation plan.

For **HMGP**, **the PDM Program**, and **FMA**, the Applicant must provide written justification that identifies the specific criteria from above or circumstance, explain why there is no longer an impediment to satisfying the mitigation planning requirement, and identify the specific actions or circumstances that eliminated the deficiency.

In determining whether to grant the exception, FEMA takes into consideration factors including whether an Applicant has prioritized its authorized HMA project assistance for use in those communities with an approved local or Indian Tribal mitigation plan, whether there are additional project funds available for award to a jurisdiction that does not have an approved local or Indian Tribal mitigation plan, and whether an Applicant has placed higher priority for grant funding on communities with higher risks. In all cases, a local or Indian Tribal mitigation plan must be completed and approved by FEMA within 12 months of the award. If a local or Indian

Tribal mitigation plan is not approved by FEMA within this timeline, the project subgrant will be terminated and any costs incurred after the notice of the subgrant's termination will not be reimbursed by FEMA.

When an HMGP project subgrant is awarded under extraordinary circumstances, the Grantee shall acknowledge in writing to the Regional Administrator that a plan will be completed within 12 months of the award of the project grant. The Grantee must provide a work plan for completing the local or tribal mitigation plan, including milestones and a timetable, to ensure that the jurisdiction will complete the plan in the required time. This requirement shall be incorporated into the grant award (both the planning and project subgrant agreements, if a planning subgrant is also awarded).

D.5.1 Indian Tribal Government Hazard Mitigation Plan Requirement

Indian Tribal governments with an approved Indian Tribal mitigation plan in accordance with 44 CFR Section 201.7 may apply for assistance from FEMA as a Grantee. In addition, if an Indian Tribal government with an approved Indian Tribal mitigation plan in accordance with 44 CFR Section 201.7 coordinates the review of their Indian Tribal mitigation plan with the State or another Indian Tribal government, it has the option to apply as a subapplicant through that State or Indian Tribal government, except as prohibited by State law.

D.5.2 Conformance with Hazard Mitigation Plans

Projects submitted for consideration for HMA funding must be consistent with the goals and objectives identified in the current, FEMA-approved State or Indian Tribal (Standard or Enhanced) Mitigation Plan and local or Indian Tribal mitigation plan for the jurisdiction in which the activity is located.

D.6 Environmental Planning and Historic Preservation Requirement

HMA programs, and grants awarded pursuant to these programs, must conform to 44 CFR Parts 9 and 10, and with all applicable EHP laws, implementing regulations, and EO^s, such as the NEPA, the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), EO 11988 (*Floodplain Management*), EO 11990 (*Protection of Wetlands*), and EO 12898 (*Environmental Justice*). EHP requirements ensure appropriate consideration of reasonable alternatives, taking the project's impacts to the human environment into account in the decision-making process. The project, when completed, must comply with all applicable environmental laws and regulations as a condition of grant eligibility.

FEMA reviews the completeness of the responses to the questions in the EHP review section of the project subapplication and supporting documentation. For HMA project subapplications that do not include the required information for each property identified in the subapplication, there

may be a delay in identifying outstanding EHP compliance measures. Lack of the required information by the application deadline may prohibit FEMA from awarding a grant or subgrant.

FEMA has developed guidance to assist in completing the EHP information section of a project subapplication, including an eLearning Tool, online training, and information about historic preservation. For links to these EHP resources, see [Part X, C.5](#).

D.6.1 Floodplain Management and Protection of Wetlands

As noted in [Part IV D.6](#), all activities funded by HMA programs must conform to 44 CFR Part 9. Activities involving development will only be eligible for a grant if the Applicant demonstrates that there is no practicable alternative to such development in accordance with 44 CFR Section 9.9. In addition, **HMGP** funds cannot be used to fund new construction or Substantial Improvement in a floodway or new construction in a coastal high hazard zone. However, the costs to elevate or floodproof a damaged structure or facility are not included in determining whether the Substantial Improvement threshold is triggered.

For additional information see 44 CFR Section 9.11(d).

D.7 National Flood Insurance Program Eligibility Requirements

HMA eligibility is related to the NFIP as follows:

- ♦ **Subapplicant eligibility:** All subapplicants for **FMA** must currently be participating in the NFIP, and not withdrawn or suspended, to be eligible to apply for grant funds. Certain non-participating political subdivisions (i.e., regional flood control districts or county governments) may apply and act as subgrantees on behalf of the NFIP-participating community in areas where the political subdivision provides zoning and building code enforcement or planning and community development professional services for that community;
- ♦ **Project eligibility:** **HMGP** and **PDM** mitigation project subapplications for projects sited within an SFHA are eligible only if the jurisdiction in which the project is located is participating in the NFIP. There is no NFIP participation requirement for HMGP and PDM project subapplications for projects located outside of the SFHA;
- ♦ **Hazard mitigation planning eligibility:** There are no NFIP participation requirements for **HMGP** and **PDM** hazard mitigation planning subapplications; and
- ♦ **Property eligibility:** Properties included in a project subapplication for **FMA** funding must be NFIP insured at the time of the application submittal. Flood insurance must be maintained for the life of the structure.

D.7.1 Special Flood Hazard Area Requirements

For structures that remain in the SFHA after the implementation of the mitigation project, flood insurance must be maintained for the life of the structure to an amount at least equal to the project cost or to the maximum limit of coverage made available with respect to the particular property, whichever is less. The maximum limit of coverage made available is defined as the replacement cost value of the structure up to \$250,000 for residential and \$500,000 for non-residential. Insurance coverage on the property must be maintained during the life of the property regardless of transfer of ownership of such property.

The subgrantee (or property owner) must legally record, with the county or appropriate jurisdiction's land records, a notice that includes the name of the current property owner (including book/page reference to record of current title, if readily available), a legal description of the property, and the following notice of flood insurance requirements:

This property has received Federal hazard mitigation assistance. Federal law requires that flood insurance coverage on this property must be maintained during the life of the property regardless of transfer of ownership of such property.

Pursuant to 42 U.S.C. 5154a, failure to maintain flood insurance on this property may prohibit the owner from receiving Federal disaster assistance with respect to this property in the event of a flood disaster. The Property Owner is also required to maintain this property in accordance with the floodplain management criteria of 44 CFR Part 60.3 and City/County Ordinance.

Applicants/subapplicants receiving assistance for projects sited in an SFHA must ensure that these requirements are met by requesting that the participating property owner(s) sign an *Acknowledgement of Conditions for Mitigation of Property in an SFHA with FEMA Grant Funds* form and providing the form to FEMA prior to award or final approval. This form is available on the FEMA Web site at <http://www.fema.gov/library/viewRecord.do?id=3592>, or from the appropriate FEMA Regional Office (for Regional Office information, see [Part VII](#)). Properties that do not meet these requirements will not be eligible to receive assistance under the HMA programs.

If an approved HMA project affects the accuracy of the applicable Flood Insurance Rate Map (FIRM), the subgrantee is responsible for ensuring that appropriate map amendments or revisions are made. Costs associated with map amendments may be identified in the cost estimate section of a subgrant application.

D.8 Statutory, Regulatory, and Other Requirements

Mitigation activities must adhere to all relevant statutes, regulations, and requirements, including:

- ◆ Sections 203 (PDM Program) and 404 (HMGP) of the Stafford Act;

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- ◆ Section 1366 (FMA) of the NFIA;
 - ◆ Section 322 of the Stafford Act (Mitigation Planning);
 - ◆ Section 324 of the Stafford Act (Management Costs);
 - ◆ NHPA;
 - ◆ NEPA;
 - ◆ Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970;
 - ◆ Floodplain Management and Protection of Wetlands (44 CFR Part 9);
 - ◆ Environmental Considerations (44 CFR Part 10, NEPA, and ESA);
 - ◆ Coastal Barriers Resources Act (CBRA; 44 CFR Part 206, Subpart J);
 - ◆ Uniform Administrative Requirements for Grants and Cooperative Agreements to States and Local Governments (44 CFR Part 13);
 - ◆ Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and other Non-Profit Organizations (2 CFR Part 215);
 - ◆ Floodplain Management (44 CFR Part 60);
 - ◆ Flood Mitigation Grants (44 CFR Part 79);
 - ◆ Property Acquisition and Relocation for Open Space (44 CFR Part 80);
 - ◆ Hazard Mitigation Planning (44 CFR Part 201);
 - ◆ Hazard Mitigation Grant Program (44 CFR Part 206, Subpart N);
 - ◆ Management Costs (44 CFR Part 207);
 - ◆ Cost Principles for Educational Institutions (2 CFR Part 220, OMB Circular A-21); Cost Principles for State, Local, and Indian Tribal Governments (2 CFR Part 225, OMB Circular A-87); Cost Principles for Nonprofit Organizations (2 CFR Part 230, OMB Circular A-122);
 - ◆ OMB Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*;
 - ◆ OMB Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations*;
 - ◆ Federal Acquisition Regulations (FAR) Subpart 31.2, Contracts with Commercial Organizations; and
 - ◆ Other applicable Federal, State, Indian Tribal, and local laws, implementing regulations, and EO^s (e.g., EO 11988, EO 11990).

PART V. APPLICATION AND SUBMISSION INFORMATION

Part V provides guidance on developing HMA applications or subapplications, and on related funding restrictions.

A. Address to Request Application Package

Applications for **HMGP** are processed through the National Emergency Management Information System (NEMIS). Applicants may use the Application Development Module of NEMIS to create project applications and submit them to the appropriate FEMA Region in digital format for the relevant disaster. For NEMIS Helpdesk resources, see [Part X C.6](#).

Applications for the **PDM Program** and **FMA** are processed through the *eGrants* system. The *eGrants* system encompasses the entire grant application process and provides the means to electronically create, review, and submit a grant application to FEMA via the Internet.

Applicants and subapplicants can access *eGrants* at <https://portal.fema.gov/famsVuWeb/home>.

The FEMA Technical Service desk phone number is 1 (877) 611-4700. For additional *eGrants* resources, see [Part X C.6](#).

For more information about using NEMIS or *eGrants*, contact the appropriate FEMA Regional Office (see [Part VIII](#)).

B. Content and Form of Application

For **HMGP**, subapplication packages are available from eligible Applicants following Presidential major disaster declarations. The Applicant selects and prioritizes subapplications and submits them to FEMA. Applicants must submit an SF-424, Application for Federal Assistance, before HMGP funding can be obligated. The Applicant submits the subapplications both in digital format via NEMIS and in hard copy format.

Applications and subapplications for the **PDM Program** and **FMA** are submitted via the *eGrants* system. If a subapplicant does not use the *eGrants* system, the Applicant must enter the paper subapplication(s) into the *eGrants* system on the subapplicant's behalf. Blank applications that conform to the *eGrants* format are available for printing from the *eGrants* system and the FEMA Web site. Supporting documentation that cannot be electronically attached to the *eGrants* application (e.g., engineering drawings, photographs, and maps) must be submitted to the appropriate FEMA Regional Office. The entire application, including all paper documentation, must be received by the appropriate FEMA Regional Office no later than the application deadline.

C. Submission Dates and Times

HMGP submittal deadlines for applications are established based on the disaster declaration date. For submission of an application for HMGP, see [Part IX, A.1](#) and [A.6](#).

Completed applications for the **PDM Program** and **FMA** must be submitted to FEMA through *eGrants*. Application submission due dates and times are posted to the HMA Web site at <https://www.fema.gov/hazard-mitigation-assistance>. Subapplicants should consult the official designated point of contact (POC) for their Applicant for more information regarding the application process. For more information on FEMA and Applicant contacts, see [Part VIII](#). For additional information on HMA application cycles either contact FEMA or go to <http://www.grants.gov/>.

D. Intergovernmental Review

It may be necessary to allow sufficient time for an intergovernmental review of an application as established by EOs 12372 and 12416 (*Intergovernmental Review of Federal Programs*). If an Applicant has chosen not to participate in the intergovernmental review process, the application may be sent directly to FEMA. Guidance on the intergovernmental review process, including the names and addresses of the single POCs as listed by OMB, is available at http://www.whitehouse.gov/omb/grants_spoc.

E. Funding Restrictions

HMA programs allow the funding of eligible costs for mitigation activities as outlined in [Part IV, D.1](#). Subapplications that propose a Federal expenditure in excess of the Federal funding limit will not be considered for an award. For each program, additional funding restrictions apply as described below.

E.1 HMGP Funding Restrictions

- ◆ Up to 7 percent of the Grantee's HMGP ceiling may be used for mitigation planning activities in compliance with 44 CFR Section 201.3(c)(4).
- ◆ Up to 5 percent of the Grantee's HMGP ceiling may be used for mitigation measures that are difficult to evaluate against traditional program cost-effectiveness criteria (i.e., the 5 Percent Initiative).
- ◆ For Presidential major disaster declarations for tornadoes and high winds, an additional 5 percent of the Grantee's HMGP ceiling may be used to fund hazard mitigation measures (e.g., warning systems) to address the unique hazards posed by tornadoes.

For more information on the 5 Percent Initiative and the additional 5 percent for tornadoes, see [Part IX, A.10](#).

E.2 PDM Program Funding Restrictions

- ◆ Up to \$800,000 Federal share may be requested in a subapplication for a planning grant to develop a new hazard mitigation plan.
- ◆ Up to \$300,000 Federal share may be requested in a subapplication for a planning grant to update a hazard mitigation plan.
- ◆ Up to \$3 million Federal share may be requested in a subapplication to implement a mitigation project.
- ◆ The cumulative Federal award for subapplications awarded during a single application cycle to any one Applicant shall not exceed 15 percent of the total appropriated PDM Program funds for that application cycle.

MAXIMUM AMOUNTS OF MITIGATION PLANNING GRANTS

Under the PDM Program, the maximum mitigation planning grant is \$800,000 for a new plan and \$300,000 for an update.

Under FMA, the maximum individual planning grant is \$50,000 for any Applicant and \$25,000 for any subapplicant.

E.3 FMA Funding Restrictions

- ◆ Individual planning grants using FMA funds shall not exceed \$50,000 to any Applicant or \$25,000 to any subapplicant. FMA funds can only be used for the flood hazard component of a hazard mitigation plan that meets the planning criteria outlined in 44 CFR Part 201.

E.4 Management Costs Funding Restrictions

For **all HMA** programs, indirect costs may be included as a part of the management cost estimate shown in the application or subapplication.

For **HMGP** only: The Grantee may request a flat percentage rate (4.89 percent) of the projected eligible program costs for management costs. The Grantee is responsible for determining the amount, if any, of funds that will be passed through to the subgrantee(s) for their management costs. For further information on HMGP management costs, see [Part IX, A.2.5](#) and [A.4](#).

Applicants for the **PDM Program** and **FMA** may apply for a maximum of 10 percent of the total funds requested in their grant application budget (Federal and non-Federal shares) for management costs to support the project and planning subapplications included as part of their grant application. Applicants requesting Applicant management costs must submit a separate Management Costs subapplication in eGrants. This subapplication must be included in the overall grant application or the request will not be considered. Applicants who are not awarded grants funds for project or planning activities will not receive reimbursement for the corresponding costs incurred in developing and submitting applications.

Subapplicants for the **PDM Program** and **FMA** may apply for a maximum of 5 percent of the total funds requested in a subapplication for management costs. Subapplicants requesting management costs must include them in the project or planning subapplication for consideration as separate activities in the Mitigation Activity section of *eGrants*. Subapplicants who are not awarded subgrants for project or planning activities will not receive reimbursement for the corresponding costs incurred in developing and submitting subapplications.

F. Other Submission Requirements

F.1 Application Consideration under Multiple HMA Programs

FEMA will only consider applications and subapplications submitted to a specific HMA program. If an applicant would like to have a subapplication considered under multiple HMA programs, the applicant must submit that subapplication to each HMA program separately.

F.2 Pre-Award Costs

Costs incurred after the HMA application period has opened, but prior to the date of the grant award or final approval, are identified as pre-award costs. For **HMGP**, the opening of the application period is the date when HMGP is authorized, which is generally the date of declaration. The opening of the application period for the **PDM Program** and **FMA** is established annually by FEMA.

Pre-award costs directly related to developing the application or subapplication may be funded through HMA as funds are available. Such costs may have been incurred, for example, to develop a BCA, to gather EHP data, for preparing design specifications, or for workshops or meetings related to development and submission of HMA applications and subapplications.

Costs associated with implementation of the activity but incurred prior to grant award or final approval are not eligible (projects initiated or completed prior to grant award or full approval of the project are not eligible). To be eligible for HMA funding, pre-award costs must be identified as separate line items in the cost estimate of the subapplication. Applicants and subapplicants may identify such pre-award costs as their non-Federal cost share. Applicants and subapplicants who are not awarded grants or subgrants will not receive reimbursement for the corresponding pre-award costs.

G. Applicant Guidance

G.1 General Applicant Guidance

FEMA will not direct the Applicant on how to submit its applications. The Applicant may submit a single application representing all subapplications or they may submit multiple applications. When submitting multiple subapplications, they should be ranked in priority order.

Before forwarding subapplications to FEMA, Applicants also should review subapplications to document that:

- ♦ The subapplicant has documented its capacity to manage the subgrant funds;
- ♦ The subapplicant has documented its capacity to complete the mitigation activity in the time specified;
- ♦ Non-Federal cost-share funds are or will be available for the project;
- ♦ The maintenance requirements have been sufficiently identified, and the subapplicant or another authorized entity has accepted the maintenance responsibility;
- ♦ The underlying cost-effectiveness data are accurate and complete; and
- ♦ All program- and project-specific requirements have been met and are documented as appropriate.

If the subapplication is considered to be deficient, the Applicant may revise or augment the subapplication in consultation with the subapplicant. Applicants must certify that they have evaluated the activities included in each subapplication and that activities will be implemented in accordance with 44 CFR Part 13 and other applicable program or activity type requirements.

G.2 Minimum Eligibility and Completeness Criteria

FEMA will no longer accept incomplete and placeholder project applications. Incomplete applications or subapplications delay project approval because they do not contain sufficient information for FEMA to make program eligibility determinations. Applications and subapplications submitted to FEMA must meet the minimal eligibility and completeness criteria as there is no method to determine eligibility without these data. These minimal eligibility criteria are required for all submittals including over-submittals and placeholder applications. Additional information may be requested during FEMA review. The following list is not all inclusive. For a more detailed checklist please see [Part X, Appendix E](#) for projects and [Part X, Appendix H](#) for plans.

MINIMUM ELIGIBILITY AND COMPLETENESS REQUIREMENTS

Applications and subapplications submitted to FEMA must meet the minimal eligibility and completeness criteria, as there is no method to determine eligibility without these data. For a detailed Eligibility and Completeness checklist please see [Part X, Appendix E](#) for projects and [Part X, Appendix H](#) for plans.

Unless otherwise noted, the following criteria apply to plans, management costs, and project subapplications and applications:

- ♦ Eligible Applicant;
- ♦ Meets all plan requirements per 44 CFR Parts 201 and 206;
- ♦ Provides a detailed SOW as described in [Part V, H](#);

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- ◆ Provides a work schedule of 3 years or less;
 - ◆ If project is suitable for phased or incremental funding, the schedule reflects activities and timelines for each funding increment (**projects**);
 - ◆ Budget/Match Source;
 - A detailed cost estimate/budget is provided that supports the SOW;
 - ◆ Cost-effectiveness and Feasibility (**projects**);
 - Project includes a FEMA-approved BCA or FEMA-approved alternate cost-effectiveness documentation (see [Part V, I](#) for additional information);
 - The proposed activity is feasible and effective as demonstrated through conformance with accepted engineering practices, established codes, standards, modeling techniques, or best practices (see [Part V, J](#) for additional information);
 - ◆ EHP;
 - Project includes information and documentation to demonstrate conformance with all applicable laws and regulations (e.g., NEPA and State Historic Preservation Act);
 - Project demonstrates that it minimizes harm to the environment and is the best alternative from a range of options considered (see [Part V, K](#) for additional information); and
 - ◆ Assurances.

H. Scope of Work

The SOW identifies the eligible mitigation activity, as described in [Part IV, D.1](#); describes what will be accomplished; and explains how the mitigation activity will be implemented. The mitigation activity must be described in sufficient detail to verify the cost estimate. All activities for which funding is requested must be identified in the SOW prior to the close of the application period.

H.1 Project Scope of Work

The project subapplication SOW provides detailed information about the project, as well as applicable references and supporting documentation. The SOW includes:

- ◆ **Purpose of the project** – The intended outcome or objectives of the project;
- ◆ **Clear, concise description of the proposed project** – Proposed conceptual design, means of implementation of the project, and responsible party for implementation;
- ◆ **Identification of properties to be mitigated** – All properties to be mitigated must be identified, including additional, alternate properties that may be substituted should one or

more of the other properties be withdrawn for eligibility or other reasons. In order for alternate properties to be properly considered in the event of a substitution, the same level of information for the alternate properties is required as is provided for the proposed properties;

- ◆ **Outcomes** – Proposed project accomplishments, problem(s) that the project will solve, parties that will directly or indirectly benefit from the project, and ways that the risks of damage or harm will be reduced;
- ◆ **Special project components** – New technologies that will be used during project implementation and how they are expected to provide the necessary results, and necessary laboratory tests or field-testing;
- ◆ **Other projects** – Other projects that are currently being implemented or expected to be implemented that will affect the proposed project;
- ◆ **Extraordinary Circumstances** – If this exception is used, a plan must be completed within 12 months of the award of the project grant, per [Part IV, D.5](#) (Hazard Mitigation Plan Requirement); and
- ◆ **Latitude/Longitude and site photographs** – Subapplicants must identify the proposed project location on a map and provide the latitude/longitude and any relevant photographs including, but not limited to sides of the building, foundation, roof, both sides of the culvert, and the surrounding project area.

The required documentation depends upon the nature of the proposed project and may include: proposed schematics, drawings or sketches, photographs, maps, sections of hazard maps, a Flood Insurance Study, or a FIRM. Whenever possible, data used to document existing conditions must be obtained from recognized sources, such as Federal agencies, State agencies, and academic organizations. The references and/or supporting documentation from qualified and credible sources such as Professional Engineers or local government records should be included when using locally developed data. Deviations from standard procedures, methods, techniques, technical provisions of the applicable codes, or best practices must be thoroughly explained and documented. Subapplicants must identify the proposed project location on a map and provide any relevant photographs including, but not limited to, sides of the building, foundation, and roof (as appropriate).

H.2 Hazard Mitigation Planning Scope of Work

The hazard mitigation planning subapplication SOW must describe the development of a hazard mitigation plan or planning-related activity that is consistent with the requirements identified in 44 CFR Part 201.

For a hazard mitigation plan, the SOW must:

- ◆ Describe the proposed planning activity, including whether it will:

-
- Result in a new or updated hazard mitigation plan that complies with the requirements identified in 44 CFR Part 201; or
 - Enhance an existing mitigation plan through a planning related activity that is consistent with 44 CFR Part 201.
 - ◆ Identify the jurisdiction(s) or tribe(s) that will participate in developing the plan or the planning-related activity and describe the jurisdictions;
 - ◆ Provide a statement on how the overall planning effort will be coordinated;
 - ◆ Describe the process for plan development or the planning-related activity, clearly demonstrating what applicable regulatory requirements will be met. Document in detail the activities the jurisdiction(s) will complete to develop the plan or the planning related activity, including public involvement, identification of hazards, development of a comprehensive risk/vulnerability assessment, identification of mitigation goals and strategies, and plan implementation, and describe how these activities relate to the cost estimate; and
 - ◆ For new or updated hazard mitigation plans, describe the plan adoption process for the jurisdiction(s) or tribe(s) to ensure sufficient time to complete the plan, as well as time for State and FEMA review and, if necessary, time to complete any required revisions and to formally adopt the plan.

Additionally, for an update to a hazard mitigation plan, the SOW must include the reasons for the update and describe the process for plan update, clearly demonstrating that applicable regulatory requirements will be met. Also, provide a statement on how the overall planning effort will be coordinated.

If available, the subapplication also should include a copy of the plan review document (i.e., review tool or crosswalk) from the FEMA approval of the previous plan.

For planning related activities, the SOW should describe the:

- ◆ Final product(s);
- ◆ Process and level of effort to develop the final product(s), including key milestones (such as meetings; data research, collection, and analysis; drafts; and outreach); and
- ◆ Process to incorporate the product(s) or results into the update of the next mitigation plan.

Applicants/subapplicants are advised to make use of already developed materials and to seek available resources when developing a new mitigation plan or updating a mitigation plan. For links to mitigation planning and risk assessment resources, see [Part X, C.2](#).

H.3 Management Costs Scope of Work

For the Applicant management cost subapplication, the SOW must describe the activities and specific tasks related to developing subapplications, and implementing as well as closing subgrants. The SOW should state whether the work will be conducted by the Applicant's staff or by contractor staff.

H.4 Schedule

Subapplications should include a work schedule for all project tasks identified in the SOW, such as data collection, site survey, permitting and inspections, site preparation, and construction. The schedule should identify timelines for accomplishing significant milestones, including anticipated quarterly usage of Federal funds. Proposed schedules for individual subapplications should not exceed 36 months (see [Part VII, B.4](#)).

For planning subapplications, the work schedule must allow sufficient time for State and FEMA reviews; preparation of required revisions, if needed; formal adoption by the jurisdiction(s); and FEMA approval.

H.5 Cost Estimate

The cost estimate describes all of the subapplicant's anticipated costs associated with the SOW for the proposed mitigation activity. Cost estimates must include detailed estimates of various cost item categories, such as labor, materials, equipment, and subcontractor costs. No lump-sum estimates will be accepted. The cost estimate must identify the cost categories and value for which anticipated cash and third-party in-kind contributions will be used to meet the non-Federal cost share.

COST ESTIMATES

FEMA will accept cost estimates used to support budgets and BCAs if the Applicant or subapplicant certifies that the estimates are based on nationally published or local cost-estimating guides.

FEMA will accept cost estimates that the Applicant or subapplicant certifies were established using nationally published or local cost estimating guides to support the budget and BCA. The Applicant or subapplicant must include appropriate documentation in the application or subapplication that demonstrates a national published standard or local cost estimating guide was used. If a cost estimate is based on a contractor's bid or historic costs from another activity, detailed documentation must be provided. The applicant must document actual costs for eligible activities at closeout. Separate cost line items in a subapplication are required to ensure that cost thresholds are not exceeded. As applicable, the following line items must be listed separately in the budget:

- ◆ Pre-award costs;
- ◆ Subapplicant management costs for the PDM Program and FMA, and HMGP if the Grantee has agreed to pass through funds to the subgrantee; and

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- ◆ Information dissemination costs (for the PDM Program).

Additionally, the cost estimate should indicate items for which the cost may change, such as a price quoted by a contractor that is only valid for 1 year. Neither contingency nor escalation costs are permitted as individual line items in the cost estimate.

H.5.1 Project Cost Estimate

In addition to the items described in [Part V, H.5](#), the project cost estimate must include a line-item breakdown of all anticipated costs including, as applicable:

- ◆ Costs for anticipated environmental resource impact treatment or historic property treatment measures;
- ◆ Costs for engineering designs/specifications, including hydrologic and hydraulic studies/analyses required as an integral part of designing the project;
- ◆ Construction/demolition/relocation costs, such as survey, permitting, site preparation, and material/debris disposal costs; and
- ◆ All other costs required to implement the mitigation project, including any applicable project-type specific costs identified in the Addendum of this guidance.

For additional information about cost estimates for property acquisition and structure demolition or relocation projects, see Addendum, Parts A.5 and A.6; for wildfire mitigation projects, see Addendum, Part B.3; for safe room construction projects, see Addendum, Part C.3.4; for mitigation reconstruction see projects Addendum, Parts D.2 and D.5; and for structure elevation projects, see Addendum, Part E.3.

H.5.2 Hazard Mitigation Planning Cost Estimate

In addition to the items described in [Part V, H.5](#), the hazard mitigation planning cost estimate must include a line-item breakdown of costs associated with all elements described in the SOW, such as:

- ◆ Meetings and public outreach, including the costs associated with what is necessary and reasonable;
- ◆ Data research and collection, including eligible mapping activities or risk assessment;
- ◆ Plan drafting, review, and final production;
- ◆ Information dissemination activities, including printing and advertising; and
- ◆ Professional development training, tuition, and travel for the purpose of carrying out the planning SOW.

H.5.3 Management Cost Estimate

Applicants and subapplicants requesting management costs should provide supporting documentation and include these costs as separate line items in the cost estimate portion of the application or subapplication.

A narrative must accompany a request for management costs. The narrative should describe the activities, personnel requirements, and other costs for which the Grantee and/or subgrantee will use management cost funding. It should provide information on how the funds will be expended and monitored and show that sufficient funds will be available for closeout.

For more information on HMGP management costs, see [Part IX, A.4](#).

I. Cost-effectiveness

FEMA will only consider applications that use a FEMA-approved methodology to demonstrate cost-effectiveness. This is typically demonstrated by the calculation of a BCR. Projects for which benefits exceed costs are generally considered cost-effective. Benefits may include avoided damages, loss of function, and displacement.

FEMA provides BCA software that allows Applicants to calculate a project BCR. Written materials and training are also available. The FEMA BCA software utilizes the OMB Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*. FEMA requires using approved BCA software (version 4.5.5 or greater) to help ensure that calculations are consistent with OMB Circular A-94. The current software is available at the FEMA Regional Office or from the BCA Technical Assistance Helpline.

If FEMA standard values are used, then no additional documentation is required. If non-standard values are used, then documentation is required. Documentation must be accurate and sufficiently detailed for the analysis to be validated. FEMA recommends that supporting documentation be obtained from credible sources, such as a Flood Insurance Study.

Data associated with the various methodologies for analyzing cost-effectiveness are available from the appropriate FEMA Regional Office (see [Part VIII](#)) or the BCA Technical Assistance Helpline.

I.1 Substantial Damage Waiver

An expedited cost-effectiveness methodology is available for property acquisition projects when certain conditions are met. Structures that are declared Substantially Damaged as a result of flooding and located in a riverine SFHA on a

**SUBSTANTIAL DAMAGE
WAIVER EXTENDED
TO ALL HMA PROGRAMS**

An expedited cost-effectiveness analysis methodology is available for property acquisition projects when certain conditions are met.

preliminary or effective FIRM are considered cost-effective for acquisition projects. If this methodology is used, the project application should include a certification that the structures meet these conditions.

I.2 Aggregation

An evaluation of the cost-effectiveness of a project should include all activities included within the SOW. This may include activities in multiple jurisdictions. It may also include combining benefits from multiple activities and multiple hazards, such as wind and flood, if it is a part of the same project.

AGGREGATION

It is appropriate to aggregate benefits from multiple activities and multiple jurisdictions if part of the same project.

I.3 5 Percent Initiative

For **5 Percent Initiative** subapplications for HMGP funding, a narrative description of the project's cost-effectiveness must be provided. For more information on the 5 Percent Initiative, see [Part IX, A.10](#).

I.4 Pre-calculated Benefits (Safe rooms)

For **Safe Room Construction** projects, an expedited cost-effectiveness methodology is available that identifies the benefits associated with certain types of safe rooms (see Appendix F). If this methodology is used, the submitted project application should include a copy of the data relevant to the project location.

I.5 Greatest Savings to the Fund

FEMA also allows for the use of the GSTF data and methodology to demonstrate cost-effectiveness for properties included in mitigation projects under HMA. Subapplicants are not required to use this methodology when submitting projects for funding and may utilize the current applicable BCA version (4.5.5 or greater) methodology.

GREATEST SAVINGS TO THE FUND METHODOLOGY

GSTF can be used to demonstrate cost-effectiveness of a project under all HMA programs.

I.6 Environmental Benefits

FEMA has identified and quantified environmental benefits for mitigation activities. Incorporating environmental benefits into the overall quantification of benefits for acquisition-related activities supports

INCLUSION OF ENVIRONMENTAL BENEFITS INTO THE BCA TOOLKIT

Green open space and riparian benefits have been identified and quantified for acquisition projects. The BCR for an acquisition project must be 0.75 before the environmental benefit can be incorporated.

FIMA's mission of risk reduction, environmental compliance, and preservation of the natural and beneficial functions of the floodplain.

Specifically, FEMA developed economic values for green open space and riparian areas. FEMA will be incorporating the environmental benefits for green open space and riparian areas into the BCA toolkit for acquisition projects.

The economic value for green open space is \$7,853 per acre per year. For riparian areas, the economic value is \$37,493 per acre per year. When incorporating these values into FEMA's BCA, the yearly benefits accrue over the 100-year project useful life and are discounted at 7 percent per year to meet OMB requirements. [Table 4](#) provides the green open space and riparian benefits per acre per year and per square foot.

Table 4: Green Open Space and Riparian Benefits

Land Use	Total Estimated Benefits (per acre per year)	Total Estimated Benefits ⁽¹⁾ (per square foot)
Green Open Space	\$7,853	\$2.57
Riparian	\$37,493	\$12.29

⁽¹⁾ Projected for 100 years with 7 percent discount rate

For an acquisition project, the BCR for a project must be 0.75 before incorporating the environmental benefit. This ensures projects funded by HMA are primarily associated with risk reduction activities. Once a project's BCR reaches 0.75, the appropriate environmental benefit can be included for the individual properties.

I.7 Benefit-Cost Analysis Resources

Other methods to demonstrate cost-effectiveness may be used when they address a non-correctable flaw in the FEMA-approved methodologies or propose a new approach that is unavailable using current tools. New methodologies may be used only if FEMA approves the methodology before application submission. For more information on resources, see [Part X, C.3](#).

BCA Helpline

Telephone: (855) 540-6744

Email: bchelpline@fema.dhs.gov

BCA Policies, Overview, and Software

<http://www.fema.gov/benefit-cost-analysis>

J. Feasibility and Effectiveness Documentation

FEMA will use the information provided in the subapplication, including the SOW, the cost estimate, and supporting documentation to determine the feasibility and effectiveness of the

proposed mitigation activity. FEMA accepts the engineering design for a project if a registered Professional Engineer (or other design professional) certifies that the design meets the appropriate code or industry design and construction standards. FEMA will accept the certified engineering design in lieu of a comprehensive technical feasibility review. If accepted codes/standards are used, no additional documentation is required. See [Part X, Appendix D](#) (Referenced Regulations, Statutes, Directives, and Guidance) for examples of codes and standards used for various projects types.

If an alternative design is proposed the application/subapplication should contain:

- ◆ Applicable building code/edition or engineering standard used;
- ◆ Level of protection provided by the proposed project and description of how the proposed activity will mitigate future losses;
- ◆ For the retrofit of existing buildings or infrastructure protection projects, an assessment of the vulnerabilities of the existing building;
- ◆ Any remaining risk to the structure after project implementation; and
- ◆ Proposed schematic drawings or designs (as applicable).

Project subapplications that do not include appropriate documentation to support the determination of feasibility and effectiveness may be removed from consideration. Upon request, FEMA will provide technical assistance regarding engineering documentation.

For structure elevation and dry floodproofing activities, a statement certifying that the project will be designed in conformance with ASCE/SEI 24-05 will assist in satisfying the feasibility and effectiveness requirement.

K. Environmental Planning and Historic Preservation Documentation

The Applicant and subapplicant should ensure that the project SOW takes into account all potential EHP compliance issues. When completing the subapplication, the Applicant/subapplicant must answer a series of EHP review questions and provide information about potential impacts on environmental resources and cultural resources (if applicable) in the project area. For additional information, see [Part X, Appendix I](#) (EHP Checklist) and [Part X, Appendix J](#) (8-Step Decision Making Process for Floodplain Considerations), and [Part X, Appendix K](#) (Section 106 Process under the National Historic Preservation Act).

If potential impacts are identified through the responses to these EHP review questions, the Applicant/subapplicant must provide additional information, (as applicable), such as:

- ◆ The property address, original date of construction, and two color photographs for any buildings, structures, objects, or manmade sites/landscapes features that are 50 years or

more in age. At least one of the two photographs provided of a building should be the front or primary façade showing the elevation;

- ♦ Any identified federally listed threatened or endangered species and/or designated critical habitat in the project area;
- ♦ Vegetation, including amount (area), type, and extent to be removed or affected;
- ♦ Identification of all surface waters in the project area regardless of drainage area, size, or perceived hazard level. Information about surface waters should include dimensions, proximity of the project activity to the water, and the expected and possible impacts of the project upon surface waters, if any; and
- ♦ A description of any adverse effects on low income or minority populations in the project area.

Applicants seeking to determine whether there are any EHP issues associated with the proposed project should consult the HMA EHP Resources At-a-Glance Guide, located at <http://www.fema.gov/library/viewRecord.do?id=6976> and the HMA EHP at a Glance at <http://www.fema.gov/library/viewRecord.do?id=5904>. This Guide also provides key contacts, Web sites, and search engines to assist in early identification of EHP issues and to facilitate coordination with the appropriate State and Federal agencies.

If EHP issues are identified, the Applicant/subapplicant should initiate coordination with the relevant State and Federal agencies as early in the project planning stages as possible to address any potential EHP compliance issues associated with proposed projects. This coordination does not substitute, and shall not be interpreted to mean, that formal consultation has occurred between FEMA and the applicable resource agency.

Additional EHP compliance review activities may be necessary to facilitate project approval, such as environmental impact statements, environmental assessments, Phase I environmental site assessments, biological assessments, archeological or standing structures surveys and documentation, wetlands delineations, and air quality conformity analysis or determinations.

If FEMA or the Applicant/subapplicant identifies any potential impacts through the EHP review process described above, the following requirements must be completed before a grant award may be made:

- ♦ Evaluate any potential effects to environmental and historic resources and provide the required information and documentation to identify the impact on these resources;
- ♦ Complete an evaluation of alternatives to the proposed action that will avoid or minimize these impacts, including consideration of the environmental impact of taking no action;
- ♦ Complete any required consultation and/or coordination with the appropriate parties (e.g., the State Historic Preservation Officer, the U.S. Fish and Wildlife Service, the National

Marine Fisheries Service) to evaluate potential effects of the proposed project and to identify any measures necessary to avoid or minimize these effects;

- ◆ Demonstrate that the project will comply with all environmental laws and regulations; and
- ◆ Make certain that the costs of any measures to treat adverse effects are realistically reflected in the project budget estimate.

Applicants/Grantees may incur costs for significant EHP compliance review activities and/or EHP mitigation measures. FEMA will consider the following factors to determine whether to reimburse costs:

- ◆ Nature of the analysis or study required (e.g., environmental impact statement);
- ◆ Costs of EHP activities compared to project costs;
- ◆ Complexity of the proposed project; and
- ◆ Nature and extent of potential adverse impacts to environmental and/or historic resources.

Applicants should consider potential EHP costs during application development and submission and should seek to avoid activities that may negatively impact EHP resources.

FEMA may remove projects from consideration for full approval and/or funding when EHP compliance review activities are not progressing and the Applicant/Grantee has not dedicated resources and/or provided required documentation in a timely manner.

For additional information on required EHP documentation, see [Part X, C.5](#).

PART VI. APPLICATION REVIEW INFORMATION

Part VI provides information about the review process so that Applicants and subapplicants can prepare applications that meet FEMA review criteria. During an application review, FEMA may request additional information or documentation from Applicants.

A. Review Criteria

While review processes vary somewhat among HMA programs, FEMA reviews all applications for:

- ◆ Application eligibility;
- ◆ Cost-effectiveness;
- ◆ Feasibility and effectiveness; and
- ◆ EHP compliance.

A.1 Application Review

FEMA will review all applications and subapplications for eligibility and completeness. Applications and subapplications that do not satisfy the eligibility and completeness requirements will not be funded. The eligibility and completeness requirements are outlined in [Parts IV](#) and [V](#).

A.2 Cost-effectiveness Review

FEMA will review the documentation provided in support of the subapplication cost-effectiveness to validate the accuracy and credibility of data and ensure the appropriate use of the cost-effectiveness methodologies. Only subapplications meeting HMA cost-effectiveness requirements will be considered eligible.

A.3 Feasibility and Effectiveness Review

FEMA will use the information provided in the subapplication, including the SOW and project cost estimate sections, as well as any supporting documentation to determine the feasibility and effectiveness of the mitigation activity.

For project subapplications, FEMA will consider the following criteria in reviewing feasibility and effectiveness:

- ◆ Conformance to accepted engineering practices, established codes, standards, modeling techniques, or best practices, as well as work schedule;

-
- ◆ Effectiveness in mitigating the risks of the hazard(s); and
 - ◆ Reasonableness of the cost estimate.

A.4 Environmental Planning and Historic Preservation Review

Applicants and subapplicants are required to provide information to support the FEMA EHP compliance review. FEMA, in consultation with appropriate Federal and State resource agencies, will use the information provided in the application/subapplication, including the SOW, project cost estimate, as well as any supporting documentation, to ensure compliance with EHP requirements.

As part of the EHP review process, FEMA will assess compliance with applicable requirements including NEPA, NHPA, ESA, CBRA, EO 11988 (*Floodplain Management*), EO 11990 (*Protection of Wetlands*), and EO 12898 (*Environmental Justice*). Funds will not be awarded, and the Applicant/subapplicant may not initiate the project, other than planning or preparatory work not involving construction or alteration of the land, until FEMA has completed this review and it is demonstrated that the project, when completed, will comply with all environmental laws and regulations.

A.5 HMA Efficiencies

FEMA accepts the engineering design for a project if a registered Professional Engineer (or other design professional) certifies that the design meets the appropriate code, or industry design and construction standards. FEMA will accept the certified engineering design in lieu of the FEMA comprehensive technical feasibility review. For example, if a registered Professional Engineer certifies that design of a community safe room project meets or exceeds FEMA P-361 standards for design and construction, FEMA will not perform a detailed design review to ensure compliance with the standard.

Additionally, in the development of applications and subapplications, the following resources and approaches should be considered as they will promote efficiencies in FEMA review and approval.

A.5.1 Safe Room Projects

Applicants must document that the proposed safe room project is consistent with the requirements of FEMA P-320 or FEMA P-361. Applicants must use the expedited HMGP application for

HMA EFFICIENCIES

FEMA provides opportunities to streamline application requirements by allowing Applicants to use:

- FEMA technical publications
- National standards and codes
- Design criteria such as ASCE criteria
- Pre-calculated benefits

PRE-CALCULATED BENEFITS FOR SAFE ROOMS UNDER HMGP

If the Applicant submits a residential safe room project with costs that are less than the pre-calculated benefit, then FEMA will consider the project to be cost effective.

Residential Safe Rooms to apply pre-calculated benefits under HMGP (see [Part X, Appendix F](#)). This pre-calculated benefit provides standardized benefits associated with residential safe rooms so that individual BCAs are not required as long as the project costs do not exceed the benefits.

A.5.2 Wind Retrofit Projects

FEMA P-804 provides design guidance for wind-retrofit projects on existing one- and two-family dwellings in coastal areas. Mitigation projects funded under HMGP and the PDM Program are required to be implemented in conformance with FEMA-804. If a subapplication complies with FEMA P-804, no additional technical information is required in the subapplication.

A.5.3 Certain Flood Mitigation Projects

FEMA recommends HMA flood mitigation projects be designed and constructed in conformance with the design criteria of ASCE/SEI 24-05 as a minimum standard. FEMA will consider a project application utilizing ASCE/SEI 24-05 as being consistent with HMA engineering feasibility and effectiveness requirements. Project applications that do not use ASCE/SEI 24-05 must submit documentation to demonstrate the project meets the engineering feasibility and effectiveness requirement.

B. Review and Selection Process

B.1 Technical Review

FEMA will conduct a technical review for all project subapplications that are forwarded from the initial FEMA review, for the following:

- ◆ Cost-effectiveness;
- ◆ Feasibility and effectiveness; and
- ◆ EHP compliance.

B.2 Requests for Information

FEMA may request additional information or documentation from Applicants to resolve outstanding administrative or procedural requirements. RFIs can take various forms, including email requests, documented telephone calls, or formal letters. Failure to provide requested information by the deadline identified in the request may result in denial, because eligibility cannot be determined. Technical assistance is available, if requested.

Comments may be provided by FEMA on subapplications determined ineligible so that subapplicants can modify their subapplication for resubmission in future grant cycles.

B.2.1 Request for Information Timelines

[Table 5](#) provides timelines for stepwise information requests and assistance offers. [Figure 4](#) outlines the RFI process and assigned responsible party. The RFI process involves an eligibility review to determine if the subapplication and subapplicant are eligible, then a completeness review is conducted to determine if a complete subapplication was submitted. If the subapplication is determined to be incomplete, there are three steps FEMA will take to request further information from the subapplicant. At each step throughout the RFI process, FEMA will work with the Applicant and subapplicant to determine available options to develop a viable project. Some options include technical assistance from FEMA or implementing a phased project. If the requested information is not received by the Regional Administrator before the deadline, the project will be denied as FEMA will have no basis to make an eligibility determination. Upon receipt of the requested information and confirmation it adequately addresses the RFI, FEMA will proceed with making a determination of project eligibility.

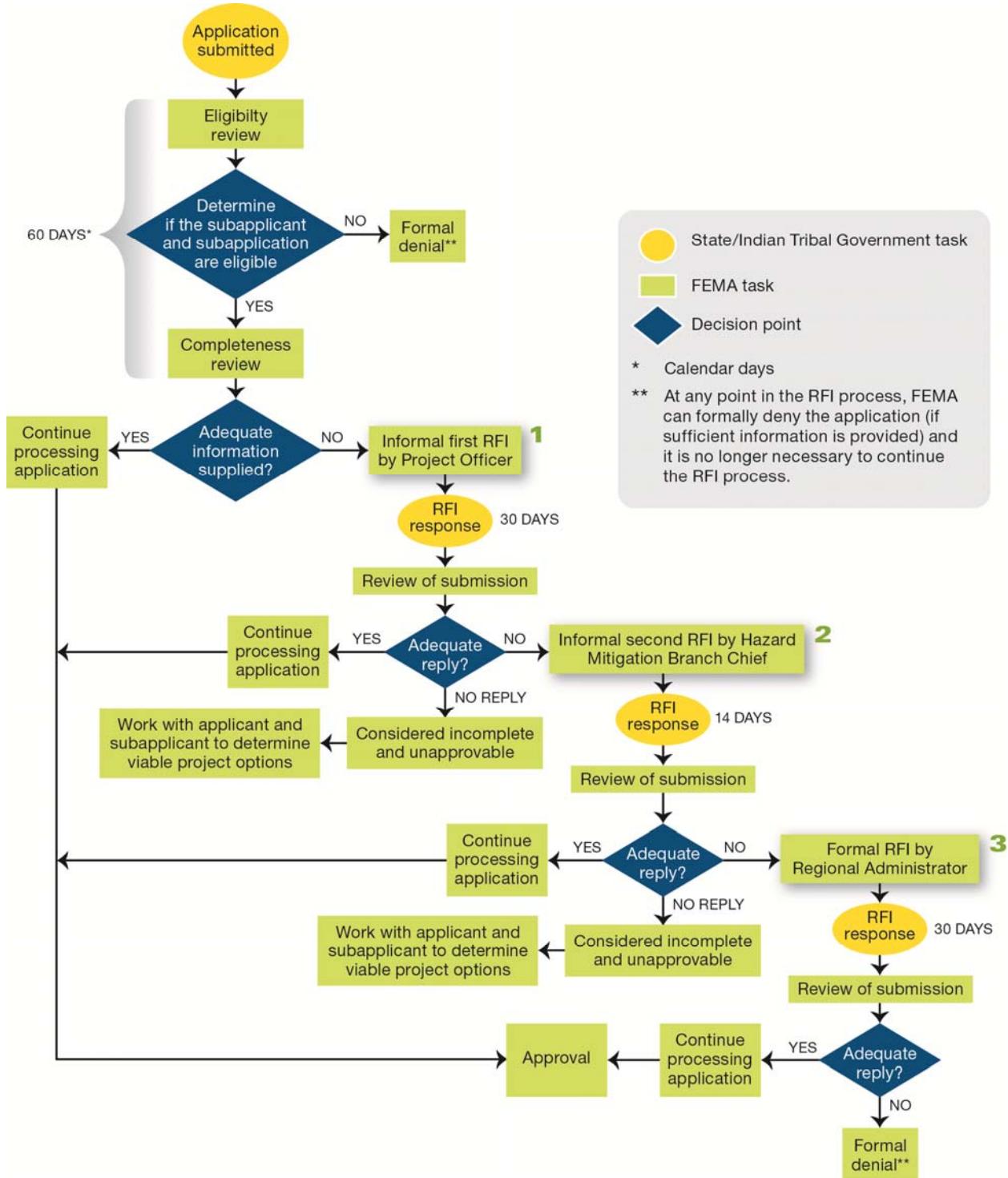
REQUEST FOR INFORMATION

If a subapplication does not meet the administrative or procedural information requirements, FEMA may request additional information in the form of an RFI. If the Regional Administrator does not receive the requested information by the final deadline, the project will be denied.

Table 5: RFI Timelines

Request Format	Timeline
Informal – First Request	The Project Officer requests additional information. If the requested information is not received within 30 calendar days from the date of the request, FEMA will consider the application to be incomplete and not approvable. FEMA may provide technical assistance if requested, unless the HMA program is competitive. The Applicant may consider phasing the project if it is feasible to do so.
Informal – Second Request	The Hazard Mitigation Branch Chief requests additional information. If the requested information is not received within 14 calendar days from the date of the request, FEMA will consider the application to be incomplete and not approvable. FEMA may provide technical assistance if requested, unless the HMA program is competitive. FEMA, Grantee, and Applicant staff should meet to resolve any open items within the allotted timeframe, if necessary.
Formal	The Regional Administrator requests additional information and will document previous requests. If the requested information is not received within 30 calendar days from the date of the request, FEMA will consider the application to be incomplete and not approvable.
Formal	If the Regional Administrator does not receive the requested information within 30 calendar days, he or she will determine the requested project application be ineligible for funding under HMGP. The second formal letter is a denial.

Figure 4: RFI Flowchart



The Regional Administrator may choose to allow more time, with justification. FEMA encourages Applicants to coordinate early with the State or eligible Indian Tribal government to identify potential technical assistance. If technical data is not readily available, the subapplicant should coordinate with Grantee to determine whether the project should be phased in order to develop required data. States or Indian Tribal governments with Grantee status could contact the FEMA regional office to request technical assistance, relevant training or other needed support.

B.3 Selection

FEMA selects eligible subapplications based on priorities set by the Applicant or program priorities, if applicable. For more information for the PDM Program, see [Part IX, B.5](#), for FMA, see [Part IX, C.4](#).

B.4 Notification

For the **PDM Program** and **FMA**, during the review and selection process FEMA will notify Applicants as to whether subapplications have been identified for further review, determined eligible but will not be funded, or determined ineligible for funding. A determination of “identified for further review” is not notification or guarantee of an award.

FEMA will work with Applicants on subapplications identified for further review. Applicants will be notified of activities required, such as an EHP review; verification of subapplicant commitments; verification of hazard mitigation plan status; and of the date by which all required activities must be completed.

Comments may be provided by FEMA on subapplications determined ineligible so that subapplicants can modify their subapplication for resubmission in future grant cycles.

The PDM Program and FMA have specific ranking criteria in addition to those described in this part. For information about ranking criteria and on the review and selection process for the PDM Program, see [Part IX, B.4](#); and FMA, see [Part IX, C.4](#).

B.5 Reconsideration Process

For the FMA and PDM programs, FEMA will reconsider its determination of a subapplication evaluated on a competitive basis only when there is an indication of a substantive technical or procedural error by FEMA. Only information provided in the submitted subapplication is considered supporting documentation for the request for reconsideration. The amount of funding available for Applicant management costs will not be reconsidered.

FEMA may evaluate subapplications on a competitive basis when:

- ◆ Submitted subapplications exceed available funds;
- ◆ Law or regulation requires the administration of a competitive program; or

-
- ◆ Circumstances merit the administration of funds in a competitive manner.

Applicants must send requests for reconsideration based upon technical or procedural error to FEMA within the time specified in the notification letter to the Applicant. A FEMA decision to uphold or overturn a decision regarding a subapplication evaluated on a competitive basis is final.

B.5.1 Consideration of Additional Information

FEMA may, at its discretion, notify Applicants that it will consider additional information in support of a subapplication.

FEMA will accept supplemental or corrected data in support of a subapplication when:

- ◆ Submitted subapplications do not exhaust available program funds;
- ◆ Law or regulation do not require the administration of a competitive program; or
- ◆ When determined appropriate by the program office.

Instructions for submitting supplemental data will be provided within the FEMA notification letter, if applicable.

For information on appeal and administration of HMGP subapplications, see [Part IX, A.11](#).

PART VII. AWARD ADMINISTRATION INFORMATION

Part VII describes how successful Applicants will receive award information. Additionally, this part describes administrative requirements from the time an award is made through closeout and the maintenance actions that must occur after an activity is complete.

A. Notice of Award

FEMA will provide an award package to the Applicant for successful subapplications. Subapplicants will receive notice of award from the Applicant.

Award packages for the **PDM Program** and **FMA** include an award letter, FEMA Form 76-10A, *Obligating Document for Awards/Amendments*, and Articles of Agreement, EHP, and/or other conditions that must be signed by the Applicant in eGrants and returned to FEMA for approval before funds can be obligated.

For **HMGP**, award packages for subgrants include an approval letter, an obligation document, and EHP and/or other conditions.

When the Applicant or subapplicant accepts an award, they are denoted as Grantee and subgrantee, respectively. The Grantee and subgrantee agree to abide by the grant award terms and conditions as set forth in the Articles of Agreement or the FEMA-State Agreement.

B. Administrative and National Policy Requirements

B.1 Cost-Share Documentation

Requirements for cash and third-party in-kind contributions can be found in 44 CFR Section 13.24. Third-party in-kind and cash contributions are only allowable for eligible program costs. The following documentation is required for cash and third-party in-kind contributions:

- ◆ Record of donor;
- ◆ Dates of donation;
- ◆ Rates for staffing, equipment or usage, supplies, etc.;
- ◆ Amounts of donation or value of donation; and
- ◆ Deposit slips for cash contributions.

Such documentation must be kept on file by the Grantee and subgrantee.

B.2 Scope of Work Changes

In accordance with 44 CFR Section 13.30, Grantees must obtain FEMA's prior approval whenever there is a proposed SOW change. Requests for changes to the SOW after award are permissible as long as they are consistent with the intent of the program. Requests must be made in writing and demonstrate the need for the scope change. The request also should include a revised scope, schedule, and budget. Any SOW changes are subject to all programmatic requirements. All approvals will be at FEMA's discretion.

SCOPE CHANGE

Grantees and subgrantees must request FEMA's approval for a change in scope after the grant has been awarded. The change must be consistent with the intent of the program. Requests must be made in writing and demonstrate the need for a change.

B.3 Budget Changes

Grantees and subgrantees are permitted to rebudget within the approved direct cost budget to meet unanticipated requirements and may make limited program changes to the approved budget. For more information on direct cost categories, please see OMB Circular A-87 and 2 CFR Part 225, *Cost Principles for State, Local, and Indian Tribal Governments*. Unless expressly waived by FEMA, the following types of post-award changes to budgets will require the prior written approval of FEMA:

BUDGET CHANGE

In limited cases, Grantees and subgrantees are permitted to make adjustments within the approved direct cost category to meet unanticipated requirements.

B.3.1 Non-construction Projects

- ◆ Non-construction subgrant adjustments of more than 10 percent in any direct cost categories; and
- ◆ Any changes that would result in additional funding to the grant.

B.3.2 Construction Projects

- ◆ All construction cost adjustments that lead to the need for additional funds.

When budget changes are made, all programmatic requirements continue to apply. Additional information regarding budget adjustments and revisions can be found in 44 CFR Section 13.30.

B.3.3 Cost Overruns and Underruns

A cost overrun or underrun can result from a scope, schedule, or budget change.

Grantees must notify FEMA prior to redirecting funds from an underrun to other approved subgrants for which an overrun has been requested. The subgrant must continue to meet programmatic eligibility requirements including cost share.

B.4 Program Period of Performance

The POP is the period during which the Grantee is expected to complete all grant activities and to incur costs. The POP for the Program begins with the opening of the application period and ends no later than 36 months from the close of the application period.

FEMA will not establish activity completion timelines for individual subgrants. Grantees are responsible for ensuring that all approved activities are completed by the end of the grant POP.

PERIOD OF PERFORMANCE

With the publication of this HMA Unified Guidance, the POP for the Program begins with opening of the application period and ends no later than 36 months from the close of the application period.

B.4.1 Extensions

Requests for extensions to a grant POP will be evaluated by FEMA but will not be approved automatically. The Regional Administrator can extend the POP for up to 12 months with justification. All requests to extend the grant POP beyond 12 months from the original grant POP end date must be approved by FEMA Headquarters.

All extension requests must be submitted to FEMA at least 60 days prior to the expiration of the grant POP and justifications must be submitted in writing. The justification must include:

- ◆ Verification that progress has been made as described in quarterly reports;
- ◆ Reason(s) for delay;
- ◆ Current status of the activity/activities;
- ◆ Current POP termination date and new projected completion date;
- ◆ Remaining available funds, both Federal and non-Federal;
- ◆ Budget outlining how remaining Federal and non-Federal funds will be expended; and
- ◆ Plan for completion, including updated schedule.

B.5 Requests for Advances and Reimbursements

The Grantee's responsibility of an HMA grant is to process requests for advances and reimbursements of funds. The Grantee should establish accounting procedures to disburse money to subgrantees in a timely manner and should provide to subgrantees a POC for information on requesting and receiving the funds, records that must be maintained, forms to be used, and timelines for requesting the funds.

For the **PDM Program** and **FMA**, Payment and Reporting System (PARS) is used to transfer funds between FEMA and Grantees. Grantees shall submit to FEMA a copy of the Standard Form (SF-425).

For **HMGP**, the Department of Health and Human Services, Division of Payment Management, Payment Management System, SMARTLINK, is used to transfer funds between FEMA and Grantees. Grantees shall submit to FEMA a copy of the SF-425.

B.5.1 Strategic Funds Management

In accordance with the needs of the Disaster Relief Fund as well as Grantee priorities and ability to execute the project in a timely manner, FEMA may elect to provide funding for certain projects in incremental amounts, including advance payments (Strategic Funds Management or SFM). SFM allows FEMA to schedule obligations to be available when the State is ready to execute an HMGP subgrant or components of the subgrant. SFM also allows for incremental obligations as needed within the 3-year POP requirements to support project activities as described in the project work schedule.

SFM does not allow funds to be advanced for an HMGP project that is not approved and eligible.

DIFFERENCE BETWEEN STRATEGIC FUNDS MANAGEMENT, PHASED PROJECTS, PRE-AWARD COSTS, AND ADVANCE ASSISTANCE

SFM is designed to provide incremental funding for eligible activities when the funds are required.

Phased projects are those that receive funding for only certain complex activities that are approved to allow the Applicant to develop a full work scope/data package to support the full project description.

Pre-award costs are eligible costs incurred by the Applicant in advance of receiving funds. These activities are reimbursed when the project is approved and funded.

Advance Assistance provides States and Indian Tribal governments with resources to develop mitigation strategies and obtain data to prioritize, select, and develop complete HMGP applications in a timely manner.

B.6 Program Income

FEMA encourages Grantees and subgrantees to generate program income to help defray program costs. Program income is gross income received by the Grantee or subgrantee directly generated by a grant-supported activity or earned only as a result of the grant during the grant POP. Program income may be derived from use or rental of real or personal property acquired with grant funds, and sale of commodities or items fabricated under the grant award. Subgrantees deduct this income from total project costs as specified in 44 CFR Section 13.25(g)(1). This income may not count towards the non-Federal cost share.

B.7 Federal Income Tax on Mitigation Project Funds

FEMA mitigation payments that benefit property owners through the mitigation of their structures are not subject to Federal income taxation. FEMA mitigation payments to acquire a property will be treated as an involuntary conversion for tax purposes. These tax relief measures

are effective for such payments made in all prior years. For more information, property owners should consult the Internal Revenue Service (IRS) office or a tax advisor.

B.8 Noncompliance

If a Grantee or subgrantee materially fails to comply with any term of an award, whether stated in a Federal statute or regulation, an assurance, a State Administrative Plan or application, a notice of award, or elsewhere, including in this guidance, FEMA may take one or more of the following actions, as appropriate:

- ◆ Temporarily withhold cash payments pending correction of the deficiency by the Grantee or subgrantee;
- ◆ Disallow (that is, deny both use of funds and matching credit for) all or part of the cost of the activity or action not in compliance;
- ◆ Wholly or partly suspend or terminate the current award for the Grantee's or subgrantee's HMA grant program(s);
- ◆ Withhold further awards for HMA grant program(s); or
- ◆ Take other remedies that may be legally available.

Additional details can be found in 44 CFR Section 13.43.

C. Reporting Requirements

Grantees and subgrantees must maintain records of work and expenditures. Grantees submit quarterly financial and performance reports to FEMA on January 30, April 30, July 30, and October 30. The first quarterly reports are due within 30 days of the end of the first Federal quarter following the initial grant award. FEMA may waive the initial reports. The Grantee shall submit quarterly financial status and performance reports thereafter until the grant ends. Failure to submit financial and performance reports to FEMA in a timely manner may result in an inability to access grant funds until proper reports are received by FEMA. Grantees are encouraged to contact FEMA should this occur.

The **PDM Program** and **FMA** quarterly reports can be submitted via *eGrants*. For **HMGP**, quarterly performance reports can be submitted via NEMIS or a hard copy to the Region. PDM Program and FMA quarterly financial reports must be submitted via PARS.

C.1 Federal Financial Reports

Grantees shall submit a quarterly Federal Financial Report (FFR). Obligations and expenditures must be reported on a quarterly basis through the FFR (SF-425), which is due to FEMA within 30 days of the end of each calendar quarter (e.g., for the quarter ending March 31, the FFR is due no later than April 30). A report must be submitted for every quarter of the POP, including

partial calendar quarters, as well as for periods where no grant activity occurs. Future awards and fund drawdowns may be withheld if these reports are delinquent. The final FFR is due 90 days after the end date of the POP.

OMB has directed that the FFR (SF-425) replace the use of the SF-269, SF-269A, SF-272, and SF-272A. The SF-425 consolidates the Federal Status Report and the Federal Cash Transaction Report into a single report. The SF-425 is intended to provide Federal agencies and grant recipients with a standard format and consistent reporting requirements.

Reporting periods and due dates:

- ◆ October 1 – December 31; Due January 30
- ◆ January 1 – March 31; Due April 30
- ◆ April 1 – June 30; Due July 30
- ◆ July 1 – September 30; Due October 30

FEMA may suspend drawdowns from SMARTLINK or PARS if quarterly financial reports are not submitted on time.

C.2 Performance Reports

The Grantee shall submit a quarterly performance report for each grant award. Performance reports should include:

- ◆ Reporting period, date of report, and Grantee POC name and contact information;
- ◆ Project identification information, including FEMA project number (including disaster number and declaration date for the HMG), subgrantee, and project type using standard eGrants/NEMIS project type codes;
- ◆ Significant activities and developments that have occurred or have shown progress during the quarter, including a comparison of actual accomplishments to the work schedule objectives established in the subgrant;
- ◆ Percent completion and whether completion of work is on schedule; a discussion of any problems, delays, or adverse conditions that will impair the ability to meet the timelines stated in the subgrant; and anticipated completion date;
- ◆ Status of costs, including whether the costs are: (1) unchanged, (2) overrun, or (3) underrun. If there is a change in cost status, the report should include a narrative describing the change. Also, include amount dispersed to subgrantee by activity;
- ◆ A statement of whether a request to extend the grant POP is anticipated;
- ◆ Incremental funding amounts (SFM) and progress completed;

-
- ◆ For acquisition projects, the Grantee must notify FEMA on the current status of each property for which settlement was completed in that quarter; and
 - ◆ FEMA may require additional information as needed to assess the progress of a grant.

FEMA may suspend drawdowns from SMARTLINK or PARS if quarterly performance reports are not submitted on time.

C.3 Final Reports

The Grantee shall submit a Final SF-425 and Performance Report no later than 90 days after the end date of the POP, per 44 CFR Section 13.50.

D. Closeout

D.1 Subgrant Closeout

Upon subgrant completion, the Grantee must ensure that:

- ◆ Each subgrant has been completed in compliance with the approved SOW. The Grantee must conduct a site visit or collect photographs for a project subgrant to ensure the approved SOW was completed;
- ◆ Each subgrant has been completed in compliance with all environmental mitigation conditions attached to it;
- ◆ Actual expenditures have been documented and are consistent with the SF-424A or SF-424C;
- ◆ All program income has been deducted from total project costs as specified in 44 CFR Section 13.25(g)(1);
- ◆ All project work was performed in accordance with all required permits and applicable building codes as modified or protected by the approved project;
- ◆ For projects involving an insurable facility, the required hazard insurance (e.g., NFIP) has been secured;
- ◆ Geospatial coordinates, in the form of latitude and longitude with an accuracy of +/- 20 meters (64 feet), have been provided for the project. For minor localized flood reduction, hazardous fuels reduction, and soil stabilization projects, an accurate recording of the official acreage, using open file formats geospatial files (i.e., shapefiles), has been submitted;
- ◆ For new or updated hazard mitigation plans, a final copy of the FEMA-approved and community-adopted plan has been submitted; and
- ◆ For planning related activities, the activity is consistent with 44 CFR Parts 201 or 206 (HMGP).

For project-specific requirements, see the Appendices and the Addendum to this HMA Unified Guidance. Grantees should close out subgrants as activities are completed. In addition, as cost underruns are identified, the Grantee should submit de-obligation requests to FEMA.

The subgrantee is required to keep records for at least 3 years from the date when the Grantee submits to FEMA the single or final expenditure report for the subgrantee in accordance with 42 U.S.C. 705 and 44 CFR Section 13.42.

For additional information about closeout for property acquisition and structure demolition or relocation projects, see Addendum, Parts A.13 and A.15. For additional information about closeout for mitigation reconstruction projects, see Addendum, Part D.9.

D.2 Grant Closeout

The Grantee has up to 90 days following the expiration of the grant POP to liquidate valid expenditures incurred during the POP. Cost underruns remaining after the post-POP liquidation period date must be reported to FEMA for de-obligation. The closeout process for the Grantee involves the following steps:

- ◆ The Grantee ensures all subgrants have been closed out as identified in [Part VII, D.1](#);
- ◆ The Grantee reconciles/adjusts subgrant costs, ensures that non-Federal share costs are documented, and ensures that all costs submitted are eligible according to the FEMA-approved SOW;
- ◆ The Grantee receives and processes cost adjustments or returns unobligated funds to FEMA via SMARTLINK or PARS. Final payment is made to the Grantee;
- ◆ The Grantee submits a closeout letter to FEMA with supporting documentation, including:
 - Statement that SOW(s) has been completed as approved and all EHP requirements have been satisfied;
 - SF-425 (for PARS, the final SF-425 is also submitted via PARS);
 - SF-270, *Request for Advance or Reimbursement*, if applicable, or request for de-obligation of unused funds, if applicable;
 - FEMA Form 20-18, *Report on Government Property*, if applicable; and
- ◆ The Grantee notifies FEMA that the grant is ready for final closeout.

The Grantee must maintain the complete grant closeout records file for at least 3 years from the submission date of its single or last expenditure report in accordance with 44 CFR Section 13.42.

For **HMGP**, FEMA can track closeouts using the Project Closeout module in NEMIS.

D.2.1 Update of Repetitive Loss Database

Grantees with projects that mitigate a repetitive loss property, as identified by the NFIP, must update the NFIP Repetitive Loss Database as project activities are completed.

- ◆ For acquisition and demolition or relocation projects, Grantees must provide this update when there is no longer an insurable structure on the property; and
- ◆ For elevation, reconstruction, floodproofing, and minor flood control projects, Grantees must provide this update when the approved activity is complete or otherwise effective.

The NFIP defines a repetitive loss property as any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period since 1978. At least two of the claims must be more than 10 days apart but within 10 years of each other. A repetitive loss property may or may not be currently insured by the NFIP.

Please note this definition of repetitive loss property is different from the FMA definition of repetitive loss property located in [Part IX, C.1](#).

To gain access to sensitive NFIP data, government officials are required to obtain a User Name and Password for access to Data Exchange, the Repetitive Loss Database that is managed by the NFIP Legacy Systems Contractor. Currently, only two access accounts are permitted per State and are reserved for the State Hazard Mitigation Officer (SHMO) and the State NFIP Coordinator or their designee. To obtain a User Name and Password for access to Data Exchange, send an email with your name, title, contact information, and the reason that access to Data Exchange is needed to FEMA. Once FEMA authorizes you for NFIP Legacy Systems access to Data Exchange, you will be notified via email.

To maintain accurate, up-to-date records for all repetitive loss properties mitigated as a result of HMA grant funds, FEMA requires that the Grantee submit FEMA Form AW-501, *NFIP Repetitive Loss Update Worksheet* (OMB 1660-0022). Form AW-501 must be submitted along with documentation supporting the change in the mitigated status of a structure (e.g., elevation certificate). This form must be submitted for each property mitigated with HMA grant funds prior to closeout. The AW-501 form and instructions for completing and submitting it can be found on the FEMA Web site: <http://www.fema.gov/library/viewRecord.do?id=3244>. Detailed AW-501 forms for individual repetitive loss properties can be obtained by accessing Data Exchange and selecting the link to AW-501 data after selecting to look up property by property locator or repetitive loss number.

States accessing NFIP data via the electronic systems (Data Exchange) are advised of, and must acknowledge, the sensitive nature of the information and the need to prevent the release of the data to unauthorized users. When the data is released to a local government by either the State or the appropriate FEMA Regional Office, the local government must be notified in writing that the records relating to individuals and individual properties are:

being made available through the FEMA routine use policy for the specific purposes of mitigation planning, research, analysis, and feasibility studies consistent with the NFIP and for uses that further the floodplain management and hazard mitigation goals of the States and FEMA.

PART VIII. FEMA CONTACTS

Part VIII identifies resources that may help Applicants and subapplicants request HMA funds.

If requested, FEMA will provide technical assistance to both Applicants and subapplicants regarding:

- ◆ General questions about the HMA programs;
- ◆ Specific questions about subapplications after the application period opens;
- ◆ Feasibility and effectiveness, cost-effectiveness, and EHP compliance during the application period; and
- ◆ The *eGrants* application processes.

For additional technical assistance resources, including HMA application and award resources, see [Part X, C.7](#).

FEMA encourages Applicants and subapplicants to seek technical assistance early in the application period by contacting their appropriate FEMA Regional Office. [Table 6](#) shows which States are served by each FEMA Region.

Contact information for FEMA Regional Offices is provided at <http://www.fema.gov/regional-operations>.

Contact information for each SHMO is provided at <http://www.fema.gov/state-hazard-mitigation-officers>.

Table 6: FEMA Regions

FEMA Region	Serving
I	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
II	New Jersey, New York, Puerto Rico, U.S. Virgin Islands
III	Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia
IV	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee
V	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin
VI	Arkansas, Louisiana, New Mexico, Oklahoma, Texas
VII	Iowa, Kansas, Missouri, Nebraska
VIII	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming
IX	Arizona, California, Hawaii, Nevada, American Samoa, Guam, the Northern Mariana Islands
X	Alaska, Idaho, Oregon, Washington

PART IX. ADDITIONAL PROGRAM GUIDANCE

Part IX provides additional information applicable to assistance available under each particular HMA grant program. This section supplements the information provided in Parts I through VIII, and the unique project type guidance included in the Addendum. Part IX does not provide all of the information necessary to apply for funding through an HMA program and must be read in conjunction with other relevant sections of this guidance.

A. Hazard Mitigation Grant Program

Most of the information that an Applicant or subapplicant needs to apply for an HMGP award or that a Grantee or subgrantee needs to manage a HMGP award is provided in Parts I through VIII, and Part X. This section contains supplemental guidance specific to HMGP.

A.1 Grantee Request for HMGP Funds

HMGP is authorized through a Presidential major disaster declaration for activities that provide a beneficial impact to the disaster area. A Governor may request that HMGP funding be available throughout the State or only in specific jurisdictions. For information regarding the declaration process and authorization of HMGP, see 44 CFR Part 206, Subpart B, and seek assistance from the appropriate FEMA Regional Office.

The Governor's Authorized Representative (GAR) serves as the grant administrator for all funds provided under HMGP 44 CFR Section 206.438 (d). The GAR responsibilities include providing technical advice and assistance to eligible subapplicants and/or subgrantees and ensuring that all potential subapplicants are aware of available assistance for the submission of all documents necessary for grant award.

A.2 State Administrative Plan

The State Administrative Plan is a procedural guide that details how the Grantee will administer HMGP. Grantees must have a current Administrative Plan approved by FEMA before receiving HMGP funds. The State Administrative Plan may become an annex or chapter of the State's overall emergency response and operations plan or comprehensive mitigation program strategy. At a minimum, the State Administrative Plan must:

- ◆ Designate the State agency that will act as Grantee;
- ◆ Identify the SHMO;
- ◆ Identify staffing requirements and resources, including a procedure for expanding staff temporarily following a disaster, if necessary;

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- ◆ Establish procedures to guide implementation activities, including Grantee management costs and distribution of subgrantee management costs; and
 - ◆ Comply with 44 CFR Section 206.437.

A.2.1 Designation of Grantee and SHMO

Typically, the agency designated to act as Grantee manages the State responsibilities for Federal and State disaster assistance and is responsible for meeting the mitigation planning requirement. Although a single agency may administer the funding, the Governor may establish an interagency mitigation team to manage the State mitigation program.

The SHMO is typically responsible for managing the State's mitigation program, coordinating the mitigation team, and developing as well as implementing the hazard mitigation plan. States often rely on staff from the emergency management agency or other State agencies to augment the staff of the SHMO following a disaster.

A.2.2 Staffing Requirements and the Mitigation Team

The State Administrative Plan should identify the positions and minimum number of personnel needed to implement HMGP. Key positions may include clerical, administrative, and financial management staff; program specialists to support mitigation planning and the implementation of mitigation activities and to conduct BCAs; and environmental planners. However, the organizational structure of the staff should remain flexible as it may be augmented as needed with emergency management agency staff, staff from other State agencies, or temporary staff or contractors hired to administer HMGP effectively. The State Administrative Plan should include a procedure for expanding staff resources and using HMGP management costs.

The mitigation team may include representatives of agencies involved with emergency management, natural resources, floodplain management, environmental issues and historic and archeological preservation, soil conservation, transportation, planning and zoning, housing and economic development, building regulations, infrastructure regulations or construction, public information, insurance, regional and local government, academia, business, and non-profit organizations. With the varied backgrounds and specialized expertise of members, the team creates interagency, interdisciplinary insight regarding risks and potential solutions. The interagency aspect of the team can diffuse political pressure on the Grantee agency and increase the availability of resources. The mitigation team may support the Grantee agency by:

- ◆ Developing a comprehensive mitigation strategy;
- ◆ Supporting development and implementation of the State Mitigation Plan;
- ◆ Communicating with local governments regarding State mitigation priorities;
- ◆ Building public and business/industry support for mitigation initiatives;

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- ◆ Reviewing, assigning priority, and recommending mitigation actions for implementation; and
 - ◆ Seeking funding for implementation of mitigation measures.

A.2.3 Procedures to Guide Implementation Activities

The State Administrative Plan must establish procedures to:

- ◆ Identify and notify potential subapplicants of the availability of HMGP funding;
- ◆ Provide potential subapplicants information on the application process, program eligibility, and deadlines;
- ◆ Determine subapplicant eligibility;
- ◆ Provide information for environmental and floodplain management reviews in conformance with 44 CFR Parts 9 and 10;
- ◆ Process requests for advances of funds and reimbursements;
- ◆ Monitor and evaluate the progress and completion of funded mitigation activities;
- ◆ Review and approve cost overruns;
- ◆ Process appeals;
- ◆ Provide technical assistance as required to subgrantees;
- ◆ Comply with the administrative requirements of 44 CFR Parts 13 and 206;
- ◆ Comply with audit requirements of 44 CFR Section 13.26 and OMB Circular A-133; and
- ◆ Provide quarterly progress reports to FEMA on funded mitigation activities.

A.2.4 Sliding Scale

The maximum amount of HMGP funding available is calculated using a “sliding scale” formula based on a percentage of the estimated total Federal assistance under the Stafford Act, excluding administrative costs for each Presidential major disaster declaration. Applicants with a FEMA-approved State or Tribal Standard Mitigation Plan may receive:

- ◆ Up to 15 percent of the first \$2 billion of the estimated aggregate amount of disaster assistance;
- ◆ Up to 10 percent for the next portion of the estimated aggregate amount more than \$2 billion and up to \$10 billion; and
- ◆ Up to 7.5 percent for the next portion of the estimated aggregate amount more than \$10 billion and up to \$35.333 billion.

Applicants with a FEMA-approved State or Indian Tribal Enhanced Mitigation Plan are eligible for HMGP funding not to exceed 20 percent of the estimated total Federal assistance under the Stafford Act, up to \$35.333 billion of such assistance, excluding administrative costs authorized for the disaster.

A.2.5 Management Costs

The Grantee must amend its State Administrative Plan to include procedures for determining the reasonable amount or percentage of management costs that it will pass through to the subgrantee, as well as closeout and audit procedures before FEMA will obligate any management costs (see 44 CFR Sections 207.4(c) and 207.7(b)). The State will determine the amount, if any, of management costs it will pass through to the subgrantee. FEMA has not established any minimum for what constitutes a reasonable amount.

A.2.6 Submission and Approval Deadlines

A State may forward a new or updated State Administrative Plan to FEMA for approval at any time. A State should review and update their plan annually and must review and update it following a Presidential major disaster declaration if required to meet current policy guidance or changes to the administration of the program. If a review indicates that there will be no changes to the current State Administrative Plan, the Grantee should notify FEMA of this within 90 days of the disaster declaration.

A.3 HMGP Funding

FEMA will determine the funding it will make available for the HMGP by a lock-in, which will act as a ceiling for funds available to a Grantee, including its subgrantees. The level of HMGP funding available for a given disaster is based on a percentage of the estimated total Federal assistance under the Stafford Act, excluding administrative costs for each Presidential major disaster declaration, as described in 44 CFR Section 206.432(b) and [Part III, A](#) of this guidance.

An initial estimate will be provided within 35 days of the disaster declaration or soon thereafter, in conjunction with calculation of the preliminary lock-in amount(s) for management costs.

The 6-month estimate is no longer the floor or a guaranteed minimum funding for HMGP. The 12-month lock-in is the maximum amount available. Prior to 12 months, total obligations are

THE HMGP FINAL LOCK-IN

Because lock-in estimates are subject to change, FEMA will not obligate more than 75 percent of any estimate before the final lock-in is calculated.

Total State Management Cost (SMC)
(4.89% of Total Available HMGP):

Prior to 12 Months:

FEMA obligates up to 75 percent of total HMGP funding separate from SMC

At 12 Months:

FEMA establishes the full HMGP ceiling amount

At 18 Months:

For a catastrophic disaster, the final lock-in amount { Δ adjusted upon

limited to not more than **75 percent** of any current estimate, without the concurrence of the Regional Administrator or Federal Coordinating Officer (FCO) with Disaster Recovery Manager authority and the Office of the Chief Financial Officer (OCFO).

FEMA will establish the HMGP funding ceiling for each disaster at 12 months after the disaster declaration. This amount, also known as the “lock-in” value for HMGP, is the maximum that FEMA can obligate for eligible HMGP activities. The OCFO will continue to provide HMGP estimates prior to 12 months; however, these estimates will not represent a minimum or floor amount.

In rare circumstances, when a catastrophic disaster has resulted in major fluctuations of projected disaster costs, FEMA may, at the request of the Grantee, conduct an additional review 18 months after the disaster declaration. If the resulting review shows that the amount of funds available for HMGP is different than previously calculated, the final lock-in amount will be adjusted accordingly.

The Grantee must justify in writing to the Regional Administrator any requests to change the amount of the lock-in or perform subsequent reviews. The Regional Administrator will recommend to the Chief Financial Officer whether to approve the change. Changes to the lock-in will not be made without the approval of the Chief Financial Officer. The Chief Financial Officer may change the amount of the lock-in if it is determined that the projections used to determine the lock-in were inaccurate to such a degree that the change to the lock-in would be material, or for other reasons in his or her discretion that may reasonably warrant such changes. The Chief Financial Officer will not make such changes without consultation with the Grantee and the Regional Administrator.

A.4 HMGP Management Costs

The amounts, allowable uses, and procedures for HMGP management costs are established in 44 CFR Part 207. Examples of allowable management costs are listed in [Part IV, D.1.3](#). HMGP management costs will be provided at a rate of 4.89 percent of the HMGP ceiling. The Grantee, in its State Administrative Plan, will determine the amount, if any, of management costs it will pass through to the subgrantee (see [Part IX, A.2.5](#)). Management costs are provided outside of and separate from the HMGP ceiling amount. There is no additional cost-share requirement for HMGP management costs.

FEMA will establish the amount of funds that it will make available for management costs by a lock-in, which will act as a ceiling for management cost funds available to a Grantee, including its subgrantees. FEMA will determine, and provide to the Grantee, management cost lock-ins at 30 days (or soon thereafter), at 6 months, and at 12 months from the date of declaration, or upon the calculation of the final HMGP lock-in ceiling, whichever is later.

Upon receipt of the initial 30-day lock-in, Grantees may request that FEMA obligate 25 percent of the estimated lock-in amount(s) to the Grantee. No later than 120 days after the date of declaration, the Grantee must submit documentation to support costs and activities for which the projected lock-in for management cost funding will be used. In extraordinary circumstances, FEMA may approve a request by a Grantee to submit supporting documentation after 120 days.

FEMA will work with the Grantee to approve or reject the documentation submitted within 30 days of receipt. If the documentation is rejected, the Grantee will have 30 days to resubmit it for reconsideration and approval. FEMA will not obligate any additional management costs unless the Grantee's documentation is approved.

The documentation for management costs must include:

- ◆ A description of activities, personnel requirements, and other costs for which the Grantee will use the management cost funding provided under this part;
- ◆ The Grantee's plan for expending and monitoring the funds provided under this part and ensuring sufficient funds are budgeted for grant closeout; and
- ◆ An estimate of the percentage or amount of pass-through funds for management costs provided under this part that the Grantee will make available to subgrantees, and the basis, criteria, or formula for determining the subgrantee percentage or amount (e.g., number of projects, complexity of projects, etc.).

Upon receipt of the 6-month management costs lock-in, and if the Grantee can justify a bona fide need for additional management costs, the Grantee may submit a request to the Regional Administrator for an interim obligation. Any interim obligation must be approved by the Chief Financial Officer and will not exceed an amount equal to 10 percent of the 6-month lock-in amount, except in extraordinary circumstances.

The Grantee must justify in writing to the Regional Administrator any requests to change the amount of the lock-in or the cap, extend the time period before lock-in, or request an interim obligation of funding at the time of the 6-month lock-in adjustment. The Regional Administrator will recommend to the Chief Financial Officer whether to approve the extension, change, or interim obligation. Extensions, changes to the lock-in, or interim obligations will not be made without the approval of the Chief Financial Officer.

For additional information on HMGP management costs see 44 CFR Part 207.

A.5 Eligible Subapplicants

In addition to the eligible subapplicants described in [Part IV, A.1](#), PNP organizations may act as the subapplicant for HMGP. PNP organizations or institutions that own or operate a PNP facility are defined in 44 CFR Section 206.221(e). Each subapplication from a PNP must include either:

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- ◆ An effective ruling letter from the IRS granting tax exemption under Section 501(c), (d), or (e) of the Internal Revenue Code of 1954, as amended; or
 - ◆ State certification, under State law, of non-profit status.

A qualified conservation organization, as defined at 44 CFR Section 80.3(h), is the only PNP organization eligible to apply for property acquisition and demolition or relocation projects.

A.6 Submission of HMGP Subapplications

The Grantee must submit all HMGP subapplications to FEMA within 12 months of the date of the disaster declaration. Upon written request and justification from the Grantee, FEMA may extend the application submission timeline in 30- to 90-day increments not to exceed a total extension of 180 days, in the event of extraordinary conditions. For additional information see 44 CFR Section 206.436. Additional time may be available based on meeting the criteria of the Stafford Act, Section 301. To qualify, the requestor must justify how the event for which the additional time is needed created the situation in which the Grantee cannot meet the regulatory administrative deadline.

Extensions beyond regulatory time limits will be considered on a case-by-case basis. Stafford Act Section 301 provides relief for the rare circumstance when the magnitude of the event for which the extension is requested prevents the Grantee from meeting program administrative requirements. The Grantee must make the request to the Flood Insurance and Mitigation Administration Associate Administrator by submitting through the Regional Administrator, or if there is a Joint Field Office submit through the FCO. The Regional Administrator or FCO will provide his or her comments or concurrence and forward the request. The maximum time available is 90 days. The request must describe the conditions that preclude the Grantee from meeting the administrative requirements and must include a summary of current status, planned actions to meet the extension, and any resources that may be required. FEMA will consider the request and will provide a decision within 30 days.

A.7 Grant Cost-share Requirements

HMGP grants are required to have at least a 25 percent non-Federal cost share.

The Grantee may choose to meet the cost-share requirement by ensuring a minimum 25 percent non-Federal share for the overall HMGP grant award, rather than on an individual activity basis. Grantees choosing this option should develop a cost-share strategy as part of their Administrative Plan for review and approval by FEMA.

If an Applicant chooses to fund individual projects with non-Federal cost shares below 25 percent, the Applicant must notify FEMA. If an Applicant intends to implement this approach, the State Administrative Plan must explain how the Applicant will:

- ◆ Apply this approach in a fair and impartial manner to all subapplications;

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- ♦ Monitor the cost share for the overall grant throughout the POP; and
 - ♦ Address any cost-share shortfalls that may occur during the POP and at closeout.

If, at closeout, the non-Federal cost share of the grant is less than 25 percent of the total amount, FEMA will recoup the amount of Federal funds needed to bring the cost share into compliance.

A.8 Post-Disaster Code Enforcement Projects

HMGP will fund extraordinary post-disaster code enforcement costs. Extraordinary needs associated with enforcing local building codes during post-disaster reconstruction may include the performance of building department functions, such as building inspections, and the performance of Substantial Damage determinations under the NFIP.

A post-disaster code enforcement project may be funded through HMGP if:

- ♦ The Grantee assesses existing building code and/or zoning and land use management regulations and determines that they adequately address the identified natural hazard risks. The Grantee determines that the local community has adopted a building code consistent with a recent edition of the International Code Series, conforms to State-model or State-mandated building codes, and, if the local community participates in the NFIP, has local floodplain management measures in place that meet the minimum requirements for participation in the NFIP;
- ♦ The Grantee evaluates the building department and determines that its organization, funding, and enforcement and inspection processes are sufficient to ensure proper enforcement of all applicable laws and ordinances during normal operations; and
- ♦ The Grantee evaluates the building department and identifies deficiencies, and the local community agrees to address any deficiencies identified in this evaluation as a condition of receiving the subgrant. This agreement can be a simple statement attached to the evaluation and should include an implementation schedule that is mutually satisfactory to the Grantee, the subgrantee, and FEMA. The agreement should include an acknowledgment by the subgrantee that failure to meet the agreed upon implementation schedule can result in the loss of all current and/or future building department assistance used to support post-disaster operations.

The State's assessment can be accomplished through various mechanisms. Any assessment should include a discussion of the community's compliance with the NFIP. Suggested approaches include (but are not limited to):

- ♦ Employing a mutual-aid agreement among communities to use other local building officials;
- ♦ Entering into a contractual agreement with a State or regional government entity that is well versed in building codes and proper administration of a building department;

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- ◆ Entering into a contractual agreement with one of the model building code organizations;
 - ◆ Employing building code experts temporarily;
 - ◆ Deploying FEMA mitigation staff knowledgeable of building codes and proper building department administration. Former local building officials can often provide the requisite knowledge; or
 - ◆ Requesting the Hazard Mitigation Technical Assistance Program.

HMGP funds only extraordinary post-disaster code enforcement costs. Extraordinary post-disaster code enforcement costs are the costs to ensure disaster-resistant codes are implemented during disaster reconstruction after normal costs of the building department are deducted. Costs might include staffing, equipment purchases, office rental, transportation, supplies, and similar expenses. Extraordinary costs equal disaster costs minus normal costs and cost of fees or fee waivers.

- ◆ Disaster costs can be determined by the payroll and office expenses during the period of assistance. If the subapplicant must purchase new equipment, only the equivalent rental cost of this equipment for the period of assistance is considered a disaster cost. The revenues generated by fees for inspections or permits, whether collected or not, must be deducted;
- ◆ Normal costs can be determined from a monthly average of payroll and office expenses during the most recent 12-month period that does not include Federal, State, or local disaster declarations; and
- ◆ If a community has already received Federal assistance for meeting emergency building inspection needs (such as determining habitability), these costs must be deducted in determining extraordinary costs.

A.9 Advance Assistance

Advance Assistance is authorized by the SRIA, which allows advancing up to 25 percent of the HMGP ceiling or \$10 million to Applicants, whichever is less. The purpose of Advance Assistance is to provide States and Tribes resources to develop mitigation strategies and obtain data to prioritize, select, and develop complete HMGP applications in a timely manner. FEMA expects States and Tribes that receive Advance Assistance to submit complete project applications up to or over the HMGP ceiling by the application deadline.

ADVANCE ASSISTANCE

FEMA may provide up to 25 percent (with a limit of \$10 million) of the amount of estimated HMGP costs to States and Indian Tribal governments in advance of incurring eligible costs.

FEMA expects States that receive Advance Assistance to submit complete project applications up to or over the available HMGP ceiling by the final HMGP project application deadline.

FEMA will continue to implement Advance Assistance on a pilot basis for any State or Indian Tribal government having a declaration with an open application period. Advance Assistance is not automatic. States and Tribes may request Advance Assistance by submitting an HMGP application form to the Regional Mitigation Division Director. The application must identify the proposed use of the funds, including costs in sufficient detail for each proposed activity and milestones for submitting completed HMGP applications to FEMA. Advance Assistance is subject to the HMGP cost-share requirements and SFM (i.e., FEMA will not obligate funds until the State has an immediate need for the funds). Advance Assistance is part of the HMGP ceiling amount.

States may use Advance Assistance for the following activities:

- ◆ Obtain staff or resources to develop a cost-share strategy and identify potential match funding;
- ◆ Evaluate facilities or areas to determine appropriate mitigation actions;
- ◆ Incorporate environmental considerations early into program decisions;
- ◆ Collect data for BCAs, environmental compliance and other program requirements;
- ◆ Scope and prioritize hazard mitigation projects (including State coordination of local projects) to incorporate sustainability, resilience, and renewable building concepts;
- ◆ Develop hazard mitigation projects, including engineering design and feasibility actions;
- ◆ Incorporate SFM principles into mitigation project work schedules and budgets that will facilitate compliance with the legislative requirement to expend obligated funds within 24 months;
- ◆ Conduct meetings, outreach, and coordination with potential subapplicants and community residents to identify potential participants for property acquisition and demolition or relocation projects;
- ◆ Conduct engineering design and feasibility studies for larger or complex community drainage projects or critical facility retrofits (such as for phased projects);
- ◆ Conduct hydrologic and hydraulic studies for unmapped flood zones or Approximate A Zone areas where communities propose to submit hazard mitigation projects;
- ◆ Perform professional cost estimation services to aid consistency in project budgeting across subapplications;
- ◆ Rectify data consistency needs for other project application categories, such as EHP, cost sharing mechanisms, and work schedules; and
- ◆ Complete necessary documents for deed restricting properties such as acknowledgement of voluntary participation, or Model Acknowledgement of Conditions for Mitigation of Property in a Special Flood Hazard Area with FEMA Grant Funds for property acquisition projects.

Requirements and Deliverables Associated with Advance Assistance and Resulting HMGP Applications may include:

- ♦ Documentation of Advance Assistance Accomplishments: Applicants must submit documentation to FEMA to support that they accomplished all activities listed in their Advance Assistance application.
- ♦ Submission of Projects up to the HMGP Ceiling: FEMA expects States that receive Advance Assistance to submit complete project applications up to or over the available HMGP ceiling by the final HMGP project application deadline.
- ♦ Accounting for Use of Advance Assistance Funds: For accounting and audit purposes, the State must submit sufficient financial detail to demonstrate that no costs claimed under Advance Assistance are duplicated in subsequent HMGP project applications or in State Management Cost budgets.
- ♦ Documentation of Environmental Considerations: The Applicant must document that effects to environmental and historic resources were considered early in the planning and project scoping processes. This requirement is in addition to ensuring environmental compliance.

For additional information on Advance Assistance, please see [Appendix L](#), Advance Assistance Optional Application.

A.10 Phased Projects

In general, sufficient technical information is provided by the Applicant or subapplicant to allow FEMA to make an eligibility determination on a subapplication. The costs to obtain this information are generally eligible as pre-award costs (See [Part V, F.2](#) for more information). However, in rare circumstances it is beyond the subapplicant's technical and financial resources to provide the complete technical information required for a full eligibility or environmental review of a complex project. The Applicant and FEMA may provide technical assistance to the subapplicant to develop this complete body of technical data by approving a subapplication to complete a Phase I design, engineering, environmental, or feasibility study. The Phase I study provides FEMA with a technical body of information mutually concurred on by the subapplicant, the Applicant, and FEMA to determine project eligibility. If the results of the Phase I review indicate that the project meets HMGP requirements, the project would then be eligible for funding for construction under a Phase II approval. Phase I study funding is part of the project's total estimated cost, and is subject to HMGP cost-share requirements.

The use of a Phase I study should be limited to complex projects that require technical or environmental data beyond the scope of that generally required for a typical HMGP project. The following provides guidelines and outlines the process for selecting projects for Phase I/Phase II project approval.

A.10.1 Pre-Screening Process

The project must meet the following pre-screening criteria for a conditional Phase I approval in the following sequence:

- ◆ State or Indian Tribal (Standard or Enhanced) Mitigation Plan – The proposed project must be in conformance with the State or Tribal (Standard or Enhanced) Mitigation Plan;
- ◆ Justification for Selection of the Proposed Project – Justification must be provided for the selection of the proposed solution after consideration of a range of options;
- ◆ Potential Cost-effectiveness – The project demonstrates potential cost-effectiveness based on a preliminary assessment of anticipated project benefits and cost. The subapplicant must be aware that this preliminary assessment is solely for the purpose of the Phase I pre-screening process and is not the final cost-effectiveness determination;
- ◆ EHP Review – Initial environmental review to identify major EHP compliance issues. The Phase I study is categorically excluded from NEPA review; and
- ◆ Hydrologic and Hydraulic or Other Relevant Technical Data – The subapplicant provides available hydrologic and hydraulic data based on existing models and other relevant technical data, as appropriate.

A.10.2 Phase I Conditional Approval

The Applicant and FEMA may approve projects meeting the above pre-screening requirements for technical assistance under a Phase I conditional approval. FEMA and the Applicant will coordinate closely to ensure mutual concurrence on all data and technical information as the Phase I technical review process proceeds. The sequence for the process is as follows:

- ◆ Hydrologic and Hydraulic or Other Relevant Technical Data – If appropriate, the Applicant and FEMA will review the hydrologic and hydraulic or other technical data provided by the subapplicant;
- ◆ Preliminary Engineering Design – Based upon the technical data, the subapplicant develops a preliminary engineering design and layout and cost estimates with ad-hoc technical assistance from the Applicant and FEMA;
- ◆ EO 11988 – If applicable, based upon the technical data and revised engineering design, the project must demonstrate compliance with floodplain management requirements under this EO. If a FIRM amendment or revision will be necessary, the Applicant and FEMA will provide the subapplicant with technical assistance to meet this requirement;
- ◆ Refinement of the Cost-Effectiveness Assessment – Based upon the revised design and cost estimates, the Applicant and FEMA will refine the preliminary assessment of cost-effectiveness conducted in the Phase I pre-screening process. This will result in a final

BCR to evaluate the project's cost-effectiveness, which will include all the project costs including Phase I; and

- ♦ EHP Review – The Applicant and FEMA will conduct a review of the revised project design to ensure EHP compliance. The project will meet EHP requirements before Phase II approval.

A.10.3 Phase II Approval-Construction Process

If the project is determined to be eligible, technically feasible, cost-effective, and compliant with EHP requirements under the Phase I technical review, the project may then be approved for construction under Phase II.

A.11 The 5 Percent Initiative

Some mitigation activities are difficult to evaluate using FEMA-approved cost-effectiveness methodologies. Up to 5 percent of the total HMGP funds may be set aside by the Grantee to pay for such activities. These funds are not eligible to be used in situations where the mitigation activities can be evaluated under FEMA-approved cost-effectiveness methodologies but do not meet the required BCA threshold.

To be eligible for the 5 Percent Initiative, activities must:

- ♦ Be difficult to evaluate against traditional program cost-effectiveness criteria;
- ♦ Comply with all applicable HMGP eligibility criteria as well as with Federal, State, and local laws and ordinances;
- ♦ Be consistent with the goals and objectives of the State or Indian Tribal (Standard or Enhanced) and local or Tribal mitigation plans; and
- ♦ Be submitted for review with a narrative that indicates that there is a reasonable expectation that future damage or loss of life or injury will be reduced or prevented by the activity.

Activities that might be funded under the 5 Percent Initiative include:

- ♦ The use, evaluation, and application of new, unproven mitigation techniques, technologies, methods, procedures, or products;
- ♦ Equipment and systems for the purpose of warning citizens of impending hazards;
- ♦ Purchase of generators or related equipment, such as generator hook-ups;
- ♦ Hazard identification or mapping and related equipment for the implementation of mitigation activities;
- ♦ GIS software, hardware, and data acquisition whose primary aim is mitigation;

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- ◆ Public awareness or education campaigns about mitigation; and
 - ◆ Evaluation of model building codes in support of future adoption and/or implementation.

A.11.1 Availability of Additional Funds for Tornado Mitigation

FEMA allows increasing the 5 Percent Initiative amount up to 10 percent for a Presidential major disaster declaration for tornadoes and high winds at the discretion of the Grantee. The increased initiative funding can be used for activities that address the unique hazards posed by tornadoes. To qualify for this funding, the Grantee must, in its State or Indian Tribal (Standard or Enhanced) Mitigation Plan, or other comprehensive plan, address warning of citizens (ensuring 90 percent coverage), further the safe room concept in construction or rehabilitation of residences or commercial structures, and address sheltering in mobile home parks. The plan, also, must explain how the Grantee will implement an ongoing public education program so that citizens are aware of warning systems and their meaning and the availability of in-home shelter designs. Similar information should be included in the subgrantee's local or Indian Tribal mitigation plan.

A.12 Appeal Process

An eligible subapplicant, subgrantee, or Grantee may appeal any FEMA determination regarding subapplications or applications submitted for funding under HMGP. FEMA will only consider appeals in writing that contain documentation that justifies the request for reconsideration. The appeal should specify the monetary figure in dispute and the provisions in Federal law, regulation, or policy with which the appellant believes the initial action was inconsistent.

Whether the appeal is originated by the Grantee or by a subapplicant/subgrantee, the appeal must be submitted in writing to the Regional Administrator by the Grantee. The Regional Administrator is the decision-maker on first appeals. If there is an appeal of the Regional Administrator's decision on any first appeal, the Assistant Administrator for Mitigation is the decision-maker for the second appeal. In some cases the appeal may involve highly technical issues. In these cases, FEMA may consult independent scientific or technical experts on the subject under appeal.

Appellants must make appeals within 60 days after receipt of a notice of the action that is being appealed. The Grantee must forward any appeal from a subapplicant/subgrantee with a written recommendation to the Regional Administrator within 60 days of receipt. Within 90 days following the receipt of an appeal, FEMA will notify the Grantee in writing of the disposition of the appeal or of the need for additional information.

If additional information is needed, FEMA will determine a date by which the information must be provided. Within 90 days following the receipt of the requested additional information (or 90 days after the information was due), FEMA will notify the Grantee in writing of the disposition of the appeal.

FEMA will provide its decision to the Grantee in writing. If the decision is to grant the appeal, the Regional Administrator will take the appropriate action.

Additional information regarding appeals can be found at 44 CFR Section 206.440.

B. Pre-Disaster Mitigation Program

Most of the information that an Applicant or subapplicant needs to apply for a PDM award or that a Grantee or subgrantee needs to manage a PDM award is provided in Parts I through VIII, and Part X. This section contains supplemental guidance specific to the PDM Program.

B.1 Allocation

FEMA will allocate funds for eligible projects to States and Territories consistent with applicable, statutory base and/or maximum allocations in the authorizing and appropriation laws. FEMA will administer the program as directed by Congress.

B.2 Small Impoverished Communities

Grants awarded to small impoverished communities may receive a Federal cost share of up to 90 percent of the total amount approved under the grant award to implement eligible approved activities in accordance with the Stafford Act. A small impoverished community must:

- ◆ Be a community of 3,000 or fewer individuals identified by the State as a rural community that is not a remote area within the corporate boundaries of a larger city;
- ◆ Be economically disadvantaged, with residents having an average per capita annual income not exceeding 80 percent of the national per capita income, based on best available data. For the most current information, go to <http://www.bea.gov>;
- ◆ Have a local unemployment rate that exceeds by 1 percentage point or more the most recently reported, average yearly national unemployment rate. For the most current information, go to http://www.bls.gov/eag/eag_us.htm; and
- ◆ Meet other criteria required by the Applicant in which the community is located.

Applicants must certify and provide documentation of the community status with the appropriate subapplication to justify the 90 percent cost share. If documentation is not submitted with the subapplication, FEMA will provide no more than the standard 75 percent of the total eligible costs.

B.3 Information Dissemination

Under the PDM Program, subapplicants may include eligible information dissemination activities in their project or planning subapplication. Eligible information dissemination activities include public awareness and education (brochures, workshops, videos, etc.) that directly relate to the eligible mitigation activity proposed in the subapplication. Information dissemination activities are limited to a maximum of 10 percent of the total cost of a subapplication.

B.4 Applicant Ranking of Subapplications

Applicants must rank each subapplication included in their grant application in order of their priority for funding. Each subapplication must be assigned a unique rank in *eGrants*. Applicants must provide an explanation for the rank given to each subapplication and demonstrate how it is consistent with their State or Tribal (Standard or Enhanced) Mitigation Plan.

B.5 Selection

FEMA will identify subapplications for further review based on Applicant rank. FEMA may identify a subapplication for further review out of rank order based on considerations such as program priorities, available funds, and policy factors.

FEMA will notify Applicants whose subapplications are identified for further review; however, this notification and conducting FEMA-requested pre-award activities are not considered notification or guarantee of a grant award.

C. Flood Mitigation Assistance Program

Most of the information that an Applicant or subapplicant needs to apply for an FMA award or that a Grantee or subgrantee needs to manage an FMA award is provided in Parts I through VII, and Part IX. This section contains supplemental guidance specific to FMA.

C.1 Eligible Properties

Properties included in a project subapplication for FMA funding must be NFIP-insured at the time of the application submittal. Flood insurance must be maintained through completion of the mitigation activity and for the life of the structure.

Residential or non-residential properties currently insured with the NFIP are eligible to receive FMA funds. In order to receive an increased Federal cost share, properties must meet one of the definitions below (consistent with the legislative changes made in the Biggert-Waters Flood Insurance Reform Act of 2012):

- ◆ **A severe repetitive loss property** is a structure that:
 - (a) Is covered under a contract for flood insurance made available under the NFIP; and
 - (b) Has incurred flood related damage –
 - (i) For which 4 or more separate claims payments have been made under flood insurance coverage with the amount of each such claim exceeding \$5,000, and with the cumulative amount of such claims payments exceeding \$20,000; or
 - (ii) For which at least 2 separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.
- ◆ **A repetitive loss property** is a structure covered by a contract for flood insurance made available under the NFIP that:
 - (a) Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
 - (b) At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

C.2 Repetitive Loss Strategy

To be eligible for an increased Federal cost share, a FEMA-approved State or Tribal (Standard or Enhanced) Mitigation Plan that addresses repetitive loss properties must be in effect at the time of grant award and the property that is being submitted for consideration must be a repetitive loss property. Guidance on addressing repetitive loss properties can be found in the *State Multi-Hazard Mitigation Planning Guidance* and in 44 CFR Section 201.4(c)(3)(v). The Repetitive

Loss Strategy must identify the specific actions the State has taken to reduce the number of repetitive loss properties, which must include severe repetitive loss properties, and specify how the State intends to reduce the number of such repetitive loss properties. In addition, the hazard mitigation plan must describe the State's strategy to ensure that local jurisdictions with severe repetitive loss properties take actions to reduce the number of these properties, including the development of local or Tribal mitigation plans. For information about the Repetitive Loss Database, see [Part VII, D.2.1](#).

C.3 Cost Sharing

Consistent with the legislative changes made in the Biggert-Waters Flood Insurance Reform Act of 2012, cost-share availability under the FMA program depends on the type of properties included in the grant. For example, severe repetitive loss properties may receive up to 100 percent Federal funding and repetitive loss properties may receive up to 90 percent.

- ◆ In the case of mitigation activities to severe repetitive loss structures:
 - FEMA may contribute up to 100 percent Federal funding of all eligible costs, if the activities are technically feasible and cost-effective; or
 - The expected savings to the NFIF from expected avoided damages through acquisition or relocation activities, if the activities will eliminate future payments from the NFIF for severe repetitive loss structures through an acquisition or relocation activity.
- ◆ In the case of mitigation activities to repetitive loss structures, FEMA may contribute up to 90 percent Federal funding of all eligible costs.
- ◆ In the case of all other mitigation activities, FEMA may contribute up to 75 percent Federal funding of all eligible costs.

Structures with varying cost-share requirements can be submitted in one application. Applicants must provide documentation in the project application showing how the final cost share was derived. The final cost share will be entered into the eGrants system and documentation showing how the final cost share was derived must be attached to the application.

C.4 Applicant Ranking of Subapplications

Applicants must rank each subapplication included in their grant application in order of priority for funding. Each subapplication must be assigned a unique rank in eGrants. Applicants must provide an explanation for the rank given to each subapplication and demonstrate how it is consistent with their State or Tribal (Standard or Enhanced) Mitigation Plan.

C.5 Selection

FEMA will identify subapplications for further review based on a number of criteria, including but not limited to: savings to the NFIF, applicant rank, and property status (e.g., repetitive loss

property, severe repetitive loss property). FEMA also may identify a subapplication for further review out of rank order based on considerations such as program priorities, available funds, and other factors.

FEMA will notify Applicants whose subapplications are identified for further review; however, this notification and conducting FEMA-requested pre-award activities are not considered notification or guarantee of a grant award.

PART X. APPENDICES

A. Acronyms

ABFE	Advisory Base Flood Elevation
ADA	Americans with Disabilities Act
ADR	Alternative Dispute Resolution
ASCE	American Society of Civil Engineers
BCA	Benefit-Cost Analysis
BCR	Benefit-Cost Ratio
BFE	Base Flood Elevation
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CBRA	Coastal Barrier Resource Act
CBRS	Coastal Barrier Resource System
CDBG	Community Development Block Grant
CFDA	Catalog of Federal Domestic Assistance
CFR	Code of Federal Regulations
CRS	Community Rating System
DHS	Department of Homeland Security
DOB	Duplication of Benefits
DOI	Department of the Interior
DOP	Duplication of Programs
DOT	Department of Transportation
eGrants	Electronic Grants
EHP	Environmental Planning and Historic Preservation
EO	Executive Order
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration

FIMA	Flood Insurance and Mitigation Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
FY	Fiscal Year
GAR	Governor's Authorized Representative
GIS	Geographic Information System
GSTF	Greatest Savings to the Fund
Hazus	Hazards United States
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
IBC	International Building Code
ICC	Increased Cost of Compliance
IRS	Internal Revenue Service
ITP	Independent Third Party
NAP	Non-Insured Crop Disaster Assistance Program
NEMIS	National Emergency Management Information System
NEPA	National Environmental Policy Act
NFIA	National Flood Insurance Act
NFIF	National Flood Insurance Fund
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
O&M	Operations and Maintenance
OMB	Office of Management and Budget
OPA	Otherwise Protected Area
PARS	Payment and Reporting System

PDM	Pre-Disaster Mitigation
PNP	Private Non-profit
POC	Point of Contact
POP	Period of Performance
SBA	Small Business Administration
SEI	Structural Engineering Institute
SF	Standard Form
SFHA	Special Flood Hazard Area
SFM	Strategic Funds Management
SHMO	State Hazard Mitigation Officer
SOW	Scope of Work
SRIA	Sandy Recovery Improvement Act of 2013
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
TB	Technical Bulletin
URA	Uniform Relocation Assistance and Real Property Acquisition Act of 1970
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFA	U.S. Fire Administration
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WUI	Wildland-Urban Interface Area

B. Glossary

Applicant: The entity, such as a State, Territory, or Indian Tribal government, applying to FEMA for a grant that will be accountable for the use of the funds. Once grant funds are awarded, the Applicant becomes the “Grantee.”

Base Flood: A flood having a 1 percent chance of being equaled or exceeded in any given year.

Base Flood Elevation (BFE): The elevation shown on the Flood Insurance Rate Map (FIRM) for Zones AE, AH, A1–A30, AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO, V1–V30, and VE that indicates the water surface elevation resulting from a flood that has a 1 percent chance of equaling or exceeding that level in any given year.

Benefit-Cost Analysis (BCA): A quantitative procedure that assesses the cost-effectiveness of a hazard mitigation measure by taking a long-term view of avoided future damages as compared to the cost of a project.

Benefit-Cost Ratio (BCR): A numerical expression of the cost-effectiveness of a project calculated as the net present value of total project benefits divided by the net present value of total project costs.

Biomass: Biological material derived from living, or recently living organisms.

Building: A structure with two or more outside rigid walls and a fully secured roof that is affixed to a permanent site; a manufactured home or a mobile home without wheels, built on a chassis and affixed to a permanent foundation, that is regulated under the community’s floodplain management and building ordinances or laws. “Building” does not mean a gas or liquid storage tank or a recreational vehicle, park trailer, or other similar vehicle.

Clean-site certification: A letter from the appropriate local, State, Indian Tribal, or Federal entity determining that no further remedial action is required to protect human health or the environment.

Coastal Barrier Resource System (CBRS): A geographic unit designated to serve as a protective barrier against forces of wind and tidal action caused by coastal storms and serving as habitat for aquatic species. Congress restricted Federal spending and assistance for development-related activities within CBRS units to protect them from further development. Federal flood insurance is unavailable in these areas. CBRS units are identified on FEMA FIRMs.

Coastal High Hazard Area: An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.

Combustible material: Any material that, in the form in which it is used and under the conditions anticipated, will ignite and burn or will add appreciable heat to an ambient fire.

Community Rating System (CRS): A program developed by FEMA to provide incentives for those communities in the NFIP that have gone beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding.

Cost-effectiveness: Determined by a systematic quantitative method for comparing the costs of alternative means of achieving the same stream of benefits for a given objective. The benefits in the context of hazard mitigation are avoided future damages and losses. Cost-effectiveness is determined by performing a BCA.

Cost share: The portion of the costs of a federally assisted project or program not borne by the Federal Government.

Defensible space: An area that is either natural or manmade, where material capable of allowing a fire to spread unchecked has been treated, cleared, or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire-suppression operations to occur.

Dwelling: A building designed for use as a residence for no more than four families or a single-family unit in a building under a condominium form of ownership.

Elevated Building: A building that has no basement and a lowest floor that is elevated to or above the BFE by foundation walls, shear walls, posts, piers, pilings, or columns. Solid perimeter foundations walls are not an acceptable means of elevating buildings in Zones V and VE.

Environmental Benefits: Environmental benefits are direct or indirect contributions that ecosystems make to the environment and human populations. For FEMA BCA, certain types of environmental benefits may be realized when homes are removed and land is returned to open space uses. Benefits may include flood hazard reduction; an increase in recreation and tourism; enhanced aesthetic value; and improved erosion control, air quality, and water filtration.

Equipment: Tangible, nonexpendable, personal property having a useful life of more than 1 year and an acquisition cost of \$5,000 or more per unit. A Grantee may use its own definition of equipment provided such definition would at least include all equipment defined above.

Federal Agency: Any department, independent establishment, Government corporation, or other agency of the executive branch of the Federal Government, including the U.S. Postal Service, but not the American National Red Cross.

Federal Cognizant Agency: The Federal agency responsible for reviewing, negotiating, and approving cost allocation plans or indirect cost proposals developed on behalf of all Federal agencies. The OMB publishes a list of Federal Cognizant Agencies.

Firebreak: a strip of cleared land that provides a gap in vegetation or other combustible material that is expected to slow or stop the progress of a wildfire.

Fire-proofing: Removal or treatment of fuels to reduce the danger of fires igniting or spreading. (e.g., fire-proofing roadsides, campsites, structural timber).

Fire-resistant material: Material that has a property that prevents or retards the passage of excessive heat, hot gases, or flames under conditions of use.

Fire retardant: A chemical applied to lumber or other wood products to slow combustion and flame spread.

Fire Severity Zone: Three concentric zones around a building used to determine the most effective design for defensible space.

Flammability: The relative ease with which fuels ignite and burn regardless of the quantity of the fuels.

Flood Insurance Rate Map (FIRM): Official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

Floodplain: Any land area that FEMA has determined has at least a 1 percent chance in any given year of being inundated by floodwaters from any source.

Floodplain Management: The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to, emergency preparedness plans, flood control works, and floodplain management regulations.

Floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities regulate development in these floodways to ensure that there are no increases in upstream flood elevations.

Freeboard: Freeboard is a factor of safety usually expressed in feet above a flood level for purposes of floodplain management. “Freeboard” tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

Fuel break: A natural or manmade change in fuel characteristics that affects fire behavior so that fires burning into them can be more readily controlled.

Fuel condition: Relative flammability of fuel as determined by fuel type and environmental conditions.

Governor's Authorized Representative (GAR): The individual, designated by the Governor, who serves as the grant administrator for all funds provided under HMGP; the person empowered by the Governor to execute, on behalf of the State, all necessary documents for disaster assistance.

Grant: An award of financial assistance for a specified purpose by the Federal government to an eligible Grantee.

Grantee: The entity, such as a State, Territory, or Indian Tribal government to which a grant is awarded and that is accountable for the use of the funds provided. The Grantee is the entire legal entity even if only a particular component of the entity is designated in the grant award document.

Green Open Space: Green open space is land that does not directly touch a natural body of water, such as a river, lake, stream, creek, or coastal body of water.

Hazardous fuels reduction: An area strategically located in relation to predicted fire hazard and occurrence where the vegetation has been permanently modified or replaced so that fires burning into it can be more easily controlled (e.g., vegetation management activities).

Hazard mitigation planning: A process used by governments to identify risks, assess vulnerabilities, and develop long-term strategies for protecting people and property from the effects of future natural hazard events.

HMGP Lock-In Ceiling: The level of HMGP funding available to a Grantee for a particular Presidential major disaster declaration.

Identified for Further Review: Subapplications identified for further review contain sufficient information for a preliminary determination of cost-effectiveness and feasibility. In certain instances, FEMA may work with Applicants to confirm cost-effectiveness and feasibility. Identification for further review is not a notification of award.

Ignition-resistant construction: Construction standards based on use of fire-resistant materials, non-combustible materials, and 1-hour fire-rated assemblies.

Increased Cost of Compliance: Coverage for expenses a property owner must incur, above and beyond the cost to repair the physical damage the structure actually sustained from a flooding event, to comply with mitigation requirements of State or local floodplain management ordinances or laws; acceptable mitigation measures are structure elevation, dry floodproofing, structure relocation, structure demolition, or any combination thereof.

Indian Tribal Government: A federally recognized governing body of an Indian or Alaska Native Tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian Tribe under the Federally Recognized Tribe List Act of 1994, 25 U.S.C. 479a. This does not include Alaska Native corporations, the ownership of which is vested in private individuals.

Indirect cost: Cost that is incurred by a Grantee for a common or joint purpose benefitting more than one cost objective that is not readily assignable to the cost objectives specifically benefited.

Indirect cost rate: Percentage established by a Federal department or agency for a Grantee to use in computing the dollar amount it charges to the grant to reimburse itself for indirect costs incurred in doing the work of the grant activity.

Management costs: Any indirect costs, administrative expenses, and any other expenses not directly chargeable to a specific project that are reasonably incurred by a Grantee or subgrantee in administering and managing a grant or subgrant award. For HMGP, management cost funding is provided outside of Federal assistance limits defined at 44 CFR Section 206.432(b).

Manufactured (Mobile) home: A structure, transportable in one or more sections that is built on a permanent chassis and designed for use with or without a permanent foundation when attached to the required utilities.

Mitigation: Any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.

Mitigation activity: A mitigation measure, project, plan, or action proposed to reduce risk of future damage, hardship, loss, or suffering from disasters. The term “measure” is used interchangeably with the term “project” in this program.

National Flood Insurance Program (NFIP): Provides the availability of flood insurance in exchange for the adoption of a minimum local floodplain management ordinance that regulates new and Substantially Improved development in identified flood hazard areas.

Non-combustible material: Material of which no part will ignite and burn when subjected to fire, such as any material conforming to ASTM E 136.

Nonflammable: Material unlikely to burn when exposed to flame under most conditions.

Non-Federal funds: Financial resources provided by sources other than the Federal Government. The term does not include funds provided to a State or local government through a Federal grant unless the authorizing statute for that grant explicitly allows the funds to be used as cost share for other Federal grants.

Non-Residential structure: Includes, but is not limited to small business concerns, places of worship, schools, farm buildings (including grain bins and silos), pool houses, clubhouses, recreational buildings, mercantile structures, agricultural and industrial structures, warehouses, hotels and motels with normal room rentals for less than 6 months' duration, and nursing homes.

Office of Environmental Planning and Historic Preservation: Integrates the protection and enhancement of environmental, historic, and cultural resources into the FEMA mission and FEMA programs and activities; ensures that FEMA activities and programs related to disaster response and recovery, hazard mitigation, and emergency preparedness comply with Federal environmental and historic preservation (EHP) laws and Executive orders; and provides EHP technical assistance to FEMA staff, local, State, and Federal partners, and Grantees and subgrantees.

Otherwise Protected Areas (OPAs): Designation created by the Coastal Barrier Improvement Act. Flood insurance is restricted in OPAs even though they are not in the CBRS and may receive other forms of Federal assistance. OPAs are identified on FEMA FIRMs.

Period of Performance (POP): The period of time during which the Grantee is expected to complete the grant activities and to incur and expend approved funds.

Pile burning: Piling removed vegetation into manageable piles and burning the individual piles during safe and approved burning conditions.

Post-FIRM Building: A building for which construction or Substantial Improvement occurred after December 31, 1974, or on or after the effective date of an initial FIRM, whichever is later.

Practicable: An action that is capable of being done within existing constraints. The test of what is practicable depends upon the situation and includes consideration of all pertinent factors, such as environment, cost, and technology.

Pre-FIRM Building: A building for which construction or Substantial Improvement occurred on or before December 31, 1974, or before the effective date of an initial FIRM.

Prescribed burning: The deliberate and managed use of fire ignited by management actions to meet specific fuels management objectives.

Presidential Major Disaster: Any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought) or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Stafford Act to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

Private non-profit (PNP): Any non-governmental agency or entity that currently has: (i) an effective ruling letter from the Internal Revenue Service granting tax exemption under section 501(c), (d), or (e) of the Internal Revenue Code of 1954; or (ii) satisfactory evidence from the State that the organization or entity is a non-profit one organized or doing business under State law.

Project: Any mitigation measure or action proposed to reduce risk of future damage, hardship, loss, or suffering from disasters.

Public Assistance: Supplementary Federal assistance provided under the Stafford Act to State and local governments or certain PNP organizations other than assistance for the direct benefit of individuals and families. For further information, see 44 CFR Part 206, Subparts G and H. Fire Management Assistance Grants under section 420 of the Stafford Act are also considered Public Assistance.

Replacement cost value: The cost to replace property with materials of like kind and quality, without any deduction for depreciation.

Riparian Area: The land that directly abuts a natural body of water, such as a river, lake, stream, creek, or coastal body of water.

Slash: The accumulation of vegetative materials such as tops, limbs, branches, brush, and miscellaneous residue results from forest management activities such as thinning, pruning, timber harvesting, and wildfire hazard mitigation.

Special Flood Hazard Area (SFHA): The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. An area having special flood, mudflow, or flood-related erosion hazards, and shown on a Flood Hazard Boundary Map or a FIRM as Zone A, AO, A1–A30, AE, A99, AH, AR, AR/A, AR/AE, AR/AH, AR/AO, AR/A1–A30, V1–V30, VE, or V.

State Hazard Mitigation Officer (SHMO): The representative of a State government who is the primary point of contact with FEMA, other Federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.

Structural fire protection: The protection of homes or other buildings from wildland fire.

Subapplicant: The entity, such as a community/local government, Tribal government, or PNP, that submits a subapplication for FEMA assistance to the Applicant. Once funding is awarded, the subapplicant becomes the “subgrantee.”

Subgrant: An award of financial assistance under a grant by a Grantee to an eligible subgrantee.

Subgrantee: The entity, such as a community/local government, Tribal government, or PNP to which a subgrant is awarded and who is accountable to the Grantee for the use of the funds provided.

Substantial Damage: Damage of any origin sustained by a building whereby the cost of restoring the building to its before-damaged condition would equal or exceed 50 percent of the market value of the building before the damage occurred.

Wildfire: An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.

Wildland-Urban Interface Area: That geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

All terms not listed above are used consistent with the term definitions used in 44 CFR unless otherwise specified.

C. Additional Resources

Description	Web Link or Contact Information
1. NFIP Resources	
National Flood Insurance Program	http://www.floodsmart.gov
Floodplain Management	http://www.fema.gov/national-flood-insurance-program
Map Service Center	http://msc.fema.gov Telephone: (877) FEMA-MAP (336-2627)
FIRMs	http://www.fema.gov/national-flood-insurance-program-1/flood-insurance-rate-map-firm
ABFEs	Mississippi: http://www.fema.gov/news-release/abfes-are-best-resources-mississippians-rebuilding-now Louisiana: http://www.fema.gov/news-release/2006/02/06/post-katrina-policy-building-elevations
Flood Insurance Studies	http://www.fema.gov/national-flood-insurance-program-2/flood-insurance-study-fis
FEMA Form AW-501	http://www.fema.gov/national-flood-insurance-program-1/mitigated-properties-updates
2. Mitigation Planning and Risk Assessment Resources	
Hazard Mitigation Planning Overview	http://www.fema.gov/hazard-mitigation-planning-overview
Local Mitigation Planning Handbook (FR302-094-1)	http://www.fema.gov/library/viewRecord.do?id=7209
Local Mitigation Plan Review Guide	http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4859
Mitigation Planning Guidance	http://www.fema.gov/mitigation-planning-laws-regulations-guidance
Mitigation Planning Policies	http://www.fema.gov/mitigation-planning-laws-regulations-guidance
Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards	http://www.fema.gov/library/viewRecord.do?id=6938
Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials	http://www.fema.gov/library/viewRecord.do?id=7130
Mitigation Planning How-To Guides (FEMA)	http://www.fema.gov/hazard-mitigation-planning-resources
Hazard Mitigation Planning Risk Assessment	http://www.fema.gov/hazard-mitigation-planning-risk-assessment
IS-318: Mitigation Planning for Local and Tribal Communities	http://training.fema.gov/EMIWeb/IS/courseOverview.aspx?code=is-318
IS-328: Plan Review for Local Mitigation Plans	http://training.fema.gov/EMIWeb/IS/courseOverview.aspx?code=IS-328
Hazus	http://www.fema.gov/hazus
USGS National Map	http://nationalmap.gov/
USGS Natural Hazards Gateway	http://www.usgs.gov/natural_hazards/

Description	Web Link or Contact Information
3. Benefit-Cost Analysis Resources	
BCA Software and Helpline	Telephone: (866) 222-3580 Email: bchelpline@dhs.gov
BCA Overview	http://www.fema.gov/benefit-cost-analysis
BCA Policies	http://www.fema.gov/benefit-cost-analysis
4. Feasibility and Effectiveness Resources	
Engineering Helpline	Telephone: (866) 222-3580 Email: enghelpline@dhs.gov
Engineering Case Studies	http://www.fema.gov/grant-applicant-resources
Property Acquisition Projects	http://www.fema.gov/library/viewRecord.do?id=1861
Structure Elevation Projects	http://www.fema.gov/library/viewRecord.do?id=1862
Minor Localized Flood Reduction Projects	http://www.fema.gov/library/viewRecord.do?id=1863
Non-Structural Seismic Retrofit	http://www.fema.gov/library/viewRecord.do?id=1865
Structural Seismic Retrofit	http://www.fema.gov/library/viewRecord.do?id=1866
Wind Shutters	http://www.fema.gov/library/viewRecord.do?id=1864
5. EHP Resources	
EHP Program	http://www.fema.gov/environmental-planning-and-historic-preservation-program
EHP Helpline	Telephone: (866) 222-3580 Email: ehhelpline@dhs.gov
EHP Guidance	http://www.fema.gov/environmental-planning-and-historic-preservation-program/environmental-historic-preservation-1
EHP eLearning Tool	http://www.fema.gov/environmental-planning-and-historic-preservation-program/elearning-tool-fema-grant-applicants-45
EHP Policies	http://www.fema.gov/hazard-mitigation-assistance-policy
EHP Training	http://training.fema.gov/EMIWeb/IS/IS253a.asp
National Register of Historic Places	http://www.nps.gov/history/nr/
6. eGrants and NEMIS (HMGP) Resources	
FEMA Enterprise Service Desk – for HMGP (NEMIS-MT) issues	Telephone: (888) HLP-FEMA (1-888-457-3362) Email: fema-enterprise-service-desk@fema.dhs.gov
FEMA Enterprise Service Desk – eGrants issues	Telephone: (877) 611-4700
eGrants Resources Web site	http://www.fema.gov/mitigation-egrants-system
eGrants Applicant Quick Reference Guide	http://www.fema.gov/library/viewRecord.do?id=3266
eGrants Subapplicant Quick Reference Guide	http://www.fema.gov/library/viewRecord.do?id=3267
eGrants System for Grant Applicants online course (IS-31)	http://training.fema.gov/EMIWeb/IS/is31a.asp
eGrants System for Subgrant Applicants online course (IS-30)	http://training.fema.gov/EMIWeb/IS/is30a.asp

Description	Web Link or Contact Information
eGrants Internal System online course (IS-32)	http://training.fema.gov/EMIWeb/IS/courseOverview.aspx?code=is-32
MT eGrants Internal Quick Reference Guide	http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=5885
NEMIS-MT Frequently Asked Questions:	http://www.fema.gov/hazard-mitigation-grant-program/national-emergency-management-information-system-mitigation-module http://www.fema.gov/library/viewRecord.do?id=4913
NEMIS-MT User Manual	http://www.fema.gov/library/viewRecord.do?id=4909
7. HMA Application and Award Resources	
HMA Overview	http://www.fema.gov/hazard-mitigation-assistance
HMA Helpline	Telephone: (866) 222-3580 Email: hmagrantshelpline@dhs.gov
HMA Policies	http://www.fema.gov/hazard-mitigation-assistance-policy
8. Acquisition Project Resources	
Model Deed Restriction	http://www.fema.gov/library/viewRecord.do?id=6327
Model Acknowledgement of Conditions for Mitigation in Special Flood Hazard Area	http://www.fema.gov/library/viewRecord.do?id=3592
Model Statement of Assurances	http://www.fema.gov/library/viewRecord.do?id=6365
Notice of Voluntary Interest	http://www.fema.gov/library/viewRecord.do?id=3595 http://www.fema.gov/library/viewRecord.do?id=3596
Statement of Voluntary Participation	http://www.fema.gov/library/viewRecord.do?id=3333
9. Mitigation Reconstruction References	
<ul style="list-style-type: none"> • ASCE/SEI 24-05, <i>Flood Resistant Design and Construction</i>, January 2006 • ASCE/SEI 7-05, <i>Minimum Design Loads for Buildings and Other Structures</i>, 2005 • <i>International Building Code</i> (IBC), 2006 edition • International Code Council, <i>Reducing Flood Losses Through the International Codes</i>, 3rd Edition, 2008 • FEMA P-55, <i>Coastal Construction Manual</i>, 4th Edition, August 2011 • FEMA P-424, <i>Design Guide for Improving School Safety in Earthquakes, Floods and High Winds</i>, December 2010 • FEMA 489, <i>Mitigation Assessment Team Report: Hurricane Ivan in Alabama and Florida</i>, August 2005 • FEMA P-499, <i>Home Builder's Guide to Coastal Construction Technical Fact Sheet Series</i>, December 2010 • FEMA 543, <i>Design Guide for Improving Critical Facility Safety from Flooding and High Winds</i>, January 2007 • FEMA 549, <i>Mitigation Assessment Team Report: Hurricane Katrina in the Gulf Coast</i>, July 2006 • FEMA 550, <i>Recommended Residential Construction for Coastal Areas: Building on Strong and Safe Foundations</i>, 2nd Edition, December 2009 • FEMA 551, <i>Selecting Appropriate Mitigation Measures for Floodprone Structures</i>, March 2007 • FEMA 577, <i>Design Guide for Improving Hospital Safety in Earthquakes, Floods, and High Winds: Providing Protection to People and Buildings</i>, June 2007 	

Description	Web Link or Contact Information
10. Structure Elevation References	
<ul style="list-style-type: none"> • ASCE/SEI 24-05, <i>Flood Resistant Design and Construction</i>, January 2006 • FEMA P-55, <i>Coastal Construction Manual</i>, 4th Edition, August 2011 • FEMA P-259, <i>Engineering Principles and Practices of Retrofitting Floodprone Residential Structures</i>, 3rd Edition, January 2012 • FEMA P-312, <i>Homeowners Guide to Retrofitting</i>, 2nd Edition, December 2009 • FEMA 347, <i>Above the Flood: Elevating Your Flood Prone House</i>, May 2000 • FEMA P-499, <i>Home Builder's Guide to Coastal Construction Technical Fact Sheet Series</i>, December 2010 • FEMA Technical Bulletin TB-1, <i>Openings in Foundation Walls and Walls of Enclosures</i>, 2008 • FEMA Technical Bulletin TB-5, <i>Free-of-Obstruction Requirements</i>, 2008 • FEMA Technical Bulletin TB-9, <i>Design and Construction Guidance for Breakaway Walls</i>, 2008 • FEMA Form 81-31, NFIP Elevation Certificate, February 2013 	

D. Referenced Regulations, Statutes, Directives, and Guidance

Reference	Description	Web Link
REGULATIONS		
2 CFR Part 215, Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations (OMB Circular A-110)	This part contains Office of Management and Budget (OMB) guidance to Federal agencies on the administration of grants to and agreements with institutions of higher education, hospitals, and other non-profit organizations. The guidance sets forth standards for obtaining consistency and uniformity in the agencies' administration of those grants and agreements.	http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/ecfrbrowse/Title02/2cfr215_main_02.tpl
2 CFR Part 220, Cost Principles For Educational Institutions (OMB Circular A-21)	Establishes principles for determining costs applicable to grants, contracts, and other agreements with educational institutions.	http://www.whitehouse.gov/omb/circulars_a021_2004
2 CFR Part 225, Cost Principles for State, Local, and Indian Tribal Governments (OMB Circular A-87)	Establishes principles and standards for determining costs for Federal awards carried out through grants, cost reimbursement contracts, and other agreements with State and local governments and federally recognized Indian Tribal governments.	http://ecfr.gpoaccess.gov/cgi/txt-idx?c=ecfr&tpl=/ecfrbrowse/Title02/2cfr225_main_02.tpl
2 CFR Part 230, Cost Principles for Non-Profit Organizations (OMB Circular A-122)	Establishes principles for determining costs of grants, contracts and other agreements with non-profit organizations.	http://www.whitehouse.gov/omb/circulars_a122_2004
26 CFR Section 1.170A-14, Qualified Conservation Contributions	Discusses deductions allowable for charitable contributions of interests in properties.	http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=13&SID=7e3a7c14f52556f38d469032c58a4507&ty=HTML&h=L&r=SECTI ON&n=26y3.0.1.1.1.0.2.19
40 CFR Part 312, Innocent Landowners, Standards for Conducting All Appropriate Inquiries	Provide standards and practices for "all appropriate inquiries" for the purposes of the Comprehensive Environmental Response, Compensation, and Liability Act sections 101(35)(B)(i)(I) and 101(35)(B)(ii) and (iii).	http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr312_main_02.tpl
44 CFR Part 9, Floodplain Management and Protection of Wetlands	Sets forth policy, procedure, and responsibilities to implement and enforce Executive Order (EO) 11988, <i>Floodplain Management</i> , and EO 11990, <i>Protection of Wetlands</i> .	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part9.xml
44 CFR Part 10, Environmental Considerations	FEMA procedures for implementing the National Environmental Policy Act (NEPA). Provides policy and procedures to enable FEMA officials to account for environmental considerations when authorizing/approving major actions that have a significant impact on the environment.	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part10.xml
44 CFR Part 13, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments	Establishes uniform administrative rules for Federal grants and cooperative agreements and subgrants to State, local, and Indian Tribal governments.	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part13.xml

Reference	Description	Web Link
44 CFR Section 59.1, General Provisions, Definitions	Defines terms used in the Emergency Management and Assistance Federal Regulations	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part59.xml
44 CFR Part 60, Criteria for Land Management and Use	Contains regulations for sale of flood insurance; criteria to determine the adequacy of a community's floodplain management regulations; and the minimum standards for the adoption of floodplain management regulations in flood-prone areas.	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part60.xml
44 CFR Sections 60.3(b)(5) and (c)(4), Criteria for Land Management and Use and Floodplain Management Criteria for Floodprone Areas	Regulations regarding obtaining the elevation of residential and non-residential structures.	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part60.xml#seqnum60.3
44 CFR Part 79, Flood Mitigation Grants	Prescribes actions, procedures, and requirements for the administration the Flood Mitigation Assistance grant programs.	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part79.xml
44 CFR Part 80, Property Acquisition and Relocation for Open Space	Provides actions, procedures, and requirements for the administration of FEMA mitigation assistance for projects to acquire property for open space purposes under all Hazard Mitigation Assistance programs.	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part80.xml
44 CFR Part 201, Mitigation Planning	Provides information on requirements and procedures for mitigation planning as required by the Stafford Act.	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part201.xml
44 CFR Part 206, Federal Disaster Assistance for Disasters Declared On or After November 23, 1988	Prescribes policies and procedures for implementing the sections of Public Law 93-288 (the Stafford Act) that are delegated to the director of FEMA, including the administration of the Hazard Mitigation Grant Program (HMGP).	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part206.xml
44 CFR Part 207, Management Costs	Implements section 324, Management Costs, of the Stafford Act, providing actions, procedures, and policies for HMGP management costs.	http://www.gpo.gov/fdsys/pkg/CFR-2008-title44-vol1/xml/CFR-2008-title44-vol1-part207.xml
49 CFR Part 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs	Promulgates rules to ensure that owners of real property displaced or acquired by Federal or federally assisted programs are treated fairly, consistently, and equitably, and that agencies who implement these regulations do so efficiently and cost effectively.	http://ecfr.gpoaccess.gov/cgi/t/text-idx?c=ecfr;rgn=div5:view=text;node=49%3A1.0.1.1.18:idno=49;sid=4c3367f93b8162bf6daaf0a88fe20a0e;cc=ecfr
49 CFR Part 29, Governmentwide Debarment and Suspension (Nonprocurement)	This part adopts a government-wide system of debarment and suspension for nonprocurement activities.	http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&t=ecfrbrowse/Title49/49cfr29_main_02.tpl
Federal Acquisition Regulations (FAR) Subpart 31.2	The FAR codifies and publishes uniform policies and procedures for acquisition by all executive agencies. Subpart 31.2 refers to Contracts with Commercial Organizations.	http://www.acquisition.gov/far/
Internal Revenue Code of 1954, as amended, Sections 170(h) (3) and (4)	Provides definitions for qualified conservation organizations and conservation purpose, including specific information regarding historic structure certification.	http://www.law.cornell.edu/uscode/text/26/170

Reference	Description	Web Link
Internal Revenue Code of 1954, as amended, Sections 501(c), (d), and (e)	Provides criteria for tax-exempt organizations.	http://www.law.cornell.edu/uscode/text/26/501
National Flood Insurance Program (NFIP) Technical Bulletin 3-93, <i>Non-Residential Floodproofing – Requirements and Certification</i>	Provides guidance on the NFIP regulations concerning watertight construction and the required certification for floodproofed non-residential buildings in Zones A, AE, A1–A30, AR, AO, and AH whose lowest floors are below the Base Flood Elevation.	http://www.fema.gov/library/viewRecord.do?id=1716
STATUTES		
Immigration and Nationality Act	Provides a definition for the term “national of the United States.”	http://www.uscis.gov/portal/site/uscis/menuitem.eb1d4c2a3e5b9ac89243c6a7543f6d1a/?vgnextoid=f3829c7755cb9010VgnVCM10000045f3d6a1RCRD&vgnextchannel=f3829c7755cb9010VgnVCm10000045f3d6a1RCRD
Appalachian Regional Commission Funds, 40 U.S.C. 14321(a)(3), Grants and other assistance	Provides information on the authority of the Appalachian Regional Commission to make grants for administrative expenses and lists what those expenses may and may not include. Also provides information on what the local development district's contributions should be.	http://www.arc.gov/about/USCodeTitle40SubtitleIV.asp#14321
Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (Public Law 108-264), Part 102	A bill to amend the National Flood Insurance Act of 1968 to reduce losses to properties for which repetitive flood insurance claim payments have been made.	http://www.gpo.gov/fdsys/pkg/PLAW-108publ264/pdf/PLAW-108publ264.pdf
Biggert-Waters Flood Insurance Reform Act. P.L. 112-141 July 6, 2012	Flood Insurance Reform and Modernization Act that proposed changes to Mitigation Assistance Grants related to Flood Mitigation.	http://www.gpo.gov/fdsys/pkg/PLAW-112publ141/pdf/PLAW-112publ141.pdf
Civil Rights Act of 1964, 42 U.S.C. 2000d et seq., Title VI of the Civil Rights Act	Prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving Federal financial assistance.	http://www.justice.gov/crt/about/cor/coord/titlevi.php
Coastal Barrier Resources Act (Public Law 97-348; 16 U.S.C. 3501 et seq.)	Designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resource System. Areas so designated were made ineligible for direct or indirect Federal financial assistance that might support development, including flood insurance, except for emergency life-saving activities.	http://uscode.house.gov/download/pls/16c55.txt
Endangered Species Act (Public Law 93-205; 16 U.S.C. 1531–1544)	Prohibits Federal agencies from funding actions that would jeopardize the continued existence of endangered or threatened species or adversely modify critical habitat.	http://epw.senate.gov/esa73.pdf
Federal Crop Insurance Act, as amended, 7 U.S.C. 1501 et seq.	Promotes the national welfare by improving the economic stability of agriculture through a sound system of crop insurance.	http://www.agriculturelaw.com/links/cropins/statute.htm

Reference	Description	Web Link
National Environmental Policy Act (NEPA) (Public Law 91–190; 42 U.S.C. 4321 and 4331–4335)	Declares a national policy that encourages productive and enjoyable harmony between man and his environment; promotes efforts that will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding of the ecological systems and natural resources important to the Nation; and establishes a Council on Environmental Quality.	http://www.nps.gov/history/local-law/FHPL_NtlEnvirnPolcy.pdf
National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq.	The National Flood Insurance Act of 1968 created the Federal Insurance Administration and made flood insurance available for the first time. The Flood Disaster Protection Act of 1973 made the purchase of flood insurance mandatory for the protection of property located in the Special Flood Hazard Area.	http://www.fema.gov/library/viewRecord.do?id=2216
National Flood Insurance Reform Act of 1994 (Public Law 103-325)	Amended the Flood Disaster Protection Act of 1973, providing tools to make the NFIP more effective in achieving its goals of reducing the risk of flood damage to properties and reducing Federal expenditures for uninsured properties that are damaged by floods.	http://www.fema.gov/library/viewRecord.do?id=2217
National Historic Preservation Act (Public Law 89-665; 16 U.S.C. 470 et seq.)	Establishes a program for the preservation of historic and prehistoric resources deemed important to our understanding of prehistory and U.S. history and created the National Register of Historic Places.	http://www.achp.gov/docs/nhpa%202008-final.pdf
National Register of Historic Places	The official list of the Nation's historic places worthy of preservation. It is part of a national program to support public and private efforts to identify, evaluate, and protect our historic and archeological resources.	http://www.nps.gov/history/nr/
Non-Insured Crop Disaster Assistance Program, 7 U.S.C. 7333	Provides financial assistance to producers of non-insurable crops when low yields, loss of inventory, or prevented planting occur due to natural disasters.	http://www.fsa.usda.gov/FSA/newsReleases?area=newsroom&subject=landing&topic=pfs&newstype=prfactsheet&type=detail&item=pf_20110830_distr_en_nap.html
Privacy Act of 1974 (5 U.S.C. 552a)	Regulates the collection, maintenance, use, and dissemination of personal information by Federal executive branch agencies.	http://www.justice.gov/opcl/privstat.htm
Public Health and Welfare, 42 U.S.C. 5133, Pre-Disaster Hazard Mitigation	Authorizes the Pre-Disaster Mitigation program.	http://www.law.cornell.edu/uscode42/usc_sec_42_00005_133---000-.html
Public Health and Welfare, 42 U.S.C. 5154 (a), Insurance	Contains information on compliance with certain regulations and maintaining insurance in regard to Applicants and subapplicants requesting assistance to repair, restore, or replace damaged facilities under this code.	http://www.law.cornell.edu/uscode42/usc_sec_42_00005_154---000-.html
Refugee Education Assistance Act of 1980, (Public Law 96-422) Part 501(e)	Allows the President to exercise authorities over Cuban and Haitian immigrants identical to the authorities exercised in the Immigration and Nationality Act, 8 U.S.C. 1158.	http://www.ssa.gov/OP_Home/comp2/F096-422.html

Reference	Description	Web Link
Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 et seq.	Constitutes the statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and FEMA programs.	http://www.fema.gov/pdf/about/stafford_act.pdf
Secure Rural Schools and Community Self-Determination Act of 2000, 16 U.S.C. 500	Contains information regarding payment and evaluation of receipts to State or Territory for schools and roads, moneys received, projections of revenues, and estimated payments.	http://www.govtrack.us/data/us/bills.text/106/h/h2389.pdf
Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Public Law 91-646)	Ensures that people whose real property is acquired, or who move as a result of projects receiving Federal funds, will be treated fairly and equitably and will receive assistance in moving from the property they occupy.	http://uscode.house.gov/download/pls/42c61.txt
DIRECTIVES		
EO 11988, <i>Floodplain Management</i>	Requires Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.	http://www.fema.gov/plan/ehp/ehlaws/eo11988.shtm
EO 11990, <i>Protection of Wetlands</i>	Requires Federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided.	http://www.fema.gov/environmental-planning-and-historic-preservation-program/executive-order-11990-protection-wetlands
EO 12898, <i>Environmental Justice for Low-Income and Minority Populations</i>	Directs Federal agencies "to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations in the United States."	http://www.fema.gov/environmental-planning-and-historic-preservation-program/executive-order-12898-environmental-justice
EO 12372, July 14, 1982, <i>Intergovernmental Review of Federal Programs</i>	Fosters an intergovernmental partnership and strengthens federalism by relying on State and local processes for State and local coordination and review of proposed Federal financial assistance.	http://www.archives.gov/federal-register/codification/executive-order/12372.html
EO 12416, April 8, 1983, <i>Intergovernmental Review of Federal Programs</i>	Amends Section 8 of EO 12372 regarding the content of the Director of the Office of Management and Budget's report and to whom the report is submitted.	http://www.archives.gov/federal-register/codification/executive-order/12372.html
EO 12699, January 5, 1990, <i>Seismic Safety of Federal and Federally assisted or Regulated New Building Construction</i>	Requires that each Federal agency responsible for the design and construction of each new Federal building shall ensure that the building is designed and constructed in accord with appropriate seismic design and construction standards.	http://www.wbdg.orgccb/FED/FMEO/eo12699.pdf
GUIDANCE		
FEMA P-85, <i>Protecting Manufactured Homes from Floods and Other Hazards</i> (2nd Edition, November 2009)	Provides a best practices approach in reducing damages from natural hazards to assist in protecting manufactured homes from floods and other hazards.	http://www.fema.gov/library/viewRecord.do?id=1577

Reference	Description	Web Link
<i>FEMA 317, Property Acquisition Handbook for Local Communities (October 1998)</i>	A “how to” guide to help communities work through one specific hazard mitigation alternative known as property acquisition (also referred to as “buyout”).	http://www.fema.gov/library/viewRecord.do?id=1654
<i>FEMA P-320, Taking Shelter from the Storm: Building a Safe Room for Your Home or Small Business (3rd Edition, August 2008)</i>	Guide to help homeowners decide if they should build a shelter in their house; provides various shelter designs that can be given to a contractor/builder.	http://www.fema.gov/plan/prevent/saferoom/fema320.shtm
<i>FEMA P-361, Design and Construction Guidance for Community Safe Rooms (2nd Edition, August 2008)</i>	A guidance manual for engineers, architects, building officials, and prospective shelter owners that presents important information about the design and construction of residential and community safe rooms that protect people during tornado and hurricane events.	http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1657
<i>FEMA P-424, Design Guide for Improving School Safety in Earthquakes, Floods, and High Winds (December 2010)</i>	This manual is intended to provide guidance for the protection of school buildings from natural disasters. This volume concentrates on grade schools, K-12. FEMA P-424 covers earthquakes, floods, and high winds. Its intended audience is design professionals and school officials involved in the technical and financial decisions of school construction, repair, and renovations.	http://www.fema.gov/library/viewRecord.do?id=1986
<i>FEMA 489, Mitigation Assessment Team Report: Hurricane Ivan in Alabama and Florida (August 2005)</i>	Summarizes the observations, conclusions, and recommendations that resulted from post-disaster assessments sponsored by FEMA in response to Florida’s 2004 hurricane season.	http://www.fema.gov/library/viewRecord.do?id=1569
<i>FEMA P-499, Home Builder’s Guide to Coastal Construction Technical Fact Sheet Series (December 2010)</i>	Presents information aimed at improving the performance of buildings subject to flood and wind forces in coastal environments.	http://www.fema.gov/technology-transfer/home-builders-guide-coastal-construction-technical-fact-sheet-series-fema-p-499
<i>FEMA 543, Design Guide for Improving Critical Facility Safety from Flooding and High Winds: Providing Protection for People and Buildings (January 2007)</i>	Provides building professionals and decision-makers with information and guidelines for implementing a variety of mitigation measures to reduce the vulnerability to damage and disruption of operations during severe flooding and high-wind events. It concentrates on critical facilities (hospitals, schools, fire and police stations, and emergency operation centers).	http://www.fema.gov/library/viewRecord.do?id=2441
<i>FEMA 549, Mitigation Assessment Team Report: Hurricane Katrina in the Gulf Coast (July 2006)</i>	Evaluates and assesses damage from the hurricane and provides observations, conclusions, and recommendations on the performance of buildings and other structures impacted by wind and flood forces.	http://www.fema.gov/library/viewRecord.do?id=1857
<i>FEMA P-55, Coastal Construction Manual, (4th Edition, August 2011)</i>	Provides a comprehensive approach to sensible development in coastal areas based on guidance from over 200 experts in building science, coastal hazard mitigation, and building codes and regulatory requirements.	http://www.fema.gov/library/viewRecord.do?id=1671

Reference	Description	Web Link
<i>FEMA P-550, Recommended Residential Construction for Coastal Areas: Building on Strong and Safe Foundations (2nd Edition, December 2009)</i>	Provides recommended designs and guidance for rebuilding homes destroyed by hurricanes in the Gulf Coast. The manual also provides guidance in designing and building less vulnerable new homes that reduce the risk to life and property.	http://www.fema.gov/library/viewRecord.do?id=1853
<i>FEMA 551, Selecting Appropriate Mitigation Measures for Floodprone Structures (March 2007)</i>	This manual is intended to provide guidance to community officials for developing mitigation projects that reduce or eliminate identified risks for floodprone structures.	http://www.fema.gov/library/viewRecord.do?id=2737
<i>FEMA 577, Design Guide for Improving Hospital Safety in Earthquakes, Floods, and High Winds: Providing Protection to People and Buildings (June 2007)</i>	The intent of the Design Guide is to provide its audience with state-of-the-art knowledge on the variety of vulnerabilities faced by hospitals exposed to earthquakes, flooding, and high-winds risks, as well as the best ways to mitigate the risk of damage and disruption of hospital operations caused by these events.	http://www.fema.gov/library/viewRecord.do?id=2739
<i>FEMA P-804, Wind Retrofit Guide for Residential Buildings (December 2010)</i>	The purpose of this Guide is to provide guidance on how to improve the wind resistance of existing residential buildings. The content of this document should serve as guidance on retrofitting existing buildings for improved performance during high-wind events in all coastal regions.	http://www.fema.gov/library/viewRecord.do?id=4569
<i>Mitigation Planning Guidance</i>	This guidance provides information on preparing and updating mitigation plans in compliance with the mitigation planning regulations found at 44 CFR Part 201.	http://www.fema.gov/mitigation-planning-laws-regulations-guidance
<i>Mitigation Planning How-To Guides (FEMA)</i>	The guides focus on initiating and maintaining a planning process that will result in safer communities and are applicable to jurisdictions of all sizes and all resource and capability levels.	http://www.fema.gov/hazard-mitigation-planning-resources
<i>Uniform Standards of Professional Appraisal Practice (2012–2013)</i>	The generally accepted standards for professional appraisal practice in North America. Standards are included for real estate, personal property, business, and mass appraisal.	http://www.USPAP.org
<i>Hazard Mitigation Assistance Tool for Identifying Duplication of Benefits (January 2013)</i>	This guide provides instruction on what constitutes Duplication of Benefits in the use of Hazard Mitigation Assistance funds for property mitigation. It gives direction regarding verification processes and actions that can be taken to ensure that Duplication of Benefits does not occur.	http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=6815
OTHER RESOURCES		
<i>Government-to-Government Relations with American Indian and Alaska Native Tribal Governments. January 12, 1999 (Federal Register vol. 64 no. 7)</i>	Guides FEMA interactions with American Indian and Alaska Native Tribal governments.	http://www.gpo.gov/fdsys/pkg/FR-1999-01-12/html/99-642.htm

Reference	Description	Web Link
<i>OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs</i> (October 29, 1992)	Specifies certain discount rates that will be updated annually when the interest rate and inflation assumptions in the budget are changed.	http://www.whitehouse.gov/omb/circulars/a094/a094.html
<i>OMB Circular A-133, Audits of States, Local Governments, and Non-Profit Organizations</i> (revised June 27, 2003 and June 26, 2007)	Sets forth standards for obtaining consistency and uniformity among Federal agencies for the audit of States, local governments, and non-profit organizations expending Federal awards.	http://www.whitehouse.gov/sites/default/files/omb/assets/a133/a133_revised_2007.pdf
<i>ASCE/SEI 24-05, Flood Resistant Design and Construction</i> (2006)	Provides minimum requirements for flood-resistant design and construction of structures located in flood hazard areas.	https://secure.asce.org/files/estore/5419/40818_40818.pdf
<i>ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures</i> (2005)	Provides requirements for general structural design and includes means for determining dead, live, soil, flood, wind, snow, rain, atmospheric ice, and earthquake loads, and their combinations that are suitable for inclusion in building codes and other documents.	https://secure.asce.org/files/estore/896/40809_40809.pdf
<i>ASTM International Standard E1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process</i> (2005)	Defines good commercial and customary practices for conducting an environmental site assessment of a parcel of commercial real estate.	http://www.astm.org/Standards/E1527.htm
<i>ASTM International Standard E2247-08, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property</i> (2008)	This practice is intended for use on a voluntary basis by parties who wish to assess the environmental condition of forestland or rural property of 120 acres or greater taking into account commonly known and reasonably ascertainable information.	http://www.astm.org/Standards/E2247.htm
<i>International Building Code</i> (International Code Council)	The scope of this code covers all buildings except three-story, and one- and two-family dwellings and townhomes. This comprehensive code features time-tested safety concepts, structural, and fire and life-safety provisions covering means of egress, interior finish requirements, comprehensive roof provisions, seismic engineering provisions, innovative construction technology, occupancy classifications, and the latest industry standards in material design.	http://publicecodes.cyberregs.com/icod/ibc/index.htm
<i>International Code Council, International Wildland-Urban Interface Code</i> (2012)	Contains provisions addressing fire spread, accessibility, defensible space, water supply, and more for buildings constructed near wildland areas.	http://publicecodes.cyberregs.com/icod/iwuc/2012/index.htm

Reference	Description	Web Link
<i>International Code Council, Reducing Flood Losses through the International Codes</i> (3rd Edition, 2008)	This guide is intended to help community officials decide how to integrate the 2006 edition of the International Codes (I-Codes) into their current floodplain development and regulatory processes in order to meet the requirements to participate in the NFIP.	http://www.fema.gov/library/viewRecord.do?id=2094
<i>International Residential Code for One- and Two-Family Dwellings</i> (International Code Council)	A comprehensive code for homebuilding that brings together all building, plumbing, mechanical and electrical provisions for one- and two-family residences.	http://publicecodes.cyberregs.com/icod/irc/index.htm
<i>National Fire Protection Association (NFPA) 225, Model Manufactured Home Installation Standard</i> (2009 Edition)	Includes updated criteria covering the anchoring of the home and protection against seismic events, floods, and wind. Rules apply to single- and multi-section units.	http://www.nfpa.org/catalog/product.asp?pid=22509
<i>NFPA 703, Standard for Fire-Retardant Treated Wood and Fire-Retardant Coatings for Building Materials</i>	Provides enforcers, engineers, and architects with the industry's most advanced criteria for defining and identifying fire retardant-treated wood and fire-retardant coatings for building materials.	http://www.nfpa.org/catalog/product.asp?pid=70312
<i>NFPA 914, Code for Fire Protection of Historic Structures</i>	Intended to improve or upgrade the fire protection features in a wide range of historic buildings, and address ongoing operations as well as renovation and restoration projects.	http://www.nfpa.org/catalog/product.asp?pid=91410
<i>NFPA 1141, Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas</i>	Provides recommendations for planning and installing fire protection infrastructure for new developments in a community.	http://www.nfpa.org/catalog/product.asp?pid=114112
<i>NFPA 1144, Standard for Reducing Structure Ignition Hazards for Land Development in Suburban and Rural Areas</i>	Covers minimum design, construction, and landscaping elements for structures in the wildland/urban interface.	http://www.nfpa.org/catalog/http://dnrc.mt.gov/forestry/Fire/Prevention/documents/WUIrewrite/NFPA1144.pdf/
<i>NFPA 5000 Code, Building Construction and Safety Code</i> (2012 Edition)	Combines regulations controlling design, construction, quality of materials, use and occupancy, location, and maintenance of buildings and structures, with fire and life-safety requirements found in NFPA codes and standards.	http://www.nfpa.org/catalog/product.asp?pid=500012
Firewise Communities	A multi-agency effort designed to reach beyond the fire service by involving homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire—before a fire starts.	http://www.firewise.org/
U.S. Department of Commerce, Bureau of Economic Analysis	Produces economic account statistics that enable government and business decision-makers, researchers, and the American public to follow and understand the performance of the Nation's economy.	http://www.bea.gov

Reference	Description	Web Link
U.S. Bureau of Labor and Statistics	An independent national statistical agency that collects, processes, analyzes, and disseminates essential statistical data to the American public, the U.S. Congress, other Federal agencies, State and local governments, business, and labor.	http://stats.bls.gov

E. Eligibility and Completeness Review Checklist for Project Subapplications

Applications submitted to FEMA that do not contain at least the basic components listed below may be immediately denied because there is no method to determine eligibility without this data. Additional information may be requested during FEMA review. This information is required for all submittals, including potential substitutions.

Application Component	Yes	No	Comment
General			
Documentation included in the subapplication?			
Is this a phased project?			
Technical Assistance Needed? Subapplicant is encouraged to contact the State (Applicant) to request application development assistance. FEMA resources may be available but will only be provided if requested by the Applicant.			
Applicants			
Eligible Applicant is identified (State or local government; eligible Private, non-profit organization; or Indian Tribal government)			
Applicant participates in the National Flood Insurance Program			
Plan Requirement			
Project conforms with State Mitigation Plan per 44 CFR Part 201			
Project conforms with Local Mitigation Plan per 44 CFR Part 201			
Project conforms with Indian Tribal Mitigation Plan per 44 CFR Part 201			
Scope of Work			
SOW describes the proposed solution			
Alternatives considered as part of the decision-making process			
Project includes photographs of each structure and general project area			
Project includes appropriate maps that orient the reviewer to the entire project area			
Latitude and longitude are provided for each structure			
SOW justifies the proposed solution as the best option over a range of alternatives			
Project site is clearly identified using maps, GPS coordinates, or other means			
Project addresses a repetitive problem or a significant risk to public health			

Application Component	Yes	No	Comment
Project solves a problem independently or constitutes a functional portion of a solution			
Schedule			
A work schedule of 3 years or less is provided			
Budget/Match Source			
A cost estimate/budget is provided that supports the SOW			
If project requires phased or incremental funding, the budget reflects amounts estimated for each funding increment			
Non-Federal cost shares and match sources are identified			
Project should identify potential Duplication of Benefits such as Insurance, Small Business Administration loans if information is available during project development			
Cost-effectiveness and Feasibility			
Project includes a benefit-cost analysis, or alternate cost-effectiveness documentation, such as Substantial Damage verification, and located in a riverine floodplain; or a narrative supporting cost-effectiveness and request for consideration under 5 percent HMGP discretionary funding			
Project includes technical information to support proposed action. For example, level of protection for drainage projects, engineering data to support proposed seismic retrofits, and population data to support safe room placement and size. Elevations are technically feasible.			
Environmental and Historic Preservation			
Project includes information and documentation to demonstrate conformance with 44 CFR Part 9.6 and Part 10			
Project demonstrates that it minimizes harm to the environment			
Project includes construction date for each structure			
Project includes all available information relating to known historic, archaeological, or environmentally sensitive areas (e.g., critical Coastal Barrier Resources Act or Otherwise Protected Area)			
All appropriate Federal, State, and local agencies have been consulted			
Project includes environmental coordination letters or contact information to obtain required coordination information			
Assurances			
FEMA Form 20-16A, Assurances Non-Construction Programs			
FEMA Form 20-16B, Assurances Construction Programs			
FEMA Form 20-16C, Certifications Regarding Lobbying, etc.			

Application Component	Yes	No	Comment
SF-LLL, Disclosure of Lobbying Activities			
Considers long-term changes to the area it proposes to protect and has manageable future maintenance and modification requirements			
Acquisition Demolition / Relocation Information			
Project confirms compliance with timelines and all other criteria set forth in 44 CFR Part 80 requirements			
Project includes Voluntary Participation Documentation for each property			
Documentation (if needed) that the property owner is National of United States or qualified alien			
For properties that are to be relocated, will the structure be relocated outside of the Special Flood Hazard Area?			
Elevation Information			
Project identifies the Base Flood Elevation or Advisory Base Flood Elevation			
Project includes finished floor elevation (Elevation certificate is preferred)			
Project includes proposed elevation height of the structure			
Designed and Implemented consistent with ASCE/SEI 24-05			
Safe Room Information			
Project includes population size and basis			
Designed and implemented consistent with FEMA P-320 or FEMA P-361			
Wind Retrofit Information			
Project includes proposed level of protection			
Designed and implemented consistent with P-804			
Drainage Information			
Project includes initial technical information to support size, costs and local permitting requirements			

F. Safe Room Application Using Pre-Calculated Benefits

Expedited HMGP Application for Residential Safe Rooms

- ◆ The State must have an approved State Administrative Plan and State Hazard Mitigation Plan prior to grant award.
- ◆ If a local jurisdiction is the subapplicant, they must have an approved local mitigation plan in place (or receive an Extraordinary Circumstances exception) prior to grant award.
- ◆ Each safe room included in this project must meet the criteria of FEMA P-320, *Taking Shelter From the Storm, Building a Safe Room For your Home or Small Business*, or FEMA P-361, *Design and Construction Guidance for Community Safe Rooms*.
- ◆ Safe rooms cannot be placed in floodways, velocity zones, Coastal A Zones, or areas subject to coastal storm surge inundation associated with a Category 5 hurricane.
- ◆ If a residential safe room is sited in a Special Flood Hazard Area, the structure must be insured for Flood Damage, and a deed notice must be conveyed to retain this requirement.
- ◆ This project conforms with applicable Hazard Mitigation Grant Program eligibility criteria for all projects.
- ◆ Applicant may request approval for pre-award costs. Implementation costs incurred prior to grant award are not eligible for reimbursement.

State (Grantee) Information

Disaster number: _____

Eligible subapplicant: _____ State or local government _____ Private non-profit entity

Does the project conform to the State/local mitigation plan? _____ Yes _____ No

Applicant Information

Project Title: Residential Safe Room Construction/Installation

Applicant _____

Federal Information Processing Standard (FIPS) Code _____

Federal Tax ID Number (if required) _____

Data Universal Numbering System (DUNS) Number _____

Community NFIP Status: Participating Community ID # _____

In Good Standing _____ Non-participating _____ CRS _____

Legislative District(s) _____

Application prepared by:

Name _____

Title _____

Address _____

City/State/Zip _____

Telephone _____ Email _____

Applicant Agent* _____

Title _____

Address _____

City/State/Zip _____

Telephone _____ Email _____

* Individual authorized to sign financial and legal documents on behalf of the Applicant

Project Information

1. History of hazards and description of the vulnerability to be mitigated

Sample language:

This project is being submitted in response to the recent, severe weather and tornado activity nationwide. It is the intent of the State and affected local jurisdictions to support the placement and availability of safe rooms as a means of providing life-safety level protection for our citizens.

2. Scope/description: Project includes population size and basis

Sample language:

This project proposes to fund the purchase, construction/installation, and verification of 150 residential safe rooms. These safe rooms will be constructed and installed to meet FEMA P-320 or FEMA P-361 design and construction criteria, prior to reimbursement by the Applicant to the property owner; the safe rooms will be verified by a qualified professional to meet FEMA P-320 standards. Prior to closeout, all property-specific data will be provided for entry into NEMIS in order to capture full information for each mitigated property.

3. Project Useful Life: (30 years).

4. Property and Structure Information

- ◆ Address, including geo-location
- ◆ Floodplain map and flood zone information
- ◆ Structure age
- ◆ Photographs

-
- ◆ Proposed action:
 - Safe room placed inside structure (no ground disturbance)
 - Safe room placed above/below ground outside the structure (ground disturbance)
 - ◆ Additional information if identified by FEMA/State/Applicant

Environmental and Historic Preservation Compliance

Each site must be reviewed to determine compliance with environmental and historic preservation compliance requirements and to prepare necessary documentation. FEMA's *Programmatic Environmental Assessment for Hazard Mitigation Safe Room Construction* (June 2011) provides efficiencies for completing the environmental review for this project.

NOTE: FEMA may enter into agreements or other negotiated arrangements with the respective State Historic Preservation Officers and Indian Tribes to allow for expedited review in accordance with Section 106 of the National Historic Preservation Act.

Describe alternatives considered for this project:

Sample language:

Alternative 1 – Do nothing. This alternative will not result in substantial risk reduction and will leave many citizens exposed to future tornado and high-wind damages, including loss of life.

Alternative 2 – Community safe room or evacuation. Tornadoes do not allow for sufficient time to relocate household members to an off-site facility, and evacuation is not viable as travel in severe weather exposes evacuees to another set of risks and hazards with little certainty that they can reach safe haven.

Project Implementation Narrative

Briefly describe the Applicant's process for selecting and prioritizing participants; describe any limits to funding, the proposed project management actions to be taken during implementation and any variations from standard quarterly reporting; and provide a list (or form) to be submitted by property owners to validate eligible costs.

Sample language:

- ◆ *This project limits the amount reimbursable to property owner to up to 50 percent of the cost of the safe room, not to exceed \$3,500 OR This project limits the amount of each safe room to \$7,000 (or other value).*
- ◆ *Participants were prioritized based on damaged areas and dates costs were incurred.*
- ◆ *Participants will be accepted as long as funds are available. Over submittals will be considered if additional funds become available.*
- ◆ *Quarterly reports will include current totals of completed, verified sites and associated costs for each completed site.*

-
- ◆ Applicant reserves the right to expand this project as long as the application period is open.
 - ◆ Site verification form will be provided for each site location (Attachment 2).

Project Work Schedule (not to exceed 3 years)

Sample:

0–6 months: Initiate outreach-marketing; identify participants

3–12 months: Verify FEMA P-320 or FEMA P-361 criteria and all program eligibility requirements have been met for known sites.

12 months (prior to application period closing): Revise project if necessary to include more participants.

12–30 months: Provide quarterly progress reports indicating volume of completed verified actions; complete project implementation.

30–36 months: Collect all closeout data and complete data dissemination to local emergency medical services.

Cost-effectiveness Review

Sample language:

A cost-effectiveness evaluation has been performed for residential safe rooms in the (State of _____ / County of _____) and produced benefits as reflected on Table 1. These benefits are based on general sampling statewide and are based on 3 persons per household served by each safe room.

Options for capturing additional benefits: If the benefits listed in Table 1 are not sufficient to produce a ratio greater than 1:1 for this project, additional benefits may be obtained by increasing household population, where appropriate, verifying the structure type (manufactured housing produces more benefits than standard construction), and/or using a more specific local valuation that may include higher benefits based on specific risk. Technical support is available if needed.

Budget/Funding Information

Sample budget:

Cost Item	Quantity	Est. Cost Each	Total Est. Cost	Est. Fed Share	Estimated Match Share
Data Collection	150	\$100	\$15,000	\$15,000	—
Material/Construction	150	\$5,000	\$750,000	\$525,000 ⁽¹⁾	\$225,000
Project Management	150	\$200	\$30,000	\$30,000	—
Inspection Certification	150	\$200	\$30,000	\$30,000	—
Design/Engineering Review	150	\$200	\$30,000	30,000	—

Cost Item	Quantity	Est. Cost Each	Total Est. Cost	Est. Fed Share	Estimated Match Share
Verification/Closeout	150	\$100	\$15,000	\$15,000	—
Outreach	—	—	\$15,000	\$15,000	—
Data Dissemination ⁽²⁾	—	—	\$15,000	\$15,000	—
Grand Total	NA	NA	\$900,000	\$675,000	\$225,000

NOTES:

Line items for Data Collection, Project Management, Design, and Outreach could be phased. This would allow limited fund release to identify participants and collect data to complete required environmental and historic preservation reviews.

General-cost line items are samples, not all costs may be required; amounts are variable. Additional line items may be included as necessary. These values are based on historical submittals and averages.

(1) This example limits reimbursement to property owner to \$3,500.

(2) With property owner authorization, provide safe room geo-data to local emergency medical services in usable format.

**All Federal Share Obligations of \$1,000,000 or More
Must Complete the Large Project Notification Process Prior to Approval**

Aggregate Benefits By State (Abridged List)			
Alabama	\$13,336.96	Nebraska	\$9,921.78
Arkansas	\$16,717.85	North Carolina	\$5,723.26
Georgia	\$5,290.98	Ohio	\$11,469.38
Illinois	\$13,685.72	Oklahoma	\$18,366.36
Iowa	\$14,962.87	Pennsylvania	\$4,065.90
Indiana	\$18,126.34	South Carolina	\$6,139.38
Kansas	\$14,005.75	South Dakota	\$5,230.17
Kentucky	\$13,554.96	Tennessee	\$13,579.58
Louisiana	\$9,921.94	Texas	\$5,421.32
Michigan	\$6,522.49	Virginia	\$3,936.05
Missouri	\$15,654.96	West Virginia	\$4,973.50
Mississippi	\$20,067.64	Wisconsin	\$9,025.48
Minnesota	\$7,092.39		

**Final Documentation and Certification Variable by State/Region
(FEMA/State/Applicant may include additional items)**

- Property Owner Name
- Property Address, including geo-location for Safe Room
- Verification of FEMA P-320 or FEMA P-361 criteria
- Installation Inspection
- Conforms to Categorical Exclusion or Environmental Assessment
- Conforms to Local Floodplain Ordinance (if applicable)
- Flood Insurance Deed Tag (if applicable)
- Final Cost list
- Property owner permission to distribute GEO-location to local emergency medical services (optional)

G. Generator FAQ

Eligibility of Generators under the Hazard Mitigation Grant Program

General Eligibility and Application Development

1. How does the information in this guidance differ from current practice?

This Hazard Mitigation Assistance (HMA) Guidance establishes that the purchase and installation of generators for the protection of critical facilities is an eligible, stand-alone project type under the Hazard Mitigation Grant Program (HMGP) and is no longer limited only to the 5 Percent Initiative. Generators that constitute a functional portion of an otherwise eligible mitigation solution (critical or not) remain eligible.

2. Are generators still eligible under the 5 Percent Initiative?

Yes. If there is insufficient data to evaluate a generator project using a standard, HMA-approved Benefit-Cost Analysis (BCA) method, the project may be eligible under the 5 Percent Initiative, as described in current HMA Unified Guidance. To perform this evaluation, a narrative description of the project's cost-effectiveness must be provided in lieu of a BCA. However, when data is available to perform a standard, HMA-approved BCA, the standard method must be used.

3. Are eligible critical facilities limited to those listed in this guidance?

No. The critical facilities listed in this guidance are not exhaustive. Eligible critical facilities are generally meant to include, but not be limited to, facilities such as hospitals, fire stations, police stations, and water and waste water treatment plants.

4. Must the generator be permanently installed in, or anchored to, the critical facility, or can it be portable?

Generators for a single facility or building should be permanently installed on site. Portable generators are eligible provided that they meet all HMGP requirements as described in **44 CFR Section 206.434, Eligibility**. The Applicant must ensure that the generator will be in place to protect the facility functions specified in the project application. The Application should describe relevant transport, hook up, and fuel supply and storage requirements at multiple facilities and how these will be executed if the generator is portable.

5. Is the purchase of generators for residential structures an eligible activity?

No. The purchase of a generator for the singular purpose of maintaining power for a single residential structure is not an eligible activity.

6. If a generator is required by code, is the purchase of a generator for these facilities eligible?

Yes, provided that the generator project meets all HMGP requirements as described in **44 CFR Section 206.434, Eligibility**.

7. What size generator is appropriate for a facility?

This will vary by facility and usage. It is not always necessary for the generator to support facility operations to their full capacity, but it should be sized appropriately to ensure the facility is able to provide uninterrupted critical functions in the event of future power outages.

8. Is there a National Emergency Management Information System (NEMIS) code for generators as a stand-alone project type?

Yes. The new NEMIS code for stand-alone generator projects is **601.2 – Generator Regular**. The NEMIS code for generator projects as part of the 5 percent discretionary allowance is **601.1 – Generator**.

Cost-effectiveness

9. Will FEMA develop a separate BCA module for generators?

No. A separate module is not necessary to perform the analysis. The Damage Frequency Assessment (DFA) module is able to perform this analysis for multiple hazards and project types. If you experience problems using the DFA module, contact the BC helpline at bchelpline@fema.dhs.gov.

10. What are the key elements of a BCA for generator projects?

Key inputs required are:

- a. **Project Useful Life:** According to **OMB Circular A-76, Performance of Commercial Activities**, the useful life for generators or generator sets is 19 years. This value can be used as the default useful life value when performing the BCA. It may be altered based on manufacturer warranty or other documentation that can demonstrate that the generator may be able to provide service for longer than 19 years. Analysts should use the 19-year project useful life first.
- b. **Project Costs:** The cost of generators varies by size, installation, and purpose. The generator's size and specifications should be reasonable, appropriate, and necessary to continuing critical functions of the facility. The exact costs for generators, installation, and components should be provided by the subapplicant and included in the costs when performing the BCA.
- c. **Facility and Value of Service:** Analysis for facilities for potable water, waste water, police stations, fire stations, and hospitals can be quickly performed using FEMA's BCA toolkit and the DFA module, which provides service values for these facilities. To use these values, the analyst will need some information regarding the population served by the facility. For example, if a generator is to be installed at a waste water treatment plant, the analyst will need to know how many customers are served by the facility, as well as how many days the facility was not able to operate because of power failure. These values can typically be obtained from the facility manager and can be provided on official letterhead for documentation purposes.

-
- d. **Recurrence Determination:** Recurrence information used in the analysis may vary by location or by cause of power failure, such as wind or flood. See FAQ #17 for additional information.
 - e. **Other Benefits:** Other benefits (or costs avoided) may be included if they are addressed by the generator project.

11. What information is needed to perform a BCA for generator projects?

Information needed for performing the BCA will vary by facility. However, the following inputs are **required** to run the BCA module:

- 11.1 For **all BCAs** performed, the subapplicant must provide the following:
 - a. The total project cost
 - b. Useful life (19 years for generators)
 - c. Estimated yearly maintenance costs
 - d. The frequency of the event used in analysis that would cause a power failure demonstrating the need for a backup power source (generator)
 - e. The number of days that service was affected (without power)
- To calculate the value of services (benefits to society), the following inputs **must** be included for each specified facility type:
 - 11.2 For Water or Waste Water Services:
 - a. The number of customers affected by the power outage at the treatment plants
 - 11.3 For Hospitals
 - a. The number of people served by the hospital
 - b. The distance in miles between the hospital being analyzed and the hospital that would treat these people in the event the hospital was inoperative
 - c. The number of people normally served by the alternate hospital
 - 11.4 For Police Stations
 - a. The type of station (metropolitan, city, or rural)
 - b. The number of people served by the police station
 - c. The number of officers that work at the station and would serve the same area if the station were shut down as a result of a disaster
 - 11.5 For Fire Stations
 - a. The number of people served by the station
 - b. The type of area served by the fire station (urban, suburban, rural, wilderness)
 - c. The distance in miles to the nearest fire station that would provide protection for the area normally served by the fire station affected

- d. Does the fire station provide emergency medical services?

Value of service for hospitals, police, and fire stations are in the DFA module by selecting Non Residential Buildings for the Facility Type for Loss of Function in the DFA modules as shown in the screen shots below.

PROJECT: Test Generator, STRUCTURE: test generator
MITIGATION TYPE: Damage-Frequency Assessment - TBD

Save and Go Back

TYPE OF SERVICES

Facility Type For Loss of Function *

Utilities

Roads/Bridges

Non Residential Buildings

Not Applicable

Save and Go Back

PROJECT: Test Generator, STRUCTURE: test generator
MITIGATION TYPE: Damage-Frequency Assessment - TBD

Facility Type *

Fire Station Hospital Police Station Other

Fire Station

How many people are served by this fire station? * 0

Indicate the type of area served by this fire station * == SELECT == 0.0

What is the distance in miles between this fire station and the fire station that would provide fire protection for the geographical area normally served by this fire station? * 0.0

Does the fire station provide Emergency Medical Services (EMS)? Yes No

Fire Station with EMS * 0.0

What is the distance in miles between this fire station and the fire station that would provide EMS for the geographical area normally served by this fire station? * 0.0

Show Total (\$/day) 0.00

12. Are the benefits limited to damages avoided to the facility?

No, benefits are not limited to just damages avoided. The value of service for critical facilities can be used to demonstrate cost-effectiveness. The value of services for critical infrastructure and facilities are included in the BCA toolkit, which is available at <http://www.fema.gov/benefit-cost-analysis>. All costs associated with power failure that would be mitigated by a generator should be considered.

Additional losses can be included in the BCA if those losses are a direct result of interrupted power service that a generator would have mitigated. For waste water treatment plants, additional costs are sometimes required to bring the facility back to operating status after an extended power failure. This may include removal of sludge in equipment or additional man hours needed to bring the facility back to operational status. Those additional costs can be included above and beyond the value of service costs if a generator would have prevented those additional costs.

13. Can an Applicant consider multiple hazards in the BCA?

Yes. Multiple hazards may disrupt power supply. The Applicant will need to provide the frequency of each hazard used in its analysis.

14. How does an Applicant develop the return interval for an event requiring the use of a generator?

The recurrence interval used in the analysis will depend on the hazard that caused or will cause the facility to lose power. For example, in the New York City metropolitan area, winds of 85 miles per hour could equate to a 25-year recurrence interval. For other hazards, such as extreme snow fall, information about prior snow fall totals could be validated to estimate the recurrence interval. Recurrence interval data can be obtained from a number of sources, such as the National Weather Service for rainfall and ice storms and the U.S. Geological Survey for floods. If three or more past

events resulted in power failure, the DFA module can calculate the recurrence interval based on the years of the events. Question #17 provides some useful tools to assist in frequency determination.

Generally, two events are required to perform the analysis. Applicants/subapplicants are encouraged to provide as much historical damage information as they can. Projects submitted with one frequency will be considered acceptable.

15. In the case of a water treatment plant, is the cost of providing temporary water or other emergency protective measures considered a future cost avoided?

Yes. If the generator will negate the need for temporary water in the future, then those costs should be included in the analysis.

16. Are environmental benefits included in the BCA?

To the extent they can be captured and justified, environmental costs associated with raw sewage discharge can be included in the BCA for waste water treatment plants. FEMA does not have a default value for these associated costs, and these costs will vary by location. The Applicant/subapplicant should include all reasonable costs that will be mitigated by having a backup generator installed at a facility.

17. What resources are available to determine recurrence interval values?

Recurrence intervals may be determined by using some of the tools provided below:

- ◆ If the facility lost power as a result of wind damage to power lines feeding the facility, the analyst can utilize the Advanced Technology Council Wind Speed tool available at <http://www.atcouncil.org/windspeed/index.php> to determine the frequency of the coastal wind event.
- ◆ If power outages are attributed to flooding, recurrence information for the flooding event should be used in the analysis. The National Weather Services provides the Precipitation Frequency Data Server at <http://hdsc.nws.noaa.gov/hdsc/pfds/>, which can be utilized to establish a frequency for various precipitation events.
- ◆ U.S. Geological Survey stream gauge data can also be used to extrapolate frequency information for flood events, details of which can be found in the *Supplement to the Benefit-Cost Analysis Reference Guide* in the FEMA library at <http://www.fema.gov/library/viewRecord.do?id=4830>.
- ◆ National Snow and Ice Data Center (National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, National Science Foundation) at <http://nsidc.org/data/search/data-search.html>.
- ◆ Insurance claims, BureauNet information, damage repair records, data from the State/local agency, or local government Newspaper accounts citing credible sources (other than homeowner accounts) could be used in conjunction with the DFA module's unknown frequency calculator. Using this method may require more time as three events are required for analysis.

18. How should emergency operations centers (EOCs) be evaluated for inclusion in the BCA toolkit?

Finding the value (in loss of service terms) of a State Emergency Operation Center to prove cost-effectiveness of a generator project is difficult. FEMA will allow reasonable and justified “loss of service” costs for State and local EOCs that are identified by the Grantee to be entered into the DFA module to evaluate cost-effectiveness of an EOC generator project. Another or additional option is to investigate the costs of remobilizing an EOC to an alternate / continuity of operations location that could be avoided should the EOC be supplied with an uninterruptible power source such as a generator.

Scenarios

Different power failure scenarios at various facilities are outlined below. For analysis purposes, each facility was reviewed using 4 days of loss of service due to power failure at the 25-year recurrence. The 25-year recurrence interval for the test cases is based on observed wind speeds and the frequency was extrapolated using the Advanced Technology Council Wind Speed tool for the New York metropolitan area. Other project locations should use the appropriate recurrence intervals for the hazard being mitigated. Analysis was performed using the DFA module in the BCA Toolkit.

The scenarios are for demonstration purposes only. Dollar amounts and frequency intervals were chosen for comparison purposes only. Analysts should use the appropriate values for the facility being examined. For those performing the analysis, assistance is available through the benefit-cost helpline at bchelpline@fema.dhs.gov or at 1-855-540-6744. The helpline is not allowed to perform or review analyses but can provide answers to specific questions regarding methodologies.

When performing the BCA, inputs used in the module should be documented, as with all analysis. Documentation sources may include, but are not limited to, correspondence with facility or site managers, data available from the county or facility Web site, information from other government Web sites, media releases, engineering analysis, and letters from the facility manager. Discussion of data documentation is available in the BCA training materials available on FEMA.gov. There are no special or extraordinary data documentation requirements for this project type.

Scenario 1: The Purchase and Installation of a Generator at an Urban Police Station

Assumptions:

- ◆ The police station has 119 officers who serve up to 27,000 residents
- ◆ The police station loses power and the efficiency of the police station drops to 50 percent (assumes 50 percent of the force are working out of other facilities or within the community)
- ◆ The power is not fully restored for 4 days
- ◆ The project useful life for the generator is 19 years
- ◆ The project cost is \$50,000

Benefit-Cost Ratio:

- ◆ The resulting benefit-cost ratio (BCR) is 1.23

Scenario 2: The Purchase and Installation of a Generator at an Urban Fire Station

Assumptions:

- ◆ The fire station has 119 firefighters who serve up to 27,000 residents
- ◆ The fire station loses power and the efficiency of the fire station drops to 50 percent
- ◆ The power is not fully restored for 4 days
- ◆ The project useful life for the generator is 19 years
- ◆ The project cost is \$50,000

Benefit-Cost Ratio:

- ◆ The resulting BCR is 0.80

Scenario 3: The Purchase and Installation of a Generator at an Urban Hospital

Assumptions:

- ◆ The hospital serves up to 27,000 residents
- ◆ The power is not fully restored for 4 days
- ◆ The project useful life for the generator is 19 years
- ◆ The project cost is \$200,000

Benefit-Cost Ratio:

- ◆ The resulting BCR is 1.0

Scenario 4: The Purchase and Installation of a Generator at a Rural Area Water Treatment Plant (Potable Water)

Assumptions:

- ◆ The water treatment plant serves up to 15,000 customers
- ◆ The plant loses power for 3 days
- ◆ A 100-year recurrence interval is used
- ◆ The project cost is \$200,000

Benefit-Cost Ratio

- ◆ The resulting BCR is 1.05

Scenario 5: The Purchase and Installation of a Generator at an Urban Area Waste Water Treatment Plant

Assumptions:

- ◆ The waste water treatment plant serves up to 500,000 residents
- ◆ The waste water treatment plant loses power and there is no service
- ◆ The power is not fully restored for 4 days
- ◆ The project useful life for the generator is 19 years
- ◆ The project cost is \$1,500,000

Benefit-Cost Ratio:

- ◆ The resulting BCR is 24.8

H. Eligibility and Completeness Review Checklist for Planning Subapplications

Applications submitted to FEMA that do not contain at least the basic components listed below may be immediately denied because there is no method to determine eligibility without this data. Additional information may be requested during FEMA review. This information is required for all submittals, including potential substitutions.

Application Component	Yes	No	Comments
General			
Documentation included in the subapplication?			
Technical Assistance Needed? Subapplicant is encouraged to contact the State (Applicant) to request application development assistance. FEMA resources may be available but will only be provided if requested by the Applicant.			
Applicants			
Applicant included management costs for delivery of technical assistance for mitigation planning (e.g., plan reviews, planning workshops, training)			
Scope of Work (SOW)			
Proposed planning activity is consistent with 44 CFR Part 201			
Proposed planning activity is described, including whether it will result in a new or updated hazard mitigation plan (including public involvement, identification of hazards, development of a comprehensive risk/vulnerability assessment, identification of mitigation goals and strategies, and plan implementation) or enhance an existing mitigation plan through a planning-related activity			
Participating jurisdiction(s) are identified and described			
A statement is provided on how the overall planning effort will be coordinated			
SOW is consistent with work schedule and cost estimate (describes entire planning process)			
For mitigation plan updates, the SOW describes the process that each jurisdiction will complete to review each section of the previous plan and address gaps, as needed; new information (including hazard, land use, and development trends); how the previous plan was implemented; and what process will be used			
Copy of the plan review document (i.e., review tool or crosswalk) from the FEMA approval of the previous plan is included, if available/applicable			

Application Component	Yes	No	Comments
Schedule			
Work schedule of 3 years or less is provided and allows sufficient time for State and FEMA reviews; preparation of required revisions, if needed; formal adoption by the jurisdiction(s); and FEMA approval			
Cost Estimate			
Cost estimate supports the SOW and is reasonable for the jurisdictions participating			
Assurances			
FEMA Form 20-16A, Assurances Non-Construction Programs			
FEMA Form 20-16C, Certifications Regarding Lobbying, etc.			
SF-LLL, Disclosure of Lobbying Activities			

I. EHP Checklist

“Yes” indicates that the environmental regulation or statute may apply to your project.

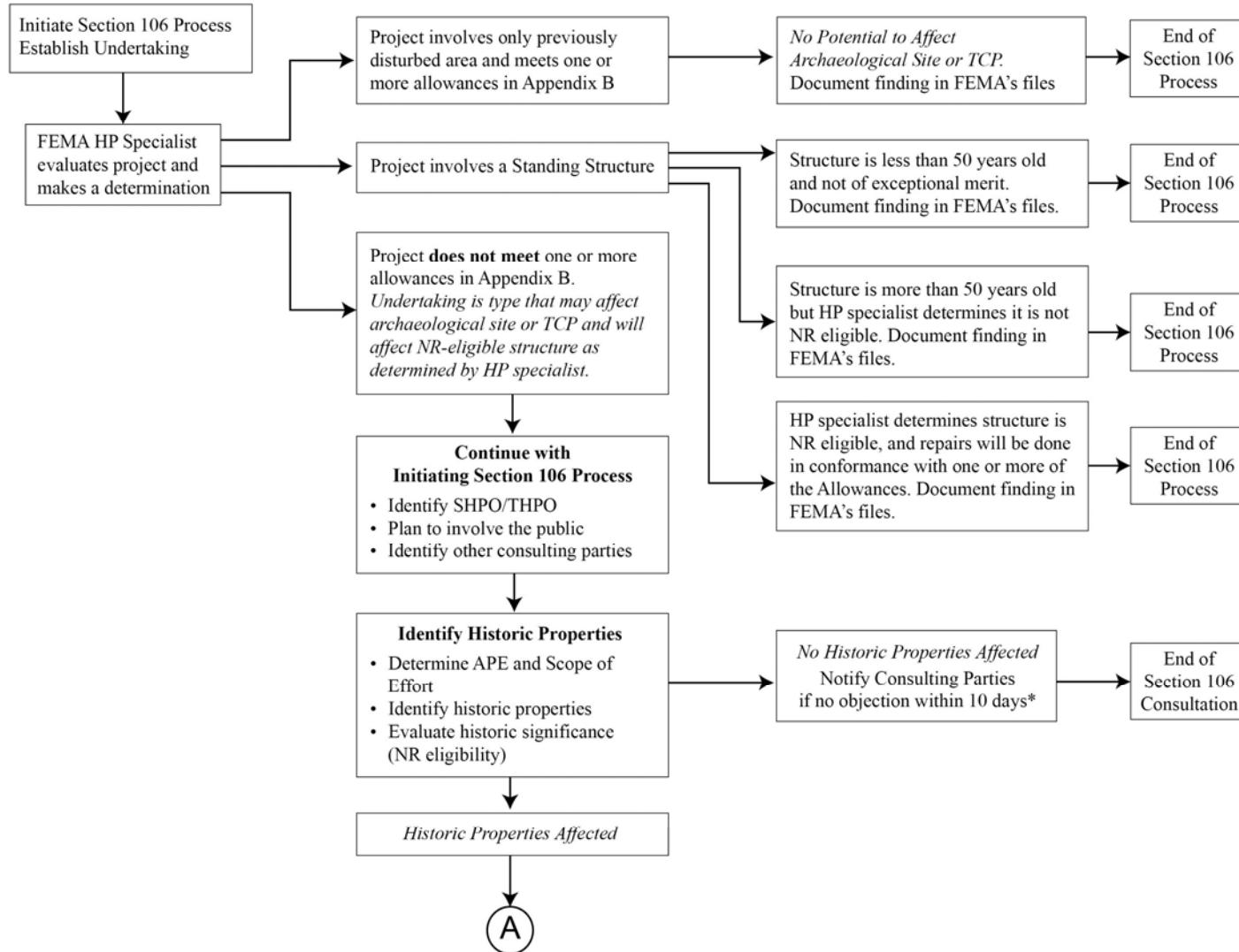
Environmental Regulation or Statute		Yes	No
National Historic Preservation Act			
1.A	Would the proposed project affect, or is the proposed project in close proximity to, any buildings or structures 50 years or more in age?		
1.B	Will the proposed project involve disturbance of ground?		
Endangered Species Act and Wildlife Coordination Act			
2.A	Are federally listed or endangered species, or their critical habitat, present in or near the project area and, if so, which species are present?		
2.B	Will the proposed project remove or affect vegetation?		
2.C	Is the proposed project in or near (within 200 feet), or likely to affect, any type of waterbody or body of water?		
Clean Water Act, Rivers and Harbors Act			
3.A	Will the proposed project involve dredging or disposal of dredged material, excavation, the addition of fill material, or result in any modification to water bodies or wetlands designated as “waters of the United States” as identified by the U.S. Army Corps of Engineers or on the National Wetland Inventory?		
Executive Order 11988 (Protection of Floodplains) and Executive Order 11990 (Protection of Wetlands)			
4.A	Does a Flood Insurance Rate Map, Flood Hazard Boundary Map, hydrological study, or some other source indicate that the project is located in, or will affect, a 100-year floodplain, a 500-year floodplain (if a critical facility), an identified regulatory floodway, or an area prone to flooding?		
4.B	Is the proposed project located in, or will it affect, a wetland as listed in the National Wetland Inventory?		
4.C	Will the proposed project alter a watercourse, water flow patterns, or a drainage way, regardless of its floodplain designation?		
4.D	Is the proposed project located in, or will it affect, a floodplain or wetland? If yes, the 8-step process summarized in Appendix J must be completed.		
Coastal Zone Management Act			
5.A	Is the proposed project located in the State’s designated coastal zone?		
Farmland Protection Policy Act			
6.A	Will the proposed project convert more than 5 acres of “prime or unique” farmland outside city limits to a non-agricultural use?		
Resource Conservation Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act			
7.A	Is there reason to suspect there are contaminants from a current or past use on the property associated with the proposed project?		
7.B	Are there any studies, investigations, or enforcement actions related to the property associated with the proposed project?		
7.C	Will any project construction or operation activities involve the use of hazardous or toxic materials?		

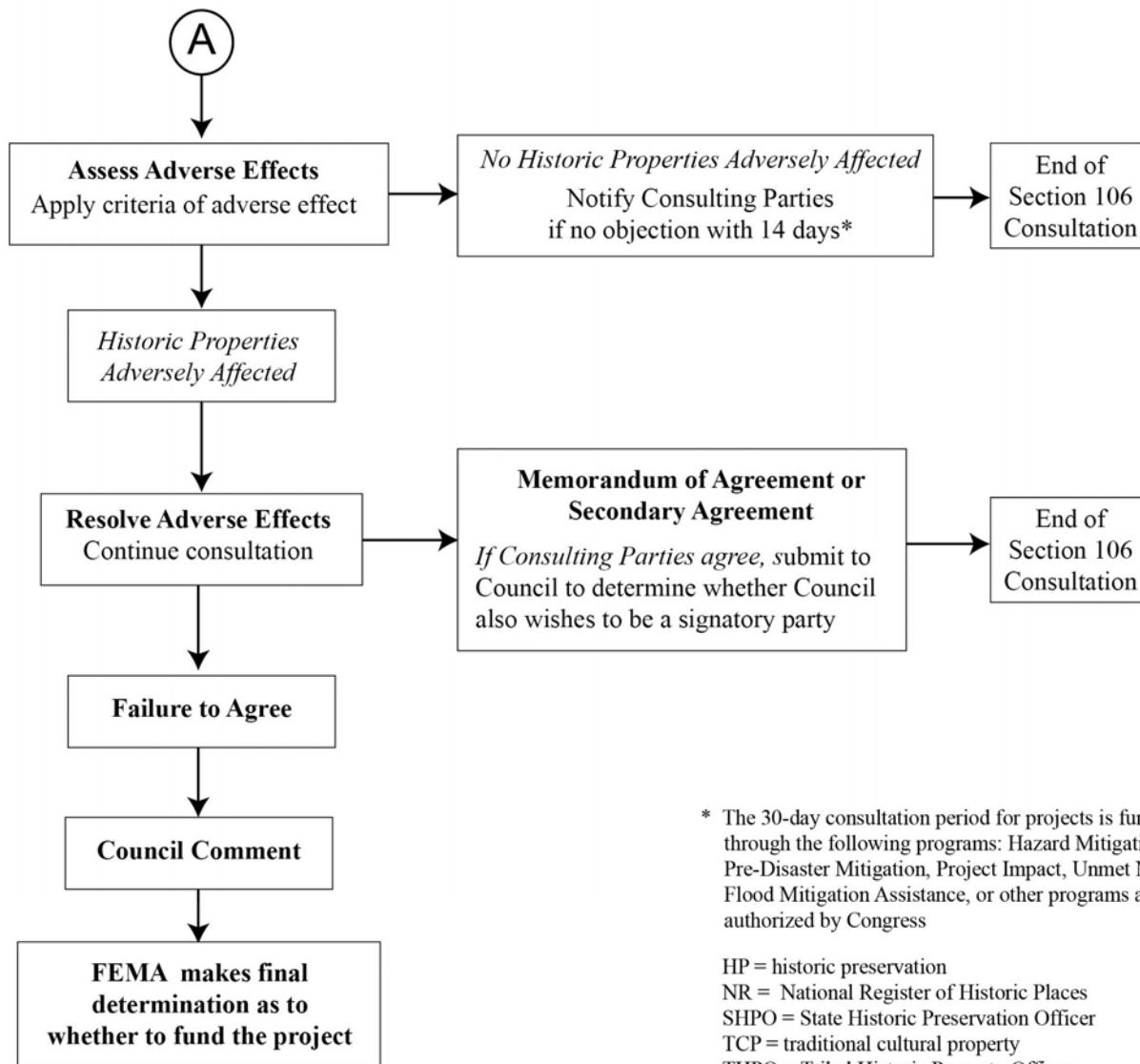
Environmental Regulation or Statute		Yes	No
7.D	Are any of the current or past land uses of the property associated with the proposed project or are any of the adjacent properties associated with hazardous or toxic materials?		
Executive Order 12898 (Environmental Justice for Low Income and Minority Populations)			
8.A	Are there any low-income or minority populations in the project's area of effect or adjacent to the project area?		
Other Environmental/Historic Preservation Laws (including applicable State laws) or Issues			
9.A	Are other environmental/historic preservation requirements associated with this project?		
9.B	Are any controversial issues associated with this project?		
9.C	Have any public meetings been conducted, or public comment solicited, on the proposed project?		

J. 8-Step Decision Making Process for Floodplain Management Considerations

- Step 1.** Determine whether the proposed action is located in a wetland and/or the 100-year floodplain (500-year floodplain for critical actions) and whether it has the potential to affect or be affected by a floodplain or wetland (see 44 CFR Section 9.7).
- Step 2.** Notify the public at the earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision-making process (see 44 CFR Section 9.8).
- Step 3.** Identify and evaluate practicable alternatives to locating the proposed action in a floodplain or wetland (including alternative sites, actions, and the “no action” option) (see 44 CFR Section 9.9). If a practicable alternative exists outside the floodplain or wetland, FEMA must locate the action at the alternative site.
- Step 4.** Identify the potential direct and indirect impacts associated with the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action (see 44 CFR Section 9.10).
- Step 5.** Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under Step 4, restore and preserve the natural and beneficial values served by floodplains, and preserve and enhance the natural and beneficial values served by wetlands (see 44 CFR Section 9.11).
- Step 6.** Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards, the extent to which it will aggravate the hazards to others, and its potential to disrupt floodplain and wetland values, and second, if alternatives preliminarily rejected at Step 3 are practicable in light of the information gained in Steps 4 and 5. FEMA shall not act in a floodplain or wetland unless it is the only practicable location (see 44 CFR Section 9.9).
- Step 7.** Prepare and provide the public with a finding and public explanation of any final decision that the floodplain or wetland is the only practicable alternative (see 44 CFR Section 9.12).
- Step 8.** Review the implementation and post-implementation phases of the proposed action to ensure that the requirements stated in 44 CFR Section 9.11 are fully implemented. Oversight responsibility shall be integrated into existing processes.

K. Section 106 Process under the National Historic Preservation Act





* The 30-day consultation period for projects is funded through the following programs: Hazard Mitigation Grant, Pre-Disaster Mitigation, Project Impact, Unmet Needs, Flood Mitigation Assistance, or other programs as authorized by Congress

HP = historic preservation
 NR = National Register of Historic Places
 SHPO = State Historic Preservation Officer
 TCP = traditional cultural property
 THPO = Tribal Historic Property Officer

L. Application for Advance Assistance

Hazard Mitigation Grant Program (HMGP) Advance Assistance Pilot Optional Application

The State of _____ requests \$_____ in Advance Assistance¹ for DR_____ pursuant to Section 1104 of the Sandy Recovery and Improvement Act (SRIA) of 2013 to accelerate implementation of the Hazard Mitigation Grant Program (HMGP). The State will use Advance Assistance to develop mitigation strategies and obtain data to prioritize, select and develop complete HMGP applications in a timely manner, as described in the Project Description (Work Scope) below.

Disaster and Project Number _____

Project Title: Advance Funding Request

Applicant _____

Federal Information Processing Standard (FIPS) Code _____

Applicant's Agent and Contact Information _____

Project Description (Work Scope)

List proposed activities, estimated costs and deliverables. (See Advance Assistance Frequently Asked Questions for list of eligible activities).

Activity	Estimated Cost	Deliverable
1.		
2.		
3.		
(Etc.)		

Work Schedule

Following is a schedule of proposed milestones by quarter for all major activities by which the State proposes to monitor progress for Advance Assistance:

¹States may apply for up to 25 percent of the estimated total HMGP grant amount or \$10 million, whichever is less.

Q1 (First Quarter Following Initial Approval)

Activity	Milestone	Deliverables
1.		
2.		
3.		
(Etc.)		

Budget Information

Total Estimated Cost (Federal and non-Federal cost) _____

Total Federal Cost _____

Line Item Budget

The State may request that FEMA obligate Advance Assistance funds incrementally, based on when the State needs the funds. Please list the obligation schedule by activity below.

Activity	Initial Amount Requested	Second Amount Requested	Third Amount Requested	Total Requested
1,				
2,				
3.				
(Etc.)				

Additional Information Section

Provide any relevant information or explanation.

C

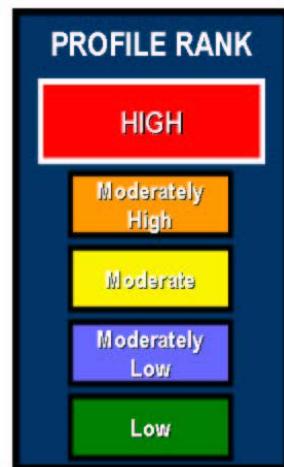
HAZARD ANALYSIS

The hazard identification and ranking was obtained primarily from the Cerritos Hazard Identification Workshop. The Hazard Identification Workshop was conducted as a participatory Steering Committee workshop to identify the potential hazards within the City. The Hazard Identification Workshop was facilitated using an interactive software spreadsheet that asked specific questions on potential hazards and then rated them accordingly. These questions guide the team in the correct facilitation and application of the program. The following information summarizes the Hazard Identification Workshop risk ranking results, including the descriptions of each hazard factor, and provides the specific descriptor choices for each risk factor and description. Additionally, a risk ranking matrix is provided to designate the overall ranking score and categorization of each hazard.

Hazard Identification and Risk Ranking

Each hazard profile included a profile ranking of the hazard (ranging from low risk to high risk). The Steering Committee determined this initial profile ranking based on all of the hazard identification and profile research summarized and group discussion and evaluation of all of the data, including numerical rankings (1-5) of the following criteria:

- **Consequence/Severity** – How wide spread is the impact area?
- **Secondary Effects** – Could the event trigger another event and separate response?
- **Probability/Frequency** – Historical view of how often this type of event occurs locally and projected recurrence intervals.
- **Warning/Onset** – Advance warning of the event, or none.
- **Duration** – Length of elapsed time where response resources are active.
- **Recovery** – Length of time until lives and property return to normal.



Risk Factors for Hazard Identification

Risk Factor	Description	Descriptors	Value
Probability/ Frequency	Prediction of how often a hazard will occur in the future	Infeasible event - not applicable due to geographic location characteristics	0
		Rare event - occurs less than once every 50 years	1
		Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
		Regular event - occurs between once a year and once every 7 years	3
		Frequent event - occurs more than once a year	4
Consequence/ Severity	Physical Damage - structures and lifelines Economic Impact – loss of function for power, water, sanitation, roads, etc.	No damage	1
		Minor/slight damage to buildings and structures, no loss of lifelines	2
		Moderate building damage, minor loss of lifelines (less than 12 hours)	3
		Moderate building damage, lifeline loss (less than 24 hours)	4
		Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	5
Vulnerability	Impact Area - area impacted by a hazard event Secondary Impacts - Capability of triggering additional hazards Onset - Period of time between initial recognition of an approaching hazard and when the hazard begins to impact the community	No physical damage, no secondary impacts	1
		Localized damage area	2
		Localized damage area, minor secondary impacts, delayed hazard onset	3
		Moderate damage area, moderate secondary impacts, moderate warning time	4
		Widespread damage area, significant secondary impacts, no warning time	5

Each profile includes a ranking of the hazard. The hazard rankings were determined by assigning each hazard the appropriate risk factors as described above. The risk factors were then used with a hazard ranking matrix to determine the final hazard score. The following table provides the matrix used for determining each hazard's score.

Risk Ranking Matrix							
Probability/Frequency Description	Risk Ranking Matrix						
	Probability/Frequency		Consequence/Severity				
Rare Event: Occurs less than once every 50 years	Value	1	1	2	3	4	5
	Vulnerability	1	1	2	3	4	5
		2	2	4	6	8	10
		3	3	6	9	12	15
		4	4	8	12	16	20
Infrequent Event: Occurs between once every 8 years and once every 50 years (inclusive)	Value	1	1	2	3	4	5
	Vulnerability	1	2	4	6	8	10
		2	4	8	12	16	20
		3	6	12	18	24	30
		4	8	16	24	32	40
Regular Event: Occurs between once a year and once every 7 years	Value	1	1	2	3	4	5
	Vulnerability	1	3	6	9	12	15
		2	6	12	18	24	30
		3	9	18	27	36	45
		4	12	24	36	48	60
Frequent Event: Occurs more than once a year	Value	1	1	2	3	4	5
	Vulnerability	1	4	8	12	16	20
		2	8	16	24	32	40
		3	12	24	36	48	60
		4	16	32	48	64	80
		5	20	40	60	80	100

The hazard scores from the Hazard Ranking Matrix were compared to the hazard rank criteria to finally categorize each hazard with a hazard ranking. The table below provides the value determinations for each hazard ranking.

Risk Rank Categorization	
High Hazard	50 to 100
Moderately High Hazard	25 to 49
Moderate Hazard	15 to 24
Moderately Low Hazard	5 to 14
Low Hazard	1 to 4

The hazard ranking worksheets are provided in the following pages.

HAZARD IDENTIFICATION AND RISK RANKING

Earthquake

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
Consequence	Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	5
Vulnerability	Widespread damage area, significant secondary impacts, no warning time	5
Risk	High	50
Comments		

Windstorm

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Rare event - occurs less than once every 50 years	1
Vulnerability	Minor/ slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	2
Consequence	Localized damage area	2
Risk	Low	4
Comments		

Flood/ Dam Failure

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Rare event - occurs less than once every 50 years	1
Consequence	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	3
Vulnerability	Moderate damage area, moderate secondary impacts, moderate warning time	4
Risk	Moderately Low	12
Comments		

HAZARD IDENTIFICATION AND RISK RANKING

Transportation Accident/Incident

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Rare event - occurs less than once every 50 years	1
Consequence	Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability	4
Vulnerability	Moderate damage area, moderate secondary impacts, moderate warning time	4
Risk	Moderate	16
Comments		

Terrorism

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Rare event - occurs less than once every 50 years	1
Consequence	Minor/ slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	2
Vulnerability	Localized damage area	2
Risk	Low	4
Comments		

Pipeline Failure/ Hazardous Material Release

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Rare event - occurs less than once every 50 years	1
Consequence	Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability	4
Vulnerability	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderately Low	12
Comments		

HAZARD IDENTIFICATION AND RISK RANKING

Drought

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Regular event - occurs between once a year and once every 7 years	3
Consequence	Minor/slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	2
Vulnerability	Localized damage area	2
Risk	Moderately Low	12
Comments		

Urban Fire

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
Consequence	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	3
Vulnerability	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderate	18
Comments		



PUBLIC PARTICIPATION & PLANNING PROCESS DOCUMENTATION

In order to facilitate the development of a Hazard Mitigation Plan that includes valuable input from the community, the City of Cerritos (City) solicited public participation in a survey posted on the City's website. The survey included 10 questions designed to provide insight into the community's opinion on perceived vulnerability to certain hazard events, to clarify which methods the community prefers to receive educational and outreach materials, and to illustrate the participants' overall level of hazard awareness.

D.1 Survey Contents and Responses

This section includes the survey questions followed by the responses received. Over a period of a month, the City received 37 responses from the public. Those responses were tabulated and listed below.

- 1. In the past five years, have you or someone in your household experienced a disaster such as an earthquake, severe windstorm, flood, utility loss, or other type of disaster? Yes or No?**

Yes	No	No Answer	Total
12	24	1	37

- 2. If yes, which of these disasters have you or someone in your household experienced?**

- **Earthquake**
- **Wildfire**
- **Transportation Incident**
- **Flood/ Dam Failure**
- **Pipeline Failure/ Hazardous Materials Leak**
- **Drought**
- **Terrorism**
- **Windstorm**
- **Other:** _____

Hazard	Number	Hazard	Number
Earthquake	11	Drought	5
Wildfire	0	Terrorism	0
Transportation Incident	2	Windstorm	1
Flood/ Dam Failure	1	Other	0
Pipeline Failure/ Hazardous Materials Release	0		

Notes: This is based on the 12 respondents who answered "yes" to Question 1.

There is no total as some respondents may have answered yes to multiple hazards while others may have answered no to all hazards.

3. How concerned are you about the following disasters affecting the City of Cerritos? (Place a checkmark along the line)

Hazard	Not Concerned	Extremely Concerned
Earthquake	_____	_____
Wildfire	_____	_____
Transportation Incident	_____	_____
Flood/ Dam Failure	_____	_____
Pipeline Failure/ Hazardous Materials Leak	_____	_____
Drought	_____	_____
Terrorism	_____	_____
Windstorm	_____	_____

To tally the results for question three, the levels of concern were given numerical values from one to seven with seven being most concerned. The results for each hazard were averaged and then ranked highest to lowest. The result was the following hazard ranking based on the participants' responses.

Table D-1: Participant Hazard Ranking

Hazard	Average Level of Concern
Earthquake	5.3
Drought	4.8
Transportation Incident	4.5
Terrorism	4.3
Pipeline Failure\ Hazardous Material Release	4.2
Windstorm	3.8
Flood/ Dam Failure	3.2
Wildfire	2.7

4. Have you ever received or requested information on ways to make your family and/or home safer from local hazards?

Yes	No	Total
22	15	37

5. How recently did you receive this information?

- In the last 6 months
- 6-12 months ago
- 1-2 years ago
- 2-5 years ago
- More than 5 years ago
- I don't remember

Timeframe	Number	Timeframe	Number
In the last 6 months	3	2-5 years ago	3
6-12 months ago	4	More than 5 years ago	1
1-2 years ago	5	I don't remember	6

Note: This is based on the 22 respondents who answered "yes" to Question 4.

6. From whom did you last receive this information?

- News Media
- Government Agency
- Insurance Agent or Company
- Utility Company

- American Red Cross
- Other Non-profit Organization
- Unsure
- Other: _____

Information Source	Number	Information Source	Number
News Media	6	American Red Cross	3
Government Agency	6	Other Non-profit Organization	1
Insurance Agent or Company	1	Unsure	1
Utility Company	2	Other	2

7. What are the best ways for you to receive information about making your family and home safer from local disasters? (Please check all that apply)

Newspapers:

- Newspaper stories
- Newspaper ads

- Outdoor advertisements (billboards, etc.)

Television:

- Television news
- Television ads

- Books

Radio:

- Radio news
- Radio ads

- Mail
- Fire Department/Rescue
- Internet search
- Fact sheet or brochure available at a City facility or event
- Chamber of Commerce
- Public workshop/meeting
- Magazine

Other methods:

- City of Cerritos newsletter
- City of Cerritos website
- Schools

- Other (please explain)

The following table illustrates the number of responses for each information source listed by total number of responses.

Information Source	Number	Information Source	Number
City of Cerritos Newsletter	29	Outdoor Advertisements	8
Television News	25	Public Workshop/ Meeting	7
Radio News	18	Newspaper Ads	6
City of Cerritos Website	17	Television Ads	6
Newspaper Stories	17	Radio Ads	4
Fact Sheet/ Brochure at City Event	15	Chamber of Commerce	3
Mail	13	Magazine	3
Internet Search	11	Books	2
Schools	10	Other	2
Fire Department Resources	9		

8. What steps, if any, have you or someone in your household taken to prepare for a disaster? (Check all that apply)

Our household has an emergency supply with the following:

- Food
- Water
- Flashlight(s)
- Batteries
- Battery-powered radio
- Medical supplies (First aid kit)
- Fire extinguisher
- Moist towelettes, garbage bags and plastic ties for personal sanitation
- Dust mask or cotton t-shirt (for air filtering)
- Plastic sheeting and duct tape (to shelter in-place)
- Wrench or pliers to shut off utilities

- **Clothing**
- **Sleeping bag or warm blanket for each person**
- **Prescription medications**
- **Important family documents (copies of insurance policies, ID and bank account records)**
- **Other:** _____

Our household has:

- **Smoke detectors in each room of the house**
- **Received First Aid/CPR Training**
- **Made a fire escape plan**
- **Developed a reconnection plan: (where to go and who to call after a disaster)**
- **Discussed utility shutoffs**
- **Other:** _____

The following table illustrates the number of responses for each disaster preparation action listed by total number of responses.

Emergency Supply Item	Number	Emergency Supply Item	Number
Flashlight	32	Personal Sanitation Items	21
Water	30	Fire Extinguisher	19
Batteries	29	Clothing	18
First Aid Kit	28	Dust Mask or T-shirt	16
Food	26	Prescription Medications	16
Wrench or Pliers	25	Plastic Sheeting and duct-tape	14
Radio	24	Important Family Documents	14

Emergency Supply Item	Number	Emergency Supply Item	Number
Sleeping Bag/ Blanket	23	Other	2

Emergency Supply Item	Number	Emergency Supply Item	Number
Smoke Detector in each room	31	Made a Fire Escape Plan	13
Received First Aid/CPR Training	18	Developed a Reconnection Plan	10
Discussed Utility Shutoffs	17	Other	1

9. How long have you lived in the City of Cerritos? _____ years

Years of Residence			
0-15 year	6	36-50 years	16
16-26 year	8	No Answer	1
26-35 years	6		

The years of residence for each participant ranges from three years to 47 years. The average length of residence among participants was 30 years with the majority of responders falling into the 36-50 year residency range.

10. Do you own or rent your home?

Rent	Own	Total
1	36	37

D.2 Inferences

The results of the public survey served three main purposes. It created a profile of the group of responders, provided insight regarding the methods the public would like to receive safety information, and, lastly, it provided the Steering Committee with the public's opinion of the hazard ranking. Conclusions drawn from the collected responses for each of these areas are discussed in more detail in the following subsections.

Participant Profile

It was important for the Steering Committee to identify certain characteristics of the participating group in order to give proper weight to the feedback received. First, each participant was asked to provide their years of residence and whether or not they owned or rented their home. With regards to years of residence, the assumption was made that those who had lived in the City over a long period of time would have a better understanding of the hazards that have affected the City historically. Next, the Steering Committee assumed homeowners would take more interest in their community than renters due to higher personal investment in the long-term stability and functionality of the City. Based on these two assumptions and the responses received (see questions 9 and 10 above), the Steering Committee determined the participating group was invested in the success of the City and had a good grasp of historical hazard events as many of these homeowners have lived in the City more than 30 years.

Next the Steering Committee wanted to assess whether or not the participating group had actively tried to mitigate hazards in their own homes. An assumption was made that those who took a proactive role in mitigating hazards individually would have a better understanding of the City's efforts to mitigate the effects of a regional hazard. While the details of the responses from question 8 can be viewed above, the main point is that over 90 percent of the participants had taken steps to prepare themselves for a disaster. In doing so, this demonstrated to the Steering Committee the participating group was conscious of the threat of hazard events and were proactive about taking steps to mitigate loss. Coupled with their perceived knowledge of historical hazard events and personal investment in the City's progress, the Steering Committee determined the feedback from the participating group was credible and beneficial to the Hazard Mitigation Plan update process.

Methods for Successful Public Outreach

For nearly every hazard identified by the Steering Committee, public education and outreach serves as one of the main ways to mitigate future losses. While the City already has many outreach campaigns in place, the Steering Committee decided it would be useful for the public to comment on which information distribution methods were best for receiving information. The data provided from this line of questioning will allow the City to maximize its outreach efforts by utilizing those methods provided by the public to guide future outreach campaign planning.

As outlined in question 8, 59% of the public had received or requested safety information regarding local hazards. This number is significantly different from the 90% who said they took steps in their homes to protect themselves against disasters. Therefore, nearly half of the participating group took preventive actions without requesting information from local authorities. While this data tells us little about the best ways to reach the public, it provided a little more insight into the participating group profile.

According to the survey results, the primary method the public would like to receive safety information is through the City Newsletter. However, the Steering Committee acknowledged that the survey was advertised through the City Newsletter so many participants may have been notified via this method. Therefore, this result may be biased based on the preferences of the participation group. Conversely, the survey received a great response compared to the level of public participation through other methods. Therefore, the City Newsletter has proven to be a good method for reaching the public. Future outreach campaigns within the City will consider using the City Newsletter whenever appropriate, in addition to exploring other options.

Other methods that received strong support from the public were TV news, radio news, and newspaper stories. The Steering Committee resolved to examine how they could expand the City's use of each of these mediums in future outreach programs. Additionally, the Steering Committee discussed how the average age of each participant may have resulted in less interest in more recent methods for information distribution. The use of social media was discussed as a new element the City should consider incorporating into future outreach programs.

Hazard Profiling

To fulfill FEMA's requirement to include the public in the planning process, the survey participants were asked to rank the hazards identified in the first Steering Committee meeting. The participants ranked the hazards based on their level of concern. The results were tallied and organized greatest to least to create a public hazard ranking. The list

created by the Steering Committee and the Public ranking were reviewed side by side as shown below.

Steering Committee Hazard Ranking	Survey Participant Hazard Ranking
Earthquake	Earthquake
Urban Fire	Drought
Transportation Accident/ Incident	Transportation Incident
Flood/ Dam Failure	Terrorism
Pipeline/ Hazardous Materials Release	Pipeline/ Hazardous Materials Release
Drought	Windstorm
Terrorism	Flood/ Dam Failure
Windstorm	Wildfire

The Steering Committee reviewed the two hazard rankings and considered the difference between each list. The Steering Committee found that those hazards which affected individuals received the highest ranking from the public while the Steering Committee gave a higher ranking to hazards with the most perceived vulnerability to the whole City. The Steering Committee discussed several potential reasons for the differences in perceived vulnerability. The first reason may be that the public might only be privy to hazard information that affects them directly or that is publicized by the media. Another reason might be the manner in which the question was asked. Asking about a personal level of concern may have led participants to reflect only on their personal safety rather than the vulnerability of the entire City. With these two items in mind, the Steering Committee resolved to use the public's ranking as a guide to which mitigation actions would be well received by the community. The Steering Committee assumed when the City implements mitigation measures for hazards which present the highest level of concern, the action will lessen the magnitude of concern and will therefore be viewed favorably by the public. The Steering Committee intends for the City to use this information as a way to include the public's opinion as it continues to implement new mitigation measures.

D.3 Planning Process

The following sections provide additional information and supporting documentation about the planning process implemented by the Steering Committee to update the Hazard Mitigation Plan. For descriptions of the content of each Steering Committee meeting, please refer to Chapter 1.

Steering Committee Announcements

MEMORANDUM

To:

From:

Cc:

Date:

Subject:

Project Background

Congress passed Public Law 106-390 to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act and provide for assistance by the Federal Government to State and local governments in carrying out their responsibilities to alleviate the suffering and damage resulting from disasters. As part of the requirements for receiving Federal Grants for improving a locality's resistance to disasters, each locality must determine their existing vulnerabilities and develop a plan to reduce or eliminate these vulnerabilities and must have this plan approved by the appropriate State officials. The City is currently updating a Hazard Mitigation Plan to fulfill this requirement and prepare for potential disasters.

FEMA Requirements

FEMA requires that the Hazard Mitigation Plan meet certain requirements. First, the plan must be approved by the State Authority in order to receive funding for Hazard Mitigation for disasters following that date. Second, the planning process must be open and public, and must allow the public to have an opportunity to comment during the drafting stage and prior to plan approval. Third, the process must allow other local jurisdictions to be involved in the planning process. Fourth, the plan must incorporate, if appropriate, existing plans, studies, reports and technical information. To meet these requirements, the cities are compiling a Steering Committee that includes representatives from the public and local agencies.

Steering Committee Goals

Guide and provide support to develop a list of hazards, determine the full impacts throughout the cities, interface with partner agencies to determine existing mitigation measures, develop possible approaches to projects which will reduce the impacts on the cities, and prioritize them for implementation.

Steering Committee Responsibilities

The Steering Committee will provide essential insight into the past natural hazard events, current natural hazard vulnerability (including specific locations), critical City assets, and possible mitigation projects. In addition, the Steering Committee will be responsible for reviewing each stage of the document prior to finalization.

Planned Committee Meeting Schedule and Summary

Steering Committee meetings will be held approximately six times during the course of the project, according to the following schedule/topics:

Steering Committee Meeting #1 – Project Initiation, Hazard Identification, & Information Collection

During the Project Initiation Meeting, we will present an overview presentation that details the objectives and scope of the project. After a review of the project schedule and key tasks, the Steering Committee participants' areas of expertise and resultant member responsibilities and the community meeting process will be discussed. Based on each participant's area of expertise, subcommittees will be formed to focus on particular tasks of the Hazard Mitigation Plan.

To effectively characterize each agency's risk and vulnerability, surveys and interviews with appropriate Committee members will be conducted during this meeting. This meeting will also serve as a forum to discuss information that may need to be gathered for the upcoming tasks, including agency background information and asset inventory.

Steering Committee Meeting #2 – Development of Goals and Objectives

During the second Meeting, mitigation goals and objectives will be developed with the intention of reducing or eliminating the potential hazard impacts, which will provide the basis for determining the associated mitigation projects.

Steering Committee Meeting #3 – Asset Inventory and Vulnerability Assessment

As part of the third meeting, the team will develop the asset inventory to determine the quantity of buildings, people, and assets within the City. The asset inventory will include locations and specifications for general building stock, recreational areas, schools, hospitals, and other critical City facilities.

The asset inventory will be used to develop loss estimates for all hazard scenarios. The hazard probabilities and recurrence intervals will be applied to the City assets to determine which assets are subject to the greatest potential damages and which hazard events are likely to produce the greatest potential losses

Steering Committee Meeting #4 – Mitigation Action Identification

At the fourth meeting, the team will identify mitigation actions and projects that will reduce the impact of identified hazards. During the meeting, Steering Committee participants will brainstorm possible projects and actions to mitigate the effects of the identified hazards based on the hazard profiles and loss estimates. As the mitigation projects are identified, the Steering Committee will discuss mitigation action implementation plans according to mitigation action categories, corresponding goals & objectives, responsible departments, available resources, and implementation timeframe.

Steering Committee Meeting #5 – Mitigation Project Benefit-Cost Review

The fifth Meeting will be held to perform a benefit-cost review on each of the identified mitigation actions. The review will consist of identifying all benefits and costs associated with implementing a mitigation action. Once the benefits and costs are calculated, a relative priority will be assigned for each action based upon the evaluation. Prior to the sixth meeting, a draft Plan will be provided to each member of the Steering Committee for comments.

Steering Committee/Planning Team Meeting #6 – Presentation of Final Documents

The final Meeting will be held to present the final draft of the Hazard Mitigation Plan. This Meeting will provide an opportunity for public review and the subsequent timeline for the submission (prior to board/council adoption) of the HMP to Cal EMA and FEMA.

Committee Invitation

The first Steering Committee Meeting is scheduled for July 31, 2014 at 10:00 a.m. and will also include a brief project kickoff presentation. In addition, subsequent Steering Committee Meetings will be scheduled during this meeting. Please notify Rebecca Scott if you are interested in participating on the Steering Committee, and if you are able to attend the first meeting. If you are unable to attend, meeting minutes and a project schedule (including project milestones and meetings) will be emailed to all Steering Committee participants.

Potential Steering Committee Participants

The following list outlines potential Steering Committee participants that should be invited to the initial meeting. The invitation should be documented to be included in the Hazard Mitigation Plan as evidence of public and stakeholder outreach.

1. Community Safety Services Representatives
2. Community and Cultural Services Representatives
3. Community Development Representatives
4. City Finance Representatives
5. Public Works Representatives
6. City Engineering Representatives
7. Local Fire Department Representatives
8. Local Police Department Representatives
9. Los Angeles County Office of Emergency Services Representatives
10. Local Hospital Representatives
11. Local School Representatives
12. Interested Public Representatives
13. Red Cross Representatives
14. Neighboring Agencies Representatives

Steering Committee Meeting #1

City of Cerritos

Hazard Mitigation Plan

Steering Committee Meeting #1:
Project Initiation, Hazard Identification, Information Collection
July 31, 2014



Risk Management Professionals, Inc. – www.RMPCorp.com

MEETING AGENDA

- Project Overview and Background
- Steering Committee Goals
- Risk Assessment Background
- Hazard Identification and Ranking
- Information Collection

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Project Overview

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DISASTER MITIGATION ACT OF 2000

- Revitalized Federal Planning Requirements
 - State and Local Hazard Mitigation Plans
 - Plans must be updated every five years
- Federal Grant Funding Eligibility
 - Hazard Mitigation Grant Program (HMGP)
 - Pre-Disaster Mitigation Program (PDM)
- Disaster Mitigation Act of 2000 is intended to facilitate cooperation between state and local authorities on risk reduction measures and to expedite funding allocation

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PUBLIC PROCESS

DMA 2000 Stresses Public Participation:

- An open public involvement process that is comprehensive, starts early and continuous
- Coordination with neighboring communities and various interest groups in Plan development

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STEERING COMMITTEE GOALS

- Review existing Plan for implementation
- Review the list of potential hazards and add additional hazards for the revision
- Determine the hazard impacts throughout the City of Cerritos
- Interface with partner agencies to determine existing mitigation measures
- Develop possible approaches to projects which will reduce the impacts
- Prioritize mitigation projects for implementation

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STEERING COMMITTEE MEETING SCHEDULE

- Meeting #1 – Project Initiation, Hazard Identification, and Information Collection
- Meeting #2 – Review and Update Goals and Objectives
- Meeting #3 – Asset Inventory and Vulnerability Assessment
- Meeting #4 – Mitigation Action Identification
- Meeting #5 – Mitigation Project Benefit-Cost Review
- Meeting #6 – Presentation of Final Documents

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Risk Assessment Methodology

Risk Management Professionals, Inc. – www.RMPCorp.com

RISK ASSESSMENT – POTENTIAL HAZARDS

• Earthquake	• Transportation Failure
• Utility Loss	• Severe Weather
• Flooding	• Windstorm
• Transportation Accident/Incident	• Urban Fire
• Terrorism	• Drought
• Extreme Heat	• Dam Failure
• Hazardous Materials Release	• Pipeline Failure
	• Other

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RISK RANK METHODOLOGY

- The risk ranking is facilitated using an automated interactive software spreadsheet program that asks specific questions on potential hazards and then assigns a relative value to each potential hazard accordingly.
- The result of the workshop will be a ranked list of hazards to be studied in detail in the Hazard Mitigation Plan.

PROFILE RANK

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HAZARD IDENTIFICATION AND RISK RANKING

	Hazard Rank Factors	Hazard Factor Description	Rank
Earthquake	Probability/Frequency Consequence/Sensitivity Risk Rank Comments	Infeasible event - not applicable due to geographic location characteristics Infrequent event - occurs less than once every 50 years and once every 30 years (inclusive) Regular event - occurs between once every 8 years and once every 7 years Frequent event - occurs more than once a year	0 0 0 0
Wildfire	Hazard Rank Factors Probability Vulnerability Consequence Risk Rank Comments	Not a Hazard	0
Flood	Hazard Rank Factors Probability Vulnerability Consequence Risk Rank Comments	Not a Hazard	0

Hazard Ranking Matrix / Risk Ranking Worksheet

RISK RANKING – PROBABILITY/FREQUENCY

Recurrence Interval – Prediction of how often a hazard will occur in the future, including projected return intervals

Probability/Frequency Rank Descriptors	Rank
Infeasible event - not applicable due to geographic location characteristics	0
Rare event - occurs less than once every 50 years	1
Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
Regular event - occurs between once a year and once every 7 years	3
Frequent event - occurs more than once a year	4

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RISK RANKING – CONSEQUENCE/SEVERITY

Physical Damage – Structures and lifelines
Economic Impact – Loss of power, water, sanitation, roads, etc.

Probability/Frequency Rank Descriptors	Rank
No damage	1
Minor/light damage to buildings and structures, no loss of lifelines, first aid injury and no disability	2
Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	3
Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability	4
Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	5

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RISK RANKING – VULNERABILITY

Impact Area – Area impacted by a hazard event
Secondary Impacts – Capability of triggering additional hazards
Onset - Period of time between initial recognition of an approaching hazard and when the hazard begins to impact the community

Vulnerability Rank Descriptors	Rank
No physical damage, no secondary impacts	1
Localized damage area	2
Localized damage area, minor secondary impacts, delayed hazard onset	3
Moderate damage area, moderate secondary impacts, moderate warning time	4
Widespread damage area, significant secondary impacts, no warning time	5

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RISK RANKING – MATRIX

Probability/Frequency Description	Risk Ranking Matrix						
	Probability/Frequency	Consequence/Severity					
Rare Event: Occurs less than once every 50 years	Value Probability/Frequency	Vulnerability	1	2	3	4	5
			1	2	3	4	5
			2	3	4	5	6
			3	4	5	6	7
			4	5	6	7	8
Inrequent Event: Occurs between once every 8 years and once every 50 years (inclusive)	Value Probability/Frequency	Vulnerability	1	2	3	4	5
			1	2	3	4	5
			2	3	4	5	6
			3	4	5	6	7
			4	5	6	7	8
Regular Event: Occurs between once a year and once every 7 years	Value Probability/Frequency	Vulnerability	1	2	3	4	5
			1	2	3	4	5
			2	3	4	5	6
			3	4	5	6	7
			4	5	6	7	8
Frequent Event: Occurs more than once a year	Value Probability/Frequency	Vulnerability	1	2	3	4	5
			1	2	3	4	5
			2	3	4	5	6
			3	4	5	6	7
			4	5	6	7	8

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RISK RANK CATEGORIZATION

Risk Rank Equation
Risk = Probability x Consequence x Vulnerability

Risk Rank Categorization	
High Hazard	50 to 100
Moderately High Hazard	25 to 49
Moderate Hazard	15 to 24
Moderately Low Hazard	5 to 14
Low Hazard	1 to 4

Hazard Mitigation Plan Risk Management Professionals

Contact Information

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Hazard Mitigation Plan Risk Management Professionals

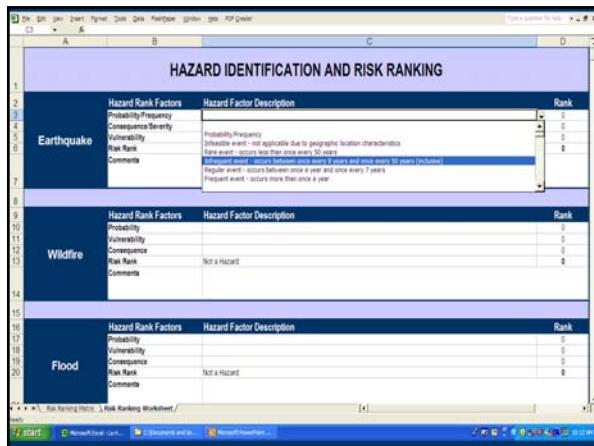
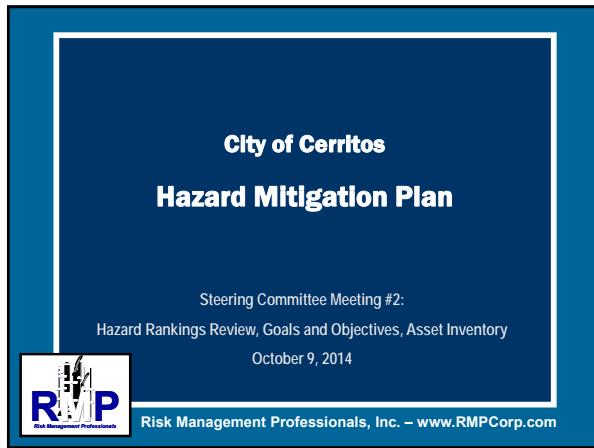
City of Cerritos
HAZARD MITIGATION PLAN-
Meeting #1

July 31, 2014

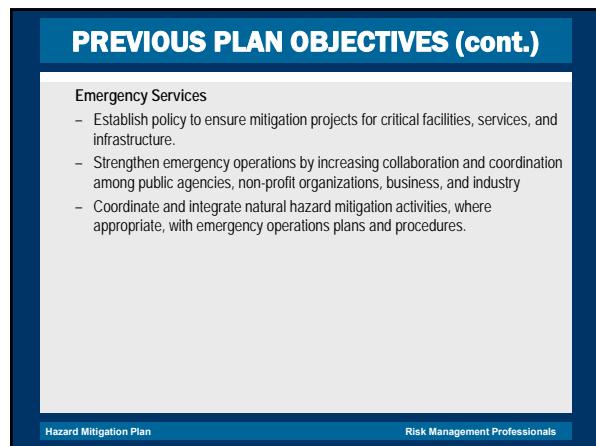
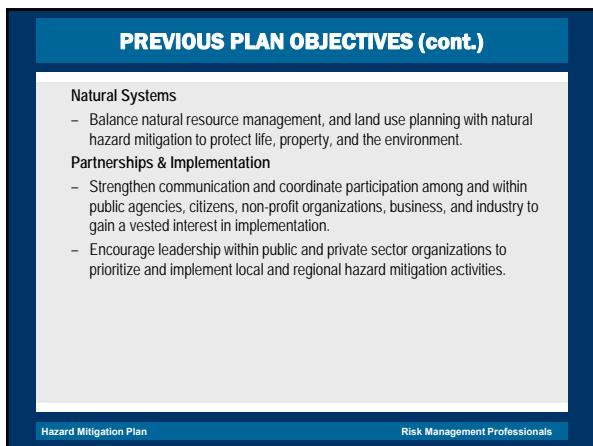
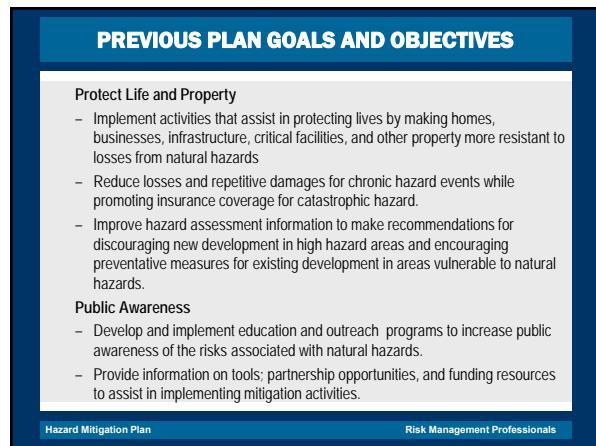
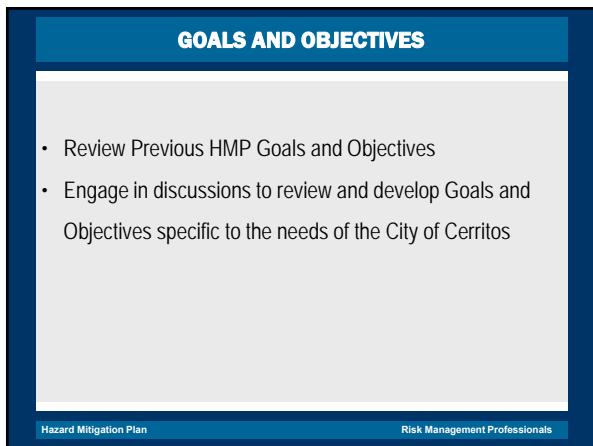
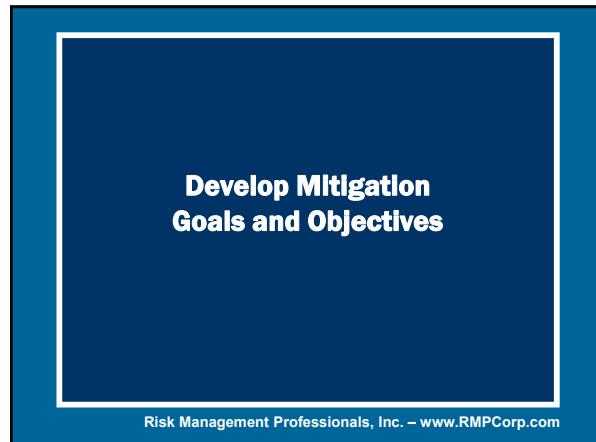
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Steering Committee Meeting #2



Probability/Frequency Description		Risk Ranking Matrix					
Probability	Frequency	Value		Consequence/Severity			
		1	2	3	4	5	
Rare Event:	Occurs less than once every 50 years	1	2	3	4	5	
Vulnerability		1	2	3	4	5	
Infrequent Event:	Occurs between once every 8 years and once every 50 years (inclusive)	2	3	4	5	6	7
Vulnerability		2	3	4	5	6	7
Regular Event:	Occurs between once a year and once every 7 years	3	4	5	6	7	8
Vulnerability		3	4	5	6	7	8
Frequent Event:	Occurs more than once a year	4	5	6	7	8	9
Vulnerability		4	5	6	7	8	9
		5	6	7	8	9	10
		6	7	8	9	10	11
		7	8	9	10	11	12
		8	9	10	11	12	13
		9	10	11	12	13	14
		10	11	12	13	14	15
		11	12	13	14	15	16
		12	13	14	15	16	17
		13	14	15	16	17	18
		14	15	16	17	18	19
		15	16	17	18	19	20
		16	17	18	19	20	21
		17	18	19	20	21	22
		18	19	20	21	22	23
		19	20	21	22	23	24
		20	21	22	23	24	25



VALIDATE GOALS AND OBJECTIVES

- Validate the previous HMP Goals and Objectives
 - Ensure they align with current trends in the City
- Develop hazard-specific goals and objectives
 - These will be used to brainstorm possible mitigation actions in the future

Hazard Mitigation Plan

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Next Steps...

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ASSET INVENTORY

- Review Asset Inventory
 - Types and number of existing and future buildings
 - Infrastructure
 - Critical Facilities
- Loss Estimates
 - Review each asset category and assign potential percentage of damage expected due to each identified hazard

Hazard Mitigation Plan

Risk Management Professionals

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Hazard Mitigation Plan

Risk Management Professionals

City of Cerritos
HAZARD MITIGATION PLAN-
Meeting #2

October 9, 2014

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Alan Strickland	CQA	House Wgn	a.strickland@currbs.us	562 914-8530
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Steering Committee Meeting #3

City of Cerritos

Hazard Mitigation Plan

Steering Committee Meeting #3:
Asset Inventory and Vulnerability Assessment
February 9, 2015

RMP
Risk Management Professionals

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Meeting Agenda

- Review Hazard Ranking & Public Survey Results
- Review HMP Goals and Objectives
- Validate Asset Inventory List
- Complete Vulnerability Assessment (Loss Estimate Calculations)
 - Assign estimated percent damage to each asset from the identified hazards

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Public Survey Results

Risk Management Professionals, Inc. – www.RMPCorp.com

Public Survey

- To fulfill FEMA's requirement to include the public during the Hazard Mitigation Planning Process, a 10-question survey was published through the City newsletter in January 2015
- The feedback from each of the 37 responses will provide insight into how the public perceives the vulnerability of the City to hazardous events

Hazard Mitigation Plan Risk Management Professionals

Community Sample Profile

- Years of City Residence
 - Ranged from 3-47 years
 - Averaged 30 years with the City

Years of Residence	Tally
0-5 years	~5
6-10 years	~7
11-25 years	~5
26+ years	~15

Hazard Mitigation Plan Risk Management Professionals

Community Sample Profile (Cont.)

- 33% of the Community Sample reported personal experience of a hazardous event while 67% did not
 - Earthquake was the most common hazard
 - Drought was the second most common hazard
- 36 were homeowners; 1 renter

Hazard Mitigation Plan Risk Management Professionals

Community Sample Profile (Cont.)

- Preparedness
 - A large majority of the Community Sample reported taking measures to mitigate personal risk in the event of an incident including the following
 - Food/Water
 - Flashlights/ Batteries
 - First Aid
 - Tools
 - Sleeping Bag/ Blankets
 - Smoke Detectors
 - CPR Training (50%)

Hazard Mitigation Plan

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Hazard Rankings Review

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Hazard Rankings

Rank	Score
High	
Earthquake	50
Moderately High	
Moderate	
Urban Fire	18
Transportation Accident/Incident	16
Moderately Low	
Flood/ Dam Failure	12
Pipeline Failure/ Hazardous Material Release	12
Drought	12
Low	
Terrorism	4
Windstorm	4

Hazard Mitigation Plan

Risk Management Professionals

Public Survey Hazard Ranking Comparison

Steering Committee Ranking	Community Sample Ranking
Earthquake	Earthquake
Urban Fire	Drought
Transportation Incident	Transportation Incident
Flood/ Dam Failure	Terrorism
Pipeline Failure/ Hazardous Materials Release	Pipeline Failure/ Hazardous Materials Release
Drought	Windstorm
Terrorism	Flood/ Dam Failure
Windstorm	Wild Fire

Hazard Mitigation Plan Risk Management Professionals

Mitigation Goals and Objectives Review

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Current Goals & Objectives

- Protect Lives, Property, and Commerce
 - Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural hazards
 - Reduce losses and repetitive damages for chronic hazard events while promoting loss prevention options for catastrophic hazards
 - Improve hazard assessment information to make recommendations for encouraging preventative measures for new and existing developments which are vulnerable to hazards
 - Promote business continuity planning for local businesses

Hazard Mitigation Plan

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Current Goals & Objectives (Cont.)

2. Promote Public Awareness
 - Develop and implement educational and outreach programs to increase public awareness of the risks associated with hazards
 - Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities
3. Protect the Environment
 - Balance natural resource management and land use planning with hazard mitigation to protect wildlife and the environment
 - Improve hazard assessment information to make recommendations for encouraging preventative measures for new and existing developments vulnerable to hazards with regard to environmental protection

Hazard Mitigation Plan

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Current Goals & Objectives (Cont.)

4. Develop and Expand Partnerships and Implementation
 - Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation
 - Encourage leadership within public and private sector organizations to prioritize and implement local and regional hazard mitigation activities
5. Enhance Emergency Services Capabilities
 - Establish a policy to ensure the creation of mitigation projects for critical facilities, services, and infrastructure
 - Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry
 - Coordinate and integrate all-hazard mitigation activities, where appropriate, with emergency operations plans and procedures

Hazard Mitigation Plan

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Hazard-Specific Objectives

Hazard Specific Objectives	
Hazard Mitigated	Hazard-Specific Objectives
Earthquake	EQ01 - Identify potential vulnerabilities in the City and conduct structural improvement projects, as appropriate EQ02 - Ensure earthquake preparedness and recovery education remains a priority
Urban Fire	UF01 - Identify vulnerable communities that could be affected by urban fires UF02 - Ensure urban fire preparedness and recovery education remains a priority
Transportation Accident/ Incident	TA01 - Continue to coordinate with affected agencies (NTSB, MTA, local public and private transit agencies, CHP, fire, HazMat department and sheriff) to address effective emergency responses TA02 - Ensure heavy industrial traffic is properly managed to minimize the potential for transportation accidents

Hazard Mitigation Plan

Risk Management Professionals

Hazard-Specific Objectives (Cont.)

Hazard Specific Objectives	
Flood/ Dam Failure	DF01 - Continue to coordinate with the Army Corps of Engineers (for the Whittier-Narrows Dam) to ensure dam failure preparedness DF02 - Continue to update mass evacuation planning with regard to Dam failure
Pipeline Failure/ Hazardous Materials Release	PF01 - Continue to coordinate with pipeline owners to ensure pipeline integrity is maintained in order to minimize the potential for failures PF02 - Continue public education for pipeline safety (Dig Alert)
Drought	DR01 - Continue to coordinate with local public and private water agencies to ensure that losses of water have minimal impacts to residents of Cerritos DR02 - Continue to expand and improve the City's recycled water systems

Hazard Mitigation Plan

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Hazard-Specific Objectives (Cont.)

Hazard Specific Objectives	
Terrorism	TR01 - Continue to coordinate with law enforcement and fire to ensure response and recovery procedures are fully established TR02 - Coordinate with the City MIS division and contracted service providers to update policies to combat cyber-terrorism TR03 - Coordinate with the County Public Health Department to ensure response and recovery in the event of a Bio-terrorism incident TR04 - Continue public education to identify potential acts of terrorism ("See something, say something")
Windstorm	WS01 - Continue to maintain the tree-trimming program to minimize the effects of severe weather and destructive winds WS02 - Ensure that any above-ground public utility assets are analyzed and upgraded to withstand a windstorm

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Asset Inventory and Vulnerability Assessment

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Asset Inventory & Loss Estimates

- Validate Asset Inventory
- Vulnerability Assessment (Loss Estimates)

Hazard Mitigation Plan Risk Management Professionals

Asset Inventory

- Validate Asset Inventory
 - Types and number of existing and future buildings
 - Infrastructure
 - Critical Facilities

Asset Inventory Summary – City of Cerritos								
Type	Name	Address	Square Footage	Cost / Square Foot	Structure Value %	Contents Value %	TOTAL	
Public Buildings	Purchasing Arts Center	12700 Center St Dr S, Cerritos, CA 90703	150,000	\$16,811.500	100%	20,521,500	\$41,043,000	
Public Buildings	Library	18025 Brookfield Ave, Cerritos, CA 90703	90,000	\$103.94	8,245,200	100%	9,245,200	\$16,500,400
City Property	Cerritos Park East (CPE)	10704 E. 16th St, Cerritos, CA 90703	15,500	\$90.30	1,369,650	100%	1,369,650	\$2,799,300
City Property	City Hall	18125 Brookfield Ave, Cerritos, CA 90703	53,288	\$12.94	6,018,847	100%	6,018,847	\$12,036,683
City Property	City Yard		24,257	\$90.30	2,150,407	100%	2,150,407	\$4,300,814
Fire Building	Fire Station		10,575	\$105.51	1,115,960	100%	1,115,960	\$2,231,960

Hazard Mitigation Plan Risk Management Professionals

Vulnerability Assessment Estimates

- Review each asset and assign potential percentage of damage expected due to each identified hazard

City of Cerritos Vulnerability Assessment Calculations		Earthquake		Urban Fire			
Type	Name	TOTAL	% Damage	Loss Estimate	%	Loss Estimate	
Public Buildings	Purchasing Arts Center	12700 Center St Dr S, Cerritos, CA 90703	\$41,043,000	30%	\$14,369,000	3%	\$2,491,190
Public Buildings	Library	18025 Brookfield Ave, Cerritos, CA 90703	\$16,500,400	30%	\$5,020,840	3%	\$881,520
City Property	Cerritos Park East (CPE)	10704 E. 16th St, Cerritos, CA 90703	\$2,799,300	30%	\$879,755	3%	\$136,895
City Property	City Hall	18125 Brookfield Ave, Cerritos, CA 90703	\$12,036,683	30%	\$4,212,843	3%	\$681,875
City Property	City Yard		\$4,300,814	30%	\$1,533,245	3%	\$275,641
Fire Building	Fire Station	\$2,231,960	30%	\$781,588	3%	\$111,598	

Hazard Mitigation Plan Risk Management Professionals

Next Steps...

Risk Management Professionals, Inc. – www.RMPCorp.com

Mitigation Action Worksheet

- Summarize mitigation project specifications
- Identify project goal, objective, and category
- Capital Improvements Plan

Hazard Mitigation Plan Risk Management Professionals

Mitigation Action Categories

- Prevention
- Property Protection
- Public Education and Awareness
- Natural Resource Protection
- Emergency Services
- Structural Projects

Hazard Mitigation Plan Risk Management Professionals

Next Steering Committee Meeting

The next Steering Committee meeting will develop potential mitigation projects within the City

To be scheduled...

Hazard Mitigation Plan

Risk Management Professionals

Contact Information

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Hazard Mitigation Plan

Risk Management Professionals

City of Cerritos
HAZARD MITIGATION PLAN-
Meeting #3

February 9, 2014

Name	Company	Position	Email Address	Phone #
Colin Scholtz	RMP	Sr. Engineer	Colin.Scholtz@RMPcorp.com	949-282-0123 x245
Alan Strickland	CERA	House Man	alan aStrickland@Certs.com	562-916-8530
Rebecca Scott	City of Cerritos	Mgmt. Analyst	rscott@cerritos.us	5)916-1227
Mike Warner	COC	Stakeholder Manager	mwarner @cerritos.us	562 916-8512
Emery Merina	City of Cerritos	Comm Svcs Supv	emery.merina@cerritos.us	562-916-1252
Charles Emes	" " "	DWP	cemg@cerritos.us	562 916 1223
Shereé Titus	City of Cerritos	Rec Svcs	stitus@cerritos.us	(562) 916-1265
Ryan Bray	RMP	Project Coordinator	Ryan.Bray@RMPcorp.com	(949) 282-0123

Steering Committee Meeting #4

City of Cerritos

Hazard Mitigation Plan

Steering Committee Meeting #4:
Mitigation Action Identification
May 7, 2015

 Risk Management Professionals, Inc. – www.RMPCorp.com

MEETING OBJECTIVES

- Review Mitigation Goals and Objectives
- Examine Relevant Results of Public Survey
- Develop Potential Mitigation Projects

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Hazard Ranking Review

 Risk Management Professionals, Inc. – www.RMPCorp.com

HAZARD RANKING SUMMARY

Rank	Score
High	
Earthquake	50
Moderately High	
Moderate	
Urban Fire	18
Transportation Accident/Incident	16
Moderately Low	
Flood/ Dam Failure	12
Pipeline Failure/ Hazardous Material Release	12
Drought	12
Low	
Terrorism	4
Windstorm	4

Hazard Mitigation Plan Risk Management Professionals

Mitigation Goals and Objectives Review

 Risk Management Professionals, Inc. – www.RMPCorp.com

OVERALL PLAN GOALS

1. Protect Lives, Property, and Commerce
2. Promote Public Awareness
3. Protect the Environment
4. Develop and Expand Partnerships and Implementation
5. Enhance Emergency Services Capabilities

Hazard Mitigation Plan Risk Management Professionals

Public Survey Results

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Public Survey

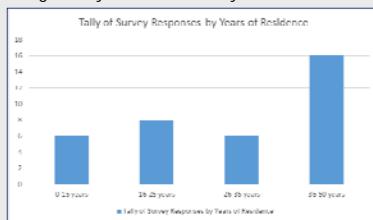
- To fulfill FEMA's requirement to include the public during the Hazard Mitigation Planning Process, a 10-question survey was published through the City newsletter in January 2015
- The feedback from each of the 37 responses will provide insight into how the public prefers to receive educational information from the City. This information can be utilized as the Steering Committee decides on ways to educate the public through Mitigation Actions.

Hazard Mitigation Plan

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Community Sample Profile

- Years of City Residence
 - Ranged from 3-47 years
 - Averaged 30 years with the City



Hazard Mitigation Plan

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Community Sample Profile (Cont.)

- 60% of participants received or requested information from the City on how to make their homes and families safer from local hazards
- Of the 22 people that received information, 12 of them received information within the last two years.



Hazard Mitigation Plan

Risk Management Professionals

Community Sample Profile (Cont.)

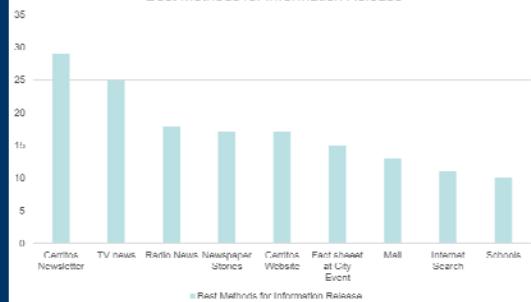
- Information Sources
 - News/ Media 6
 - Government Agency..... 6
 - Red Cross..... 3
 - Utility Company..... 2
 - Other..... 2
 - Insurance Agency..... 1
 - Non-Profit Organization..... 1
 - Unsure..... 1

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Community Sample Profile (Cont.)

Best Methods for Information Release



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Identify Potential Mitigation Actions



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MITIGATION ACTION CATEGORIES

- Prevention
- Property Protection
- Public Education and Awareness
- Natural Resource Protection
- Emergency Services
- Structural Projects

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MITIGATION ACTION WORKSHEET

- Summarize mitigation action specifications
- Identify action goal, objective, & category



Hazard Mitigation Plan Risk Management Professionals

EARTHQUAKE EXAMPLE MITIGATION PROJECTS

- Building Retrofits
- Anchor Electrical Transformers
- Install Expansion Joints
- Reinforce Well Shaft or Install Submersible Pump
- Restraine Pipes
- Improve Pipe Materials
- Install Tank Anchors
- Install Friction Dampers on Elevated Tanks

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URBAN FIRE EXAMPLE MITIGATION PROJECTS

- Community Awareness
- Fire-safe Practices for Structures and Landscaping
- Enhancement of Fire-Suppression Capabilities
- Fire Risk Mapping

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TRANSPORTATION ACCIDENT EXAMPLE MITIGATION PROJECTS

- Enhancement of Emergency Response Teams
- Airport/Freeway/Rail Site Buffering
- Contingency and Emergency Planning

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FLOOD/ DAM FAILURE EXAMPLE MITIGATION PROJECTS

- Acquisition, Relocation, & Elevation Projects
- Dry-Floodproofing (e.g., plastic sheeting)
- Wet-Floodproofing (e.g., water resistant materials)
- Stormwater Management Ordinances or Amendments
- Floodplain Ordinances or Amendments
- Storm Drainage System Improvements
- Structural Flood Control Measures (e.g., levees, dams, floodwalls) Inundation Zone Mapping
- Preparedness and Response Plans
- Notification Systems
- Structural Storage Tank Reservoir Improvements

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PIPELINE FAILURE/ HAZMAT RELEASE EXAMPLE MITIGATION PROJECTS

- Emergency Plans
- Transportation
- Disposal
- Emergency Response Teams
- Industrial Site Buffering
- Pipeline Location and Design
- Digging Hotlines
- Contingency Planning
- Improvements to Maps and Records

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DROUGHT EXAMPLE MITIGATION PROJECTS

- Water Use Ordinances
- Contingency Plans
- Emergency Water Distribution and Storage Systems
- Water Conservation Education
- System Retrofits
- Leak Detection Programs

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TERRORISM EXAMPLE MITIGATION PROJECTS

- Emergency Plans
- Emergency Response Teams
- Security
- Training

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WINDSTORM EXAMPLE MITIGATION PROJECTS

- Implement Tree Trimming
- Retrofits
- Anchoring
- Traffic Light Upgrades

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Next Steps...



Risk Management Professionals, Inc. – www.RMPCorp.com

Next Steering Committee Meeting

The next Steering Committee meeting will consist of a Benefit-Cost Review of the identified Mitigation Actions:

To be scheduled

Hazard Mitigation Plan

Risk Management Professionals

CONTACT INFORMATION

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Hazard Mitigation Plan

Risk Management Professionals

City of Cerritos
HAZARD MITIGATION PLAN-
Steering Committee Meeting #4

May 7, 2015

Name	Company	Position	Email Address	Phone #
Colin Scholtz	Risk Management Professionals	Sr. Engineer	Colin.Scholtz@RMPCorp.com	949 / 2882-0123 x245
Rebecca Scott	City of Cerritos	Management Analyst	rscott@cerritos.us	5) 916-1227
Alan Strickland	City of Cerritos CCRA	House Coordinator	astrickla@cerritos.us	(822) 916-2530
Scott Munier	L.A. Co. F.O.	Captain	SMunier@fire.lacounty.us	562 926-1571
Torquin Aceves	LACo FD	Firefighter	TQACEVES@YAHOO	714-317-8301
Mark J. Mercer	LACo FD	Firefighter		562-691-4692
Shenae Titus	City of Cerritos	Recreation Supt	stitus@cerritos.us	562) 916-1255

Steering Committee Meeting #5

City of Cerritos

Hazard Mitigation Plan

Steering Committee Meeting #5:
Mitigation Project Benefit-Cost Review
September 3, 2015

 Risk Management Professionals, Inc. – www.RMPCorp.com

MEETING OBJECTIVES

- Conduct a Benefit-Cost Review of Mitigation Projects
- Discuss schedule for last steps of update process

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Benefit-Cost Review

 Risk Management Professionals, Inc. – www.RMPCorp.com

PURPOSE OF BENEFIT-COST REVIEW

- FEMA requires the Steering Committee to prioritize actions for implementation
- The process is designed to help the Steering Committee weigh pros and cons for each action
- RMP's method utilizes a qualitative methodology with a High, Medium, and Low range
 - High – Benefits are perceived to exceed costs without further study or evaluations; or the action is critical
 - Medium – Benefits are perceived to exceed costs, but may require further study or evaluation prior to implementation
 - Low – Benefits and costs require evaluation prior to implementation

Hazard Mitigation Plan Risk Management Professionals

BENEFIT-COST REVIEW

- Review each identified mitigation project and quantify the benefits and costs of implementing each project
 - Assign a priority based on the benefit-cost review

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
2015 MHP 01 - "Establish a framework for the City of Cerritos Hazard Mitigation Steering Committee for implementing, monitoring, and evaluating citywide mitigation activities."	• • !!	• • !!	!!
2015 MHP 02 - "Develop public and private partnership to foster hazard mitigation program coordinate and collaboration in the City of Cerritos."	• • !!	• • !!	!!
2015 MHP 03 - "Conduct evaluations of critical facilities and develop inventories of all facilities and identify priorities for improvement. This includes, but is not limited to, incorporating alternative power sources for emergency power, fire, water, and fire. Initiate mitigation projects accordingly."	• • !!	• • !!	!!

Hazard Mitigation Plan Risk Management Professionals

BENEFIT-COST REVIEW EXAMPLE

- Example from FEMA:

Actions	Benefits (Pros)	Costs (Cons)	Priority
Flooding of businesses can be mitigated.	- Avoidance of 1 loss of life every 20 years (losses reduced by half) - Saving of \$50,000 in private damages and \$25,000 in public costs - 100% use of existing businesses completely eliminated - Interruption solved - Probability of flooding can be applied for to implement the proposed	- Flooding cost = \$10,000 X 10 = \$100,000 - Need at least 3 people to administer (after obtaining technical assistance from the State) - Need a year to implement	High (Priority no. 1)
Build safe rooms for neighborhood of 50 houses without basements	- Avoidance of 5 lives lost every 20 years (losses reduced by half) - Saving of \$10,000 in private damages and \$5,000 in public costs - mitigating this hazard results due to regular occurrence of tornadoes	- City will share 50% of the cost per existing home = \$25,000 X 50 = \$1,250,000 - Administrative cost per home = \$1,000 X 50 = \$50,000 - need 3 years to complete these rooms, however, they may never strike this exact area	Medium (Priority no. 2)
Broadcast educational video on local channel on hazard mitigation	- Local channel might be willing to broadcast free of cost - Broadcast informed audiences about mitigation methods as well as what to do in an emergency	- Cost of preparing video = \$5,000 - Only 1% of population might notice - Only 1% of that 1% might actually implement individual mitigation methods	Low (Priority no. 3)

Hazard Mitigation Plan Risk Management Professionals

Next Steps...



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NEXT ADVISORY COMMITTEE MEETING

The Draft Hazard Mitigation Plan will be provided to each member for review. Once comments are implemented, the Public Review Draft Hazard Mitigation Plan will be presented at a City Council meeting:

**City Council Meeting:
October 2015**

Hazard Mitigation Plan

Risk Management Professionals

CONTACT INFORMATION

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Hazard Mitigation Plan

Risk Management Professionals

City of Cerritos
HAZARD MITIGATION PLAN-
Steering Committee Meeting #5

September 3, 2015

Name	Company	Position	Email Address	Phone #
Rebecca Scott	City of Cerritos	Mgmt. Analyst		
Colin Scholtz	Risk Management Professionals	Sr. Engineer	Colin.Scholtz@RMPCorp.com	949/282-0123 ext. 245
Raoul Verant	Norwalk BSO		Norwalk@norwalkca.gov	(562) 574-5743
Eric Wosick	City of Norwalk	Emergency Prep Officer	Eric.Wosick@NORWALKCA.GOV	929-5743 (562)
Ciro Racionero	LASD	OPS. Supervisor	CIRACO@LASD.ORG	840-0044
Joe Nunez	CAPRAIN		JBNUNEZ@CAPRAIN.ORG	562-560-0194
Mirie Gutierrez	LADP	EOC	Mirie.Gutierrez@LADP.ORG	562-860-0097
Sherry Titus	CITY OF CERRITOS	Recreation Superintendent	Sherry.Titus@Cerritos.us	(562) 916-1255

City Council Meeting and Public Review

Public Comment Advertisement

The City solicited public involvement during the review of the draft Hazard Mitigation Plan. The following Figures D.1 and D.2 illustrate the posting of the draft Plan on the City's website as well as an invitation to submit comments at the February 25, 2016 City Council meeting.

Figure D.1: Draft Hazard Mitigation Plan Posting for Public Review

The screenshot shows the City of Cerritos website. At the top left is the date "2/16/2016". At the top right is a link to "City of Cerritos | Home Page". Below the header is the City of Cerritos logo, which features a white water tower silhouette on the left and the words "City of Cerritos" in a stylized script font over a green landscape graphic on the right. A blue banner across the middle of the page contains the text "TOP STORIES" in white. Below this banner, there is a section titled "City of Cerritos Draft Hazard Mitigation Plan". Further down the page, there is another section titled "El Niño Storm Preparation Tips from Los Angeles County" followed by a bulleted list of tips. At the bottom of the page, there is a section titled "Los Angeles County Sheriff's Department Tip-A-Cop event Thursday, March 10 at Wood Ranch BBQ in Cerritos (PDF)". Finally, at the very bottom, there is a section titled "Festival of Friendship being held Saturday, February 6 at Los Cerritos Center (PDF)".

Figure D.2: Invitation for Public Participation at a City Council Meeting

2/16/2016

City of Cerritos | Local Hazard Mitigation Plan draft available for review

The logo for the City of Cerritos features a white, dome-shaped building silhouette on the left. To its right, the words "City of Cerritos" are written in a large, flowing, white script font. The background of the logo is a colorful illustration of green hills and trees under a blue sky.

Local Hazard Mitigation Plan draft available for review

February 1, 2016

The City of Cerritos has updated its Local Hazard Mitigation Plan (LHMP) as mandated by the Federal Emergency Management Agency. A current LHMP allows the City to reduce the costs associated with disaster response and recovery by implementing hazard mitigation strategies.

Beginning Friday, February 12, a final draft of the LHMP will be available for review at the Public Works counter at City Hall and on the City's website at cerritos.us. The City Council will conduct a public hearing to discuss the draft at the February 25 City Council meeting.

As part of the City Council meeting, a short overview of the planning process and intent of the Hazard Mitigation Plan update was provided by Rebecca Scott, Management Analyst for the City. During the meeting, Dr. Mark Chung, a City resident, came forward to voice his support for the Plan. Dr. Chung stated that he and his wife have been residents of the City for five years, and are always amazed at the City's progressiveness. He found the City's original Mitigation Plan six months previously when he was searching the internet. He read it with great detail and looks forward to the new plan as he is not only a physician, but a volunteer for the Sheriff and the Community Emergency Response Team (CERT). He stated that he looks forward to FEMA support of training citizens and volunteers in case of an emergency, such as earthquakes, tornados or acts of terrorism. He wishes to be informed about any possible FEMA funding for a CERT van, radio communications for emergencies (like HAM radios), supplies, emergency food supplies and sheltering. Dr. Chung stated that his wife Jane is a Red Cross volunteer and a nurse and that they both feel that this is a great opportunity to move forward and support the City in its disaster planning.

Additional comments were made by the City Council regarding the Plan's implementation strategy as well as compliments on Dr. Chung's interest in City disaster planning. A recording of the meeting can be found on the City's website at http://cerritos.granicus.com/MediaPlayer.php?view_id=15&clip_id=3691. Item 8A of the agenda contains the review and consideration of the City's draft Hazard Mitigation Plan.

The close of the City Council meeting marked the end of a two-week period in which the public had the opportunity to comment on the draft Hazard Mitigation Plan before submission for State review. Dr. Chung's statement was the only comment submitted by the public during the comment period. For more information, and to direct any public comments, please contact Rebecca Scott at 562-916-1227.

The table on the following page documents the City personnel, Risk Management Professionals staff, and public representatives that took part in the City Council discussion regarding the draft Hazard Mitigation Plan.

Table D.1: City Council Meeting Attendees

Name	Affiliation	Title
Rebecca Scott	City of Cerritos	Management Analyst
Ryan Bray	Risk Management Professionals	Project Coordinator
Jim Edwards	City of Cerritos	Councilmember
Mark Pulido	City of Cerritos	Councilmember
Naresh Solanki	City of Cerritos	Councilmember
George Ray	City of Cerritos	Mayor Pro Tem
Carol Chen	City of Cerritos	Mayor
Dr. Mark Chung	Citizen	Citizen



BENEFIT-COST ANALYSIS

Benefits can be classified as avoided damages and losses. To calculate the benefit of implementing mitigation recommendations, one would first calculate the likely damage without the mitigation action. Next, one would calculate the likely damage after the implementation of the mitigation recommendation. Then, the losses after mitigation are subtracted from the losses without mitigation to calculate net benefits. Finally, the useful life of the building and the time value of money (discount rate) are used to convert those average annual losses to their present value using the following Net Present Value (NPV) equation:

$$NPV = -M + B * [(1 - (1 + i)^{-T}) / i]$$

Where M is the cost of the mitigation measure, B is the net benefit (loss without mitigation - loss with mitigation), T is the useful life of the asset (50 years), and I is the interest rate to calculate the present day value (7%).

The net benefits of mitigation are compared to the direct costs of implementing the mitigation action. This relationship is expressed as the ratio of benefits to costs.

$$\text{Benefit / Cost} = (\text{NPV of expected benefit}) / (\text{mitigation cost})$$

A ratio of greater than 1.0 is considered a worthwhile mitigation investment.

Since the Benefit-Cost Analysis is an integral part of obtaining grant money from the Federal Emergency Management Agency for mitigation efforts, this appendix includes the requirements for classifying benefits for select mitigation projects, include FEMA's *What is a Benefit* and *Using Benefit-Cost Review in Mitigation Planning*.

WHAT IS A BENEFIT?

GUIDANCE ON BENEFIT-COST ANALYSIS

OF HAZARD MITIGATION PROJECTS

DRAFT

REVISION 2.0

(Supersedes Revision 1.0)



Federal Emergency Management Agency
Flood Insurance and Mitigation Administration
500 C Street, SW
Washington, DC 20472

May 1, 2001

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There is little doubt that flood-proofing a school, installing hurricane shutters on a beachside home, or seismically retrofitting a heavily-traveled bridge can bring substantial benefits to a community. Reducing the risk of damage from a natural disaster has the potential to save lives, significantly lower cleanup and recovery costs, and minimize the amount of time it takes for a community to return to normal among many other benefits.

While it may seem clear that activities that reduce the damage caused by natural disasters would bring a host of benefits, it is far less obvious how we would actually categorize and quantify these benefits. What kinds of benefits *do* activities like flood-proofing a school or upgrading a drainage channel provide? The purpose of this analysis is to help answer this question by identifying the benefits associated with hazard mitigation projects; demonstrating ways to quantify benefits for use in the benefit-cost analysis (BCA) of hazard mitigation projects; and presenting several applied examples of calculating the benefits of mitigation.

1.1 What is Mitigation?

Mitigation is an action taken specifically to reduce *future* damages and losses from natural disasters. Most Hazard Mitigation Grant Program (HMGP) mitigation projects are construction projects that are designed to avoid or reduce damages to buildings or infrastructure in future disasters. In addition to reducing damages to a facility or building structure, many mitigation projects also reduce the broader negative impacts that disasters have on affected communities, such as the economic effects of regional loss of power.

Examples of common mitigation projects include:

- Acquiring flood-prone structures to remove them from the floodplain,
- Elevating flood-prone structures,
- Improving storm water drainage systems,
- Adding hurricane shutters to improve building wind resistance,
- Strengthening buildings or infrastructure to resist earthquakes, and
- Bracing building contents to resist earthquakes.

Mitigation projects may also include education programs, publications or videos, building code enhancements, and mitigation planning activities, but only if such projects demonstrably result in actions which reduce future damages and losses. These types of “soft” mitigation projects are sometimes excluded by FEMA policies or priorities and are generally more difficult to evaluate than the more common types of “hard” mitigation projects listed above.

Mitigation is conceptually distinct from repair of damaged facilities. After disasters, many damaged facilities are simply repaired to their pre-disaster condition. Such repair actions are not mitigation because they do not reduce the potential for future damages and losses. However, after a disaster some projects may include both repair and mitigation. In this case, the costs of repair and mitigation must be separated. The guidance for benefit-cost analysis in this document applies only to mitigation projects, or only to the mitigation portion of projects that include both repair and mitigation elements.

1.2 What are Benefits?

The benefits of a mitigation project are the elimination and/or reduction of future damages and losses. In other words:

Benefits are simply avoided damages and losses.

For every mitigation project, benefits are calculated by estimating future damages and losses under two circumstances: with and without undertaking the mitigation project. As a simple example, consider a mitigation project to elevate a single flood-prone residential structure. Assume that future damages and losses for this home are estimated as \$5,000 per year for the as-is situation (without mitigation). After elevation, future damages and losses are estimated as \$500 per year. In this example, the benefits of the mitigation project are \$4,500 per year. The \$4,500 in annual benefits is calculated as the difference in estimated future damages and losses before and after mitigation (\$5,000 minus \$500).

For benefit-cost analysis, much of the effort is focused on estimating damages and losses. This focus on damages and losses is sometimes confusing to novices. However, as illustrated by the example above, mitigation project benefits can only be calculated by estimating damages and losses both before and after the mitigation project and then taking the difference between the two.

There are two aspects of counting benefits that are particularly important to keep in mind when conducting benefit-cost analyses of mitigation projects. First, mitigation projects reduce future damages and losses, but generally do not completely eliminate future damages and losses.

Acquisition is the only type of mitigation project that completely eliminates future damages and losses. All other mitigation projects reduce future damages and losses but do not completely eliminate them. For example, mitigation projects to elevate structures for floods or to strengthen structures for hurricanes or earthquakes may greatly reduce future damages, but some level of damages will still occur, especially in major disasters. Thus, except for acquisition projects, it will always be necessary to estimate damages and losses after mitigation.

Second, for every mitigation project, the greater the damages and losses are before mitigation, the greater are the potential benefits.

For example, if damages before mitigation are estimated as \$10,000 per year for one house and only \$500 per year for another house, then the maximum possible benefit for the first house is \$10,000 per year and only \$500 per year for the second house. The maximum level of benefit can be achieved only if the estimated damages and losses are completely eliminated by a mitigation project (i.e., by acquiring and demolishing the house). The relationship between damages and losses before mitigation and the maximum possible benefit achieved after mitigation is very important. The best mitigation projects are often those where the damages and losses are greatest before mitigation is undertaken. In other words, the greater the damage and losses are prior to mitigation project, the greater the potential benefits of mitigation. Conversely, when the damages and losses before mitigation are minor, the maximum possible benefits are limited. This relationship is very important for mitigation planning. Mitigation projects providing the highest level of benefit can be identified simply by finding the structures or facilities with the highest risk for future damages and losses.

1.3 What Benefits Should Be Counted?

The goal of FEMA's hazard mitigation program is to reduce the impacts of natural disasters on affected communities. In this context, it is very important to note:

The benefits considered in benefit-cost analysis are the benefits to the community, not just the benefits to FEMA or the federal government. The Office of Management and Budget (OMB) Advisory Circular A-94 (Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs) provides explicit guidance on what benefits to count:

Analyses should include comprehensive estimates of the expected benefits and costs to society based on established definitions and practices for program and policy evaluation. Social net benefits, and not the benefits and costs to the federal government, should be the basis for evaluating Government programs or policies that have effects on private citizens or other levels of Government.

This OMB guidance means that benefits must always be counted from the perspective of the affected community, not from the perspective of FEMA or the federal government. Thus, for benefit-cost analysis of hazard mitigation projects, a broad range of benefits may legitimately be counted, even if Federal programs do not address actually compensate for the damages when they occur.

Some of the benefits to be counted are covered by government programs. Examples of such benefits include avoided damages to public buildings or infrastructure, and emergency management costs (including debris removal) which may be covered under the Public Assistance Program. Other damages and recovery costs may be partially covered by government programs. Examples include avoided damages to private residences and displacement costs for temporary housing, which may be

partially covered under FEMA's Individual and Family Grant Program. Other damages, such as deaths and injuries, do not involve any real exchange of money and are not compensated by any government program. Regardless of whether government agencies actually compensate the damages and losses, the OMB guidance directs Federal agencies such as FEMA to count the full direct benefits of hazard mitigation projects. As an example, consider a city hall building damaged in an earthquake. Federal programs may reimburse the city for damages to the city hall and contents, for cleanup costs, and add something else that FEMA would cover or delete, but the Federal government does not provide life insurance for occupants of public buildings. From a community perspective, however, casualties from the earthquake are obviously a major negative effect of the disaster, and hence it is correct and necessary to count the casualties as damages.

The goal of benefit-cost analysis of hazard mitigation projects is always to count *all* of the benefits of each mitigation project whether or not the categories of benefits are covered by FEMA programs or programs of other federal agencies.

The broad categories of benefits to be counted are summarized in Section 1.4 below.

1.4 Categories of Benefits

Mitigation projects may be undertaken to reduce the extent of damage from natural disaster for a wide variety of facilities. Mitigation projects may apply to private residential and commercial buildings as well as many types of public buildings from city halls and schools, hospitals, to more specialized buildings providing medical, police, or fire services. Mitigation projects may also cover utilities providing electric power, water and other services as well as a wide range of infrastructure from drainage systems, to roads and bridges, to dams and other specialized structures.

The specific benefits to be counted for each mitigation project depend on the type of facility covered by the mitigation project. Different benefits may be counted for different types of projects. However, conceptually, most of the benefits to be counted for any mitigation project can be sorted into four main categories, as summarized below in Table 1.1.

Table 1.1 Categories of Avoided Damages

Avoided Physical Damages	<ul style="list-style-type: none">▪ Buildings▪ Contents▪ Infrastructure▪ Landscaping▪ Site Contamination▪ Vehicles▪ Equipment
Avoided Loss-of-Function Costs	<ul style="list-style-type: none">▪ Displacement costs for temporary quarters▪ Loss of rental income▪ Loss of business income▪ Lost wages▪ Disruption time for residents▪ Loss of public services▪ Economic impact of loss of utility services▪ Economic impact of road/bridge closures
Avoided Casualties	<ul style="list-style-type: none">▪ Deaths▪ Injuries▪ Illnesses
Avoided Emergency Management Costs	<ul style="list-style-type: none">▪ Emergency operations center costs▪ Evacuation or rescue costs▪ Security costs▪ Temporary protective measure costs▪ Debris removal and cleanup costs▪ Other management costs

These categories are briefly described below and are discussed more fully in Section 2 of this report. Examples, case studies and guidance on how to count each type of benefit are provided in Sections 3 and 4.

Physical damages are probably the easiest category of damages and losses and benefits to understand. Buildings, contents, infrastructure, landscaping, vehicles and equipment are damaged by a flood or other disaster event. The monetary damages are simply the cost to repair or replace the damaged property. For physical damages, benefits are simply the avoided damages; that is, the reduction in future damages attributable to a mitigation project.

Loss of function economic impacts are losses and costs that are incurred when facilities are damaged to the point that the normal function of the facility is disrupted. Many loss-of-function economic impacts are extra costs incurred by occupants of damaged buildings. For example, occupants of residential, commercial or public buildings may incur displacement costs for temporary quarters when damage levels render buildings unoccupiable after a disaster. The loss of function of buildings may also result in other direct economic impacts to occupants such as loss of rental income, loss of business income, or lost wages as well as disruption time (time spent in cleanup, repair, and replacement of damaged property and so on).

In addition, loss of function of some types of facilities may have negative impacts on the community as a whole. For public buildings, loss of function also means loss of the public service provided from the building; such loss of public service has a direct impact on the community. Similarly, loss of utility or transportation services may have large direct economic impacts on affected communities as a whole.

Mitigation projects that reduce physical damages to buildings and other facilities also reduce the loss of function of the facilities, so benefits from mitigation projects often include reducing loss-of-function impacts. The types of reduced loss-of-function benefits to be counted vary, depending on the type of facility, but these benefits can be large and important to count in benefit-cost analysis. For some types of mitigation projects, especially for utilities, roads, bridges, and critical facilities such as hospitals, the benefits of avoiding the loss-of-function impacts are *always* important and may be larger than the benefits of avoiding physical damages. Indeed, many mitigation projects for these types of facilities are undertaken primarily to preserve the critical function of the facility, with reduction of physical damages being an important, but secondary consideration.

For important community operations, loss of function is often the most severe impact of a hazard event, so it is critically important to correctly count the losses and the benefits of avoiding some or all of them.

Casualties include deaths, injuries and illnesses. For some types of mitigation projects, such as seismic retrofit of buildings, reducing casualties is often the main reason a project is undertaken. Whenever a specific mitigation project demonstrably reduces the future potential for casualties, it is proper and necessary to count the benefits of reduced casualties.

Emergency management costs include a range of disaster response and recovery costs that may be incurred by communities during and immediately after a disaster. In many disasters, these costs are much smaller than physical damages or loss-of-function economic impacts. Furthermore, many common mitigation projects have little or no significant impact on a community's emergency management costs. However, in circumstances where a project affects a large part of a community and may significantly reduce future emergency management costs; counting the benefits of reduced emergency management costs is proper. For most projects, however, the benefits in this category are

negligible or very small. Thus, in most cases it may not be necessary to make the effort to estimate the benefits of reduced emergency management costs. In cases where a project has a benefit-cost ratio very close to 1.0 and has significant potential benefits in reducing future emergency management costs, it may be worthwhile to calculate the damages from this source, and the benefits of reducing or eliminating them.

1.5 What Benefits Cannot Be Counted?

As summarized above, the intent of benefit-cost analysis is to count all benefits for each hazard mitigation project, whether or not FEMA or other Federal government programs cover the benefit category. . However, OMB Circular A-94 does place one important limit on the types of benefits than can be counted. In simple terms, the OMB guidance is to NOT count indirect or secondary benefits. The technical language in Circular A-94 is:

Employment or output multipliers that purport to measure the secondary impacts of government expenditures on employment and output should not be included in measured social benefits or costs

In simpler terms, this means that the possible impact of a mitigation project on local or regional employment or on overall economic output or economic activity should not be counted. Therefore, changes in employment levels, economic growth or development, tourism, or future tax revenues should not be considered in benefit-cost analysis.

The focus of OMB guidance on benefit-cost analysis is thus to count direct benefits; that is, to count the damages and losses that would be incurred in the future if the mitigation project were not completed. Such direct benefits include: avoided physical damages, avoided loss-of-function costs incurred by the affected community, avoided casualties, and avoided emergency management costs. Other, more indirect or secondary impacts should not be counted.

This policy guidance from OMB applies to FEMA and to all other federal agencies that do benefit-cost analysis except for the U.S. Army Corps of Engineers (USACE). USACE benefit-cost analysis of projects for navigable waterways is separately mandated by legislation to include a broader range of long-term regional economic impacts, reflecting the large scale and long-term regional economic impact of many Corps projects. Thus, USACE benefit-cost analysis may include benefits that are not countable for most other Federal benefit-cost analysis.

Detailed guidance on what direct benefits to count for particular types of projects, with examples and case studies are given later in this report.

1.6 What is Benefit-Cost Analysis?

Benefit-cost analysis is a standardized, systematic way to count the benefits of a mitigation project and to compare these benefits to the costs of mitigation. A complete benefit-cost analysis counts *all* of the significant direct benefits of a mitigation project.

A benefit-cost analysis always involves looking at damages and losses twice: first, before mitigation (the as-is situation) and second, after mitigation. The benefits of a mitigation project are simply the difference in expected damages and losses before and after the mitigation project are completed.

In more technical detail, a benefit-cost analysis also takes into account:

1. The probabilities of various levels of natural hazard events and damages
2. The useful lifetime of the mitigation project
3. The time value of money (the discount rate)

As a quick review, the underlying principles of benefit-cost analysis are illustrated by one simplified example. Consider a mitigation project to elevate a single flood-prone residential structure.

Annualized damages are calculated for each flood depth by estimating each damage category and then taking into account the annual probability of each flood depth. First, annualized damages are estimated before mitigation by combining the probability of each level of flooding with the estimated damages and losses at each flood depth. For a residential structure, the damages considered typically include building damages, damages to contents, and displacement costs for temporary housing (refer to Table 1.2).

Table 1.2
Example Showing Principles of Benefit-Cost Analysis
Damages Before Mitigation

Flood Depth (feet)	Annual Probability of Flooding	Scenario Damages and Losses (per flood event)	Annualized Damages and Losses
0	0.2050	\$6,400	\$1,312
1	0.1234	\$14,300	\$1,765
2	0.0867	\$24,500	\$2,124
3	0.0233	\$28,900	\$673
4	0.0098	\$32,100	\$315
5	0.0034	\$36,300	\$123
Total Annualized Damages and Losses (Before Mitigation)			\$6,312

In the Table 1.2, the scenario damages (damages per flood event) increase with increasing flood depth in the home, as expected. However, the annualized damages, which also take into account the probability of flooding, are lower at high flood depths because such floods are very infrequent at this site.

The total annualized damages and losses, \$6,312 in the above example, indicates the level of risk faced by the property. The greater the frequency and depth of flooding for a given home, the higher the annualized damages and losses. To the extent that a mitigation project reduces or eliminates these damages and losses, the greater the potential benefits of the mitigation project.

For benefit-cost analysis, a similar calculation is done after mitigation, and then benefits are calculated as the difference between annualized damages with and without undertaking the mitigation project (as shown in Table 1.3).

Table 1.3
Example Showing Principles of Benefit-Cost Analysis
Summary Calculation

Flood Depth (feet)	Before Mitigation Annualized Damages (from Table 1.2)	After Mitigation Annualized Damages	Annualized Benefits (Avoided Damages) “Before Mitigation” – “After Mitigation”
0	\$1,312	\$0	\$1,312
1	\$1,765	\$0	\$1,765
2	\$2,124	\$0	\$2,124
3	\$673	\$0	\$673
4	\$315	\$63	\$252
5	\$123	\$49	\$74
Totals	\$6,312	\$112	\$6,200
Present Value Coefficient (7% discount rate, 30 year project lifetime)			12.41
Net Present Value of Future Benefits			\$76,942
Mitigation Project Costs			\$20,000
Benefit-Cost Ratio (Net Present Value of Future Benefits ÷ Project Costs)			3.85

In this example, the annualized benefits are calculated as the difference in the annualized damages before and after mitigation. The benefits of this mitigation project are assumed to occur over a 30-year useful lifetime of the mitigation project. To compare this future stream of statistical (probabilistic) benefits to the present cost of the mitigation projects, a present value calculation is done. The present value calculation depends on the project useful lifetime and on the discount rate that accounts for the time value of money. For FEMA projects, the discount rate is specified by OMB Circular A-94 as 7%. The present value coefficient, which depends on the project useful lifetime and the discount rate, is a multiplier that converts the annualized benefits to net present value.

In this example, the annual benefit of \$6,200 corresponds to a net present value of benefits of \$76,942. The benefit-cost ratio of 3.85 indicates that the benefits are 3.85 times the costs. In other

words, for each dollar spent on mitigation there is an expected return of \$3.85 in reduced damages and losses.

1.7 Why Does FEMA Do Benefit-Cost Analysis?

There are four primary reasons why FEMA does benefit-cost analysis of hazard mitigation projects:

1. To meet the statutory and regulatory requirement eligibility requirement, as specified in the Stafford Act and in 44 CFR. To be eligible for FEMA funding under the HMGP or Flood Mitigation Assistance (FMA) program, each mitigation project must be shown to be cost-effective. As defined in the regulations, cost-effective means that the benefits of each project must exceed the costs (i.e., that the benefit-cost ratio exceeds 1.0).
2. To determine whether or not a mitigation project is worth doing.
3. To provide a common basis with which to compare and prioritize mitigation projects and to help ensure that limited mitigation funds result in the greatest possible reduction in future damages and losses.
4. To demonstrate that mitigation works. Benefit-cost analysis can be a powerful tool to help sell the concept of mitigation and to convince individuals and communities that mitigation investments are in their own self interest. For the HMGP and FMA program overall, benefit-cost analysis helps to demonstrate that the programs and their actions are fiscally sound.

The statutory and regulatory basis of FEMA's benefit-cost analyses is outlined in the Stafford Act and in the program regulations in the Code of Federal Regulations.

1.7.1 The Stafford Act

FEMA's disaster assistance activities, including the HMGP, are enabled by the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The intent and purpose of the Stafford Act is spelled out in Section 102 (2):

to supplement the efforts and available resources of States, local governments and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused by major disasters.

Hazard mitigation activities, which by their nature are designed to alleviate the damage, loss, hardship, and suffering caused by natural disasters, are addressed in Section 404 of the Stafford Act:

The President may contribute up to 50 percent of the cost of hazard mitigation measures which the President has determined are cost-effective and which substantially reduce the risk of future damage, hardship, loss, or suffering in any area affected by a major disaster.

1.7.2 44 CFR, Emergency Management and Assistance

The requirement that each mitigation project must be cost-effective is described in Section 44 206.434 Eligibility (Code of Federal Regulations, 44 Emergency Management and Assistance, Revised as of October 1, 1998). Section 206.434 specifies the eligibility requirements for Hazard Mitigation Program Grants:

(b) Minimum project criteria. To be eligible for the Hazard Mitigation Grant Program a project must:

(5) Be cost effective and substantially reduce the risk of future damage, hardship, loss, or suffering resulting from a major disaster. The grantee must demonstrate this by documenting that the project;

(i) Addresses a problem that has been repetitive or a problem that poses a significant risk to public health and safety if left unsolved,

(ii) Will not cost more than the anticipated value of the reduction in both direct damages and subsequent negative impacts to the area if future disasters were to occur. Both costs and benefits will be computed on a net present value basis,

(iii) Has been determined to be the most practical, effective and environmentally sound alternative after consideration of a range of options,

(iv) Contributes, to the extent practicable, to a long-term solution to the problem it is intended to address,

(v) Considers long-term changes to the areas and entities it protects, and has manageable future maintenance and modification requirements.

The goal of benefit-cost analysis of hazard mitigation projects is always to count the benefits of each mitigation project whether or not the categories of benefits are covered by FEMA programs or programs of other federal agencies.

The OMB Guidance to count the social net benefits, not only the benefits to the federal government, also applies on the cost side of benefit-cost analysis. Thus, it is always the total cost of the project

that is included in the analysis, not the FEMA share of the cost. For example, consider a mitigation project with a total cost of \$500,000 and calculated benefits of \$300,000 (i.e., a benefit-cost ratio of 0.60). This project fails the cost-effectiveness criterion. From the perspective of the community as a whole, the benefits are less than the cost of the project. This conclusion does not depend on what fraction of the project is FEMA funded, even if FEMA funds less than \$300,000 of the project cost, because the OMB guidance for benefit-cost analysis requires the entire project be cost-effective in order to be eligible for funding.

As discussed in Section 1, the benefits of mitigation projects are future damages and losses avoided by undertaking the mitigation project. Damages and losses become benefits when they are avoided by a mitigation project. This section describes the major categories of damages and losses estimated before and after mitigation; the estimates of damages and losses are then used to calculate the benefits of avoided such damages and losses.

In most cases, FEMA's goal is to count fully all of the benefits of each mitigation project. There are four major categories of benefits:

1. Avoided physical damages
2. Avoided loss-of-function impacts
3. Avoided casualties,
4. Avoided emergency management costs

A brief summary of how to count each of these four categories is provided in this section.

2.1 Avoided Physical Damages

Physical damages are the most direct kind of damages and usually are the easiest to count. Physical damages are simply the costs to repair or replace damaged facilities, including buildings, building contents, and infrastructure. Physical damages may also include repair or replacement costs for landscaping, site contamination restoration, vehicles, and equipment. The most common sub-categories of avoided physical damages are:

- Buildings
- Contents
- Infrastructure
- Landscaping
- Outbuildings
- Site Contamination
- Vehicles
- Equipment

Physical damage estimates (before and after mitigation) are expressed in dollars. For benefit-cost analysis of hazard mitigation projects, damages are often expressed as a percentage of the replacement value of the damaged element (e.g., a building, the contents of a building, a utility component or a bridge). Damage functions are used to express the percentage damage expected as a

SECTION TWO

How to Calculate Benefits

function of flood depth for floods, wind speed for hurricanes or level of ground shaking for earthquakes.

For buildings and infrastructure, facilities are generally deemed a complete loss and replaced rather than repaired whenever the damage percentage exceeds a value known as the demolition threshold. For buildings, a 50% demolition threshold is often assumed. For outdated or marginal buildings, much lower demolition thresholds are sometimes appropriate. Similar concepts apply to infrastructure damages.

Guidance for evaluating physical damages is summarized below in Table 2.1. FEMA has developed typical or default damage functions that express the expected percentage damage for buildings and contents. These damage functions are most useful for ordinary residential, commercial or public buildings and may have to be modified for more specialized buildings, using historical damage data, professional judgment, or both.

There are no typical or default damage functions available for estimating the other sub-categories of physical damages. For these categories, historical data and professional judgment are used to make damage estimates.

Table 2.1
Summary Guidance for Physical Damage Estimates

Type of Facility	Level of Technical Expertise Required	Typical Data Sources
Residential buildings	Low	Historical damage data Professional judgment
Commercial buildings	Low	Historical damage data Professional judgment
Public buildings	Low	Historical damage data Professional judgment DSRs if available
Specialized buildings for police, fire, and medical facilities	Moderate	Historical damage data Professional judgment Default damage functions may need to be adjusted
Contents, ordinary or specialized buildings	Low to moderate	Historical damage data Professional judgment

Type of Facility	Level of Technical Expertise Required	Typical Data Sources
Infrastructure (including utility and transportation elements)	Moderate to high	Historical damage data Specialized engineering experience with these type of facilities is essential
Landscaping damages and yard cleanup	Low to moderate	Historical data Professional judgment
Site contamination restoration	Moderate to high	Historical data Specialized engineering experience helpful
Vehicles and equipment	Moderate to high	Historical data Professional judgment

2.2 Loss-of-Function Impacts

The negative impacts of a disaster on a community often go far beyond the physical damages alone. Loss-of-function impacts are the losses, costs and direct economic impacts that occur when physical damages are severe enough to interrupt the function of a building or other facility. For a building, loss-of-function impacts may include the costs for temporary quarters while repairs are made, as well as losses in rental income, business income, or public services provided from the building. For utilities, loss of function means a loss of service or a reduction in the level of service. For a road or bridge, loss of function means closures of a road or bridge, or delays arising from a reduction in traffic capacity of a damaged road or bridge.

Loss-of-function impacts are sometimes as important as or even more important than the direct physical damages. For example, the loss of function of a hospital or fire station or other facility critical to the emergency response and recovery during and immediately after a disaster may have a much greater economic impact on the community than simply the repair costs for the physical damages. Similarly, loss of electric power or potable water service has a much larger economic impact on a community than simply the costs to repair damage to the electric power or water systems. Thus, to fully count the benefits of each hazard mitigation project it is very important to count all of the benefits of avoiding loss-of-function impacts.

The type of loss-of-function impacts to be counted varies depending on the type of facility under evaluation. Some of the sub-categories of loss-of-function impacts are somewhat more difficult to understand and to calculate than the more self-evident physical damage sub-categories. As a result, loss-of-function impacts have often been only partially counted or not counted at all when conducting benefit-cost analyses of hazard mitigation projects. Undercounting loss-of-function impacts is a serious error that may result in highly meritorious and highly cost-effective mitigation projects being improperly rejected. The most common sub-categories of loss-of-function impacts are:

- Displacement costs for temporary quarters
 - Loss of rental income
 - Loss of business income
 - Lost wages
 - Disruption time for residents
 - Loss of public services
 - Economic impact of loss of utility services
 - Economic impact of road/bridge closures

2.2.1 Displacement Time and Functional Downtime

Estimating loss-of-function economic impacts for a building or other facility always requires two steps. First, the time duration of the interruption of function must be estimated, and second, the economic value per unit time of interruption of service must be estimated.

For purposes of benefit-cost analysis, displacement time and functional downtime must be considered. **Displacement time** is the time period during which occupants are displaced from a building so repairs can be made. For low levels of damage, displacement time is generally zero; that is, minor repairs can be made without displacing occupants. **Functional downtime** is the time period during which services are lost.

Functional downtime may be much shorter than displacement time. For example, consider a city hall building that is badly damaged in a disaster. The occupants of the building may be displaced to temporary quarters for six months - this is the displacement time. Displacement costs are estimated from the displacement time and the daily or monthly cost of displacement. However, in this simple example, the functional downtime is much less than six months. If the services are re-established in the temporary quarters in two weeks, then the functional downtime is only two weeks, not six months.

Functional downtime can also be fractional. One day of functional downtime can be one day of complete loss of service, or two days of 50% loss of service, or 10 days of 10% loss of service, and so on.

For utility and transportation systems, there are generally no displacement costs because such service generally can't simply be moved to temporary quarters. Thus for these systems the loss-of-function economic impacts are calculated from the estimated functional downtime and the value of the service per day.

2.2.2 Loss-of-Function Impacts for Buildings

For buildings, loss-of-function impacts may include the following categories: displacement costs, loss of rental income, loss of business income, loss of wages, loss of public services, and disruption time.

Displacement costs are the extra costs incurred when occupants of a building are displaced to temporary quarters. Displacement costs may be incurred for residential, commercial, or public buildings. Displacement occurs only when damages to a building are sufficiently severe that the building cannot be repaired with occupants in place. At lower levels of damage, repairs are commonly made with occupants remaining in the building during the repair process.

Displacement costs include the following sub-categories of costs:

1. Rental costs for temporary quarters
2. Other monthly costs of displacement such as furniture rental, other costs of being in temporary space, extra commuting costs, etc.
3. One-time costs such as utility hookup fees, round-trip moving costs, etc.

Displacement costs are the most commonly counted loss-of-function impact. The necessary data is straightforward and relatively easy to obtain. Rental costs for temporary quarters can be obtained from local officials or real estate firms. Estimates for other monthly costs and one-time moving costs can be provided by applicants or estimated using common sense.

Rental income losses are incurred by owners when tenants vacate premises because of damages, resulting in a loss of rental income for the owner. Rental income losses may apply to any building that is rented (residential, commercial, or public).

Analysts should be aware of the potential for double-counting rental income losses. Consider an example where two homes are damaged by floods and the occupants are displaced to temporary quarters for several months while repairs are made. If one home is owner-occupied, the owner is still responsible for mortgage and tax payments on the home in addition to paying rent and other expenses

for temporary quarters. In this case, the full displacement costs for temporary quarters are additional expenses and should be counted. However, for a rented home, the economics are different. If a renter is displaced to temporary quarters, then he/she no longer pays rent for the damaged facility. This loss of rental income is a loss to the owner and may be counted as part of the loss-of-function impacts for the building. However, in this case, the displacement costs for the renter must be adjusted to consider only the possible increase in rent above the previous rent, rather than the total cost of rent at the temporary quarters. Counting the displacement costs for the renter and the full loss of rental income for the owner is double-counting and must be avoided.

The simplest way to avoid potential double-counting is to not count rental income losses. If this is done, then the full displacement costs should be counted for both owners and renters. Counting the full displacement costs for renters, does, in effect, count the lost rental income. This approach has the additional advantage that it is no longer necessary to determine whether occupants of buildings are owners or renters.

Loss of business income may occur for commercial buildings when damage is severe enough to result in temporary loss of function of a building. For benefit-cost analysis, the proper measure of loss of business income is the net income, not the gross income since expenses as well as receipts are lower when a business is closed.

Estimates of net business income losses can generally be obtained from applicants, the owners, or local officials. In making estimates of net business income losses, it is important to remember that some lost business income can be made up. For example, a business that is closed for two weeks because of hurricane damage does not necessarily lose two weeks of net business income. In many cases, some of the lost sales or income will be made up after the business reopens.

FEMA considers relatively few mitigation projects for commercial buildings. In most cases, the loss of business income constitutes only a very small fraction of total damages and losses. Thus, the benefits of avoiding or reducing loss of business income are generally only a small fraction of total damages and losses. For projects that are clearly cost-effective, it may not be necessary to consider business income losses to demonstrate cost-effectiveness. However, to count fully the benefits of hazard mitigation projects for commercial buildings, it is necessary to consider loss of business income.

Loss of wage income may also occur for commercial buildings, when damage is severe enough to result in temporary loss of function of a building. When a business closes temporarily due to damages, loss of wages for employees is analogous to the loss of business income for the owner. Historically, loss of wage income has not been considered in FEMA's benefit-cost analysis. In economic theory, wages are considered fungible, that is, movable or transferable, and it is commonly assumed that wage earners who lose one job find another. However, since loss of wages due to

disaster damage is short-term and not predictable, the assumption of fundability does not appear to apply.

The intent of the Stafford Act is to alleviate the “damage, loss, hardship, and suffering” caused by major disasters. In this context and for consistency with regard to counting losses in net business income, counting loss of wage income is appropriate for benefit-cost analysis of hazard mitigation projects. For purposes of benefit-cost analysis, wage income losses to be counted are only short-term losses due to temporary business closes. The wage losses to be counted are primarily those for hourly workers. Wage losses for salaried workers should not be counted unless these workers are also laid off without pay. Wage losses should be counted as business income losses only to the extent that they are not likely to be made up later after the business reopens.

Situations where a business may leave town with permanent loss of wages (if, for example, some flood protection improvements are not made) should not be counted because such impacts fall under the type of secondary impacts on employment or output that are excluded from consideration under OMB guidance.

Loss of wages for public employees should not be counted for two reasons: 1) most public employees are likely to continue to receive wages during and after disasters, and 2) the value of public sector wages is already included in evaluating the loss of public services.

Loss of hourly wages due to temporary business closures due to disaster damage should include the full value to employees, wages plus benefits. Local data on wages and benefits are generally available from local officials. If not, national average data may be used. As discussed in Section 7 of this report (Roads and Bridges), the current national average for wages and benefits is \$21.16 per hour.

Economic value of disruption time for residents is the value of lost time incurred by residents for pre-disaster preventative measures, evacuation time, cleanup and repair of flood damages, replacement of damaged property, dealing with insurance claims and other disaster-related matters. The key economic concept is that personal time has value, whether or not the time is formally compensated by employment. Outlined below is an approach closely analogous to that adopted by the U.S. Department of Transportation (DOT) in calculating the benefits of reducing travel time delays. The simplest assumption consistent with economic theory is that each hour of time is worth the same amount, whether such time is personal or business, compensated or not. In other words, the last hour of work time and the first hour of leisure time are assumed to have equal value. This is the assumption suggested in Section 7 (Roads and Bridges) for placing a value on delay or detour times due to closures of roads and bridges. The same economic principles apply to personal time lost due to disaster damages to residential structures. Placing an economic value on personal disruption time is consistent with the DOT’s approach and with the intent of the Stafford Act to alleviate the “damage, loss, hardship, and suffering” caused by major disasters.

The economic value of disruption time for residents is estimated at \$21.16 per hour, the national average value for wages and benefits.

Loss of Public Services may occur for public buildings when damage is severe enough to result in temporary loss of function of the building. For purposes of benefit-cost analysis, private non-profit organizations providing what are essentially public services (e.g., the Red Cross, schools, and hospitals) are evaluated in exactly the same manner as public buildings. For commercial buildings, the loss of net business income is a measure of the economic impact of loss of function of the building. For public buildings, the measure of the economic impact of loss of function is the value of the services provided to the community by the agencies operating in the building.

To value public services, FEMA makes the very simple and direct assumption that public services are worth what it costs to provide the services to the public. For example, if a public service costs \$1,000 per day to provide, then the value is assumed to be \$1,000 per day. If the service is lost because of damage to the building, the loss is assumed to be \$1,000 per day. If the loss of service is avoided because of a hazard mitigation project, then the benefit is assumed to be \$1,000 per day.

The daily cost of services is estimated from the annual operating budget for the agencies occupying a building. The annual operating budget includes all of the direct costs necessary to provide the public services, including salaries and benefits, materials, supplies, utilities, equipment costs, and rent or the annual cost of owning the building. The only exclusion is for transfer payments. For example, if a public office distributes pension checks, the value of the service is not the value of the checks distributed, but rather the cost of providing the service.

This method for valuing the loss of public services applies to all public services, including administrative functions, schools, as well as more specialized services such as public works, police, fire and medical services. For ordinary (non-disaster related) public services, the annual operating budget is used directly as a proxy to determine the daily value of services to the community. For services which are essential to immediate disaster response and recovery, a continuity premium is added to reflect the greater impact of losing services when they are most in demand and most critical to the community.

The continuity premium is a multiplier on the normal daily cost of service that is applied only to services, such as police, fire and medical that are directly related to emergency response and recovery. The continuity premium reflects the greater demand for such services during disasters and, in effect, is an estimate of how much more than the normal cost a community would be willing to pay to maintain these services during disasters. Determining an appropriate continuity premium for public services that are critical to disaster response and recovery is difficult and requires a great deal of judgment and experience. Guidance on appropriate continuity premiums for police, fire, and hospital services is given in Section 4 of this report. Guidance on appropriate continuity premiums for emergency operations centers and emergency shelters is given in Section 5 of this report.

2.2.3 Economic Impact of Loss of Utility Services

Utility services such as electric power, potable water, and wastewater are often referred to as “lifelines” because these utility services are so critical to the functioning of modern cities. Mitigation projects for utilities are often motivated primarily by the desire to maintain function of these critical services. The economic impacts of loss of utility services are generally many times larger than the physical damages alone. For example, loss of electric power affects not only the utility itself but impacts economic activity in the entire community.

Since the loss-of-function impacts (economic impact of loss of utility services) for utility systems are almost always much larger than physical damages alone, benefit-cost analysis for utility systems must always include loss-of-function impacts. Because of the complex, technical nature of most utility systems, evaluating mitigation projects for these systems usually requires specialized expertise.

Detailed technical guidance on how to evaluate mitigation projects for electric power, potable water, and wastewater utility systems is given in Section 6 of this report. The economic impacts of loss of utility services are calculated by first estimating the functional downtime (i.e., the time period for which utility service is lost), then the per capita economic impacts per day of lost service are estimated by the summing the impact of lost service on local economic activity and the economic impacts on residents, and finally, the economic impact of loss of utility services is calculated as the product of the functional downtime and the economic impact per day of lost service.

2.2.4 Economic Impact of Road and Bridge Closures

Roads and bridges, like utilities, are commonly considered lifelines for communities because they are so critical to the functioning of modern cities. Mitigation projects for roads and bridges are often motivated primarily by the desire to maintain function of these critical transportation system links. The economic impacts of road and bridge closures are often many times larger than the physical damages alone.

Since the loss-of-function impacts for roads and bridges (economic impact of road and bridge closures) are often larger than physical damages alone, benefit-cost analysis for hazard mitigation projects must always include the loss-of-function impacts.

Detailed technical guidance on how to evaluate mitigation projects for roads and bridges is given in Section 7 of this report. The economic impacts of road and bridge closures are calculated by first estimating the functional downtime (i.e., the duration of road or bridge closures), then, calculating the number of person hours of delay or detour time from the daily traffic volume and the expected

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duration of delays or detours, and finally, calculating the economic impact using the number of person hours of delay or detour times the average value of wages and benefits.

This section has reviewed the major types of loss-of-function impacts and how to calculate each one. A summary of loss-of-function impacts is given below in Table 2.2.

Table 2.2
Loss-of-Function Impacts

Type of Facility	Loss-of-Function Impact	Data Inputs
Building (residential, commercial, public)	Displacement costs	<ul style="list-style-type: none">▪ Displacement time▪ Rent for temporary quarters▪ Other monthly costs▪ One-time costs
Building (residential, commercial)	Rental income losses	<ul style="list-style-type: none">▪ Displacement time▪ Monthly rent
Building (commercial)	Business income losses Wage income losses	<ul style="list-style-type: none">▪ Functional downtime▪ Net business income per month▪ Wages and benefits per month
Building (residential)	Disruption costs	<ul style="list-style-type: none">▪ Disruption time▪ Economic value per person per hour
Building (public, ordinary services))	Loss of public services	<ul style="list-style-type: none">▪ Functional downtime▪ Operating budget
Building (public, critical services))	Economic Impact of Loss of public services	<ul style="list-style-type: none">▪ Functional downtime▪ Operating budget▪ Continuity premium (sometimes)
Utilities	Economic Impact of Loss of public services	<ul style="list-style-type: none">▪ Functional downtime▪ Economic impact per capita per day
Roads and Bridges	Economic impact of road and bridge closures	<ul style="list-style-type: none">▪ Functional downtime▪ Delay or detour time▪ Daily traffic load▪ Economic value per person per hour

2.3 Casualties

Natural disasters commonly result in casualties, including deaths, injuries, and illnesses. Casualties are the most devastating impact of disasters. Some mitigation projects are designed to reduce casualties in future disasters. Almost all earthquake projects are designed to reduce casualties, as are some hurricanes, wind, and flood mitigation projects.

For some mitigation projects, the benefits of reduced casualties can be a large fraction of the total benefits, or even the largest category of benefits. Thus, for some mitigation projects, it is very important to count the benefits of reduced casualties.

Like other benefits, the benefits of avoided casualties are calculated as the difference in casualties occurring before mitigation and after mitigation. FEMA uses statistical values to place a monetary value on the benefits of avoided casualties. In the most recent FEMA benefit-cost analysis software, statistical values of \$1,250, \$12,500 and \$2,200,000 are assigned to minor injuries, major injuries and deaths, respectively. Minor injuries are defined as those requiring medical treatment, excluding minor bruises or scrapes. Major injuries are defined as those requiring hospitalization for treatment. Minor and major illnesses can be defined similarly, using the same statistical values.

When adjusted to year 2001, these statistical values for casualties are approximately \$1,560, \$15,600, and \$2,710,000 for minor injuries, major injuries, and deaths, respectively. For economic correctness, these adjusted values are suggested for benefit-cost analysis of FEMA hazard mitigation projects.

As reviewed in Section 1.3, OMB guidance for benefit-cost analysis mandates that the benefits to be considered in FEMA's benefit-cost analyses are social net benefits, not the benefits to FEMA or to the federal government. Even though neither FEMA nor any other Federal Agency provides compensation for disaster casualties, the perspective of benefit-cost analysis is always that of the affected community. Thus, it is proper and indeed necessary to count the benefits of avoided casualties, whenever a mitigation project directly and demonstrably will reduce future casualties.

Counting the benefits of avoided casualties is necessary for nearly all earthquake mitigation projects. Reducing casualties is often the primary motivation for earthquake mitigation projects.

For many common types of mitigation projects, life safety benefits are non-existent or negligible. For example, except for situations with flash flooding or dam failures, most flood hazard mitigation projects do not significantly reduce casualties. Similarly, except for shelter projects, most hurricane mitigation projects do not significantly reduce casualties. Assuming that a mitigation project for floods or hurricanes will increase life safety may actually increase casualties by giving a potentially false sense of safety and reducing people's motivation to evacuate when necessary.

For some mitigation projects life safety benefits are very important and must be included. Calculation of life safety benefits must always be done carefully, by experienced analysts. Including spurious life safety benefits has the potential to greatly distort benefit-cost results and lead to erroneous decisions about mitigation projects.

2.4 Emergency Management Costs

Disasters commonly result in a range of emergency management costs for affected communities. Emergency management costs include emergency operations center costs, evacuation or rescue costs, security costs, temporary protective measure costs, debris removal, pumping costs and other cleanup costs, and other costs for disaster response and recovery.

If a mitigation project under evaluation significantly reduces these emergency management costs, then the benefits of reduced emergency management costs should be counted. However, many FEMA hazard mitigation projects deal with single structures or a few scattered structures in a larger community. In this case, the reduction in emergency management cost is non-existent or negligible and should not be counted.

For example, elevating or acquiring a single structure or a few scattered structures in a community does not significantly impact a community's overall emergency management costs. However, acquisition of an entire flood prone neighborhood of homes might significantly reduce emergency management costs.

Determining whether or not a specific mitigation project significantly reduces a community's emergency management costs requires considerable judgment and experience. Calculation of such benefits must be done carefully, with full documentation of data and assumptions.

The most common subcategories of emergency management costs are:

- Emergency operations center costs
- Evacuation or rescue costs
- Security costs
- Temporary protective measure costs
- Debris removal and cleanup costs
- Other management costs

2.5 Summary

The above sections provide summary guidance for four main categories of benefits, including avoided physical damages, avoided loss-of-function costs, avoided casualties, and avoided emergency management costs. For every type of benefit to be counted the procedure is the same: damages and losses are estimated both before and after undertaking a mitigation project. Then, benefits are calculated as the difference between damages and losses before and after mitigation, taking into account the time value of money (mitigation project useful lifetime and discount rate).

Within these four major categories of benefits, more than 20 subcategories of benefits were described briefly. However, once the basic procedure for calculating benefits for the major categories is mastered, calculating additional benefits for the subcategories is relatively straightforward.

Counting some of the less commonly used subcategories of benefits requires a little more ingenuity. In some cases, it may be convenient to do a side calculation and then add these benefits to those calculated in the module. For example, the modules for hurricane and flood projects do not include spaces for calculating the benefits of reduced casualties. If counting the benefits of avoided casualties is necessary for a particular mitigation project (e.g., a hurricane shelter, or acquisition of properties subject to flash flooding), then a side calculation is probably the easiest way to include these benefits in the module.

As a caveat, it is important to note that evaluating some types of projects, for example mitigation projects for utility systems, requires a moderate- to high-level of technical understanding of utility systems and thus should not be attempted by analysts lacking this expertise. Similarly, performing estimates of avoided casualty benefits and estimates of some of the other less commonly calculated benefits requires a considerable amount of experience and expertise and should not be attempted by novice analysts. Throughout the process of counting applicable benefits, care must also be taken to avoid double-counting benefits in more than one place or more than one subcategory.

This section provides examples of how to count benefits for “ordinary” buildings. In the present context, “ordinary” buildings are those that are not critical facilities for emergency response and recovery. Ordinary buildings include residential and commercial buildings, and public buildings used for non-critical functions, such as schools and administrative buildings. Public buildings used to provide services that are critical to disaster response and recovery, such as police, fire and medical facilities, emergency operations centers, and emergency shelters are addressed separately in Section 4.

Mitigation projects for ordinary buildings are the most common type of FEMA mitigation project. Most of the guidance below is applicable to mitigation projects for all types of hazards and for all types of mitigation projects. However, some categories of benefits may be applicable only to certain types of mitigation projects and/or only for some types of hazards. For example, counting the benefits of avoided casualties is almost always very important for seismic hazard mitigation projects, but generally not applicable to most other types of projects.

3.1 Single Residential Buildings

This section describes benefits to be counted for mitigation projects for single residential buildings, small groups of residential buildings, or a group of residential buildings at scattered locations. The benefits to be counted for mitigation projects for an entire neighborhood of residential buildings, which are somewhat different than for single buildings, are addressed in Section 3.2.

The categories of benefits to be counted for mitigation projects for single residential buildings are summarized below in Table 3.1.

For mitigation projects for residential buildings, the suggested benefit-cost analysis strategy is to first count the largest and most easily counted benefits. For this type of project, these benefits include building damages, contents damages, and displacement costs. For seismic projects, casualties should also be counted. If the project is cost-effective, it may not be necessary to count other benefits. If the project is not cost-effective, the categories of other physical damages and disruption costs are generally the most significant additional benefits to count. The other benefit categories generally contribute only minor benefits or aren’t applicable.

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Counting Benefits for Ordinary Buildings

Table 3.1
Categories of Benefits to be Counted
Single Residential Buildings¹

Type of Benefits to Consider	When to Count
1. Physical Damages	
Building damages	Always counted
Contents damages	Always counted
Other physical damages ² - Landscaping - Outbuildings - vehicles, equipment - site contamination	Applicable to acquisition or flood control infrastructure projects only ³ . Consider counting if significant, especially for projects that are close to being cost-effective without counting these categories.
2. Loss-of-Function Impacts	
Displacement costs	Always counted
Rental income losses	Can count if appropriate, but easier to include in displacement costs ⁴
Business income losses	For home business, consider counting, but generally constitutes only a very small fraction of benefits
Disruption time costs ⁵	Consider counting, especially for projects that are close to being cost-effective, can add significantly to benefits
3. Casualties	Always counted for seismic projects, rarely applicable to other projects ⁶
4. Emergency Management Costs	Not applicable to single residential structures ⁷

Notes:

¹ Guidance in table applies to single residential structures, small groups of residential structures, and groups of structures at scattered locations.

² Other physical damages can be counted by adding appropriate damage percentages to the damage function for building or contents. These damages may be significant and thus counting them may add significantly to the total benefits. This type of mitigation project does not reduce damages to off-site utilities or transportation systems and no benefits should be counted for such other physical damages.

³ Other physical damages are applicable only to acquisition projects or flood control

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infrastructure projects because mitigation projects to elevate or retrofit the primary structure have no impact on these other categories of damages - thus, there are no additional benefits.

⁴ Rental income losses are not necessary to count if the full costs of temporary quarters are included in displacement costs for both owners and renters. Double-counting must be avoided.

⁵ Disruption costs may be significant and thus counting them may add significantly to the total benefits.

⁶ Casualties may be important for seismic hazard mitigation projects. Counting the benefits of avoided casualties may be a substantial fraction of total benefits and thus they should always be counted. For most other mitigation projects, benefits of casualties avoided are non-existent or negligible and thus should be counted only in special circumstances.

⁷ Acquisition, elevation or retrofit of single residential structures, small groups of structures, or groups at scattered locations does not significantly reduce a community's emergency management costs because the area affected by a disaster is not decreased, and the total population affected by disaster is not decreased or not decreased significantly.

Counting Other Physical Damage. This simplified example is for floods, but the same principles apply for other hazards as well. Consider a one-story home without basement, with a replacement value of \$100,000. Building damage estimates, before and after mitigation, are calculated as percentages of building replacement value. If other physical damages are to be added to building damages, these damages must also be expressed as percentages of building replacement value (not as percentages of their replacement value). For example, if landscaping damages at -2 feet flood depth are estimated as \$500, then this damage is entered as 0.5% of the building replacement value (refer to Table 3.2).

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Table 3.2
Example Showing How to Count Other Physical Damages

Flood Depth (feet)	Building Damage %	Landscaping and Outbuilding Damage %	Vehicle and Equipment Damage %	Adjusted Total Damage %
-2	0.0%	0.5%	0.0%	0.5%
-1	0.0%	1.0%	1.0%	2.0%
0	9.0%	1.5%	2.0%	12.5%
1	14.0%	2.0%	3.0%	19.0%
2	22.0%	2.5%	4.0%	28.5%
3	27.0%	3.0%	5.0%	35.0%

In this example, the building damage percentages are the typical or default values for a one-story structure without basement. Dollar damage estimates were made, using common sense and professional judgment, for the two other categories of physical damages. The dollar estimates were then converted to percentages of building replacement value. The sum of these damage percentages then represents the total damage estimates for the building, for landscaping and outbuildings, vehicles and equipment.

In making estimates of expected dollar damages for landscaping, outbuildings, vehicles, and equipment, historical damage data can be used, along with common sense. Structures with different types of landscaping may have different levels of damage. Not all homes have outbuildings and not all vehicles and equipment will be damaged in floods, because many owners will move such items to higher ground before floods. Whenever adjustments are made as shown above in the simplified example, full documentation of data sources and assumptions are essential.

If adjustments for other physical damages are made, it is very important to make appropriate, consistent adjustments in damage estimates both before and after mitigation. For example, damages to landscaping, outbuildings, vehicles and equipment are eliminated by acquisition. However, elevation or retrofit of the primary structure does not reduce these other types of damages. Thus, estimating these types of damages makes sense only for acquisition projects.

Counting Reduced Disruption Costs. To count the benefits of disruption, disruption time estimates must be made for each damage level (e.g., flood depth or wind speed bin). Then the dollar value of disruption time is calculated by multiplying the number of adults per house by the national average value of wages and benefits (\$21.16) to get a dollar value of disruption time. This

dollar value for disruption time can be converted to a percentage of building replacement value and added to the building damage percentage in the same manner as discussed above for other physical damages. This approach is mathematically correct, and reasonably straightforward, albeit perhaps confusing to the novice. As always, whenever such adjustments are made, full documentation of data sources and assumptions is essential.

3.2 Groups of Residential Buildings

Counting benefits for groups of residential buildings is very similar to counting benefits for single residential buildings. All of the categories of benefits discussed above in Section 3.1 for single residential buildings apply to groups of residential buildings. For groups of buildings, these benefits can be calculated for each building and then summed.

In some cases, groups of very similar buildings can be combined for purposes of benefit-cost analysis. However, this type of aggregation has to be done carefully. Groups of buildings can be combined if and only if they are the same structure type and have very similar frequencies and severities of disaster events. For flood mitigation projects this means that the structures must have very closely similar first floor elevations, and be close enough geographically so that they have very closely similar flood hazard data. For hurricane, wind, or earthquake projects, this means that the structures must be geographically close.

In addition to the benefits countable for single residential structures, mitigation projects for groups of residential may have two additional categories of benefits in some cases: avoided infrastructure damages and avoided emergency management costs. These additional benefits are generally only applicable to certain types of flood hazard mitigation projects.

If a mitigation project, such as improvements in flood control infrastructure, affects an entire town or an entire neighborhood, the damages to infrastructure will generally be reduced along with damages to the structures themselves. For example, there will be reduced damages to roads and utilities as well as to buildings. Similarly, if an acquisition project removes all of the homes from a neighborhood, then much of the infrastructure supporting the homes can be “retired” and is no longer subject to damage.

Likewise, if improvements in flood control infrastructure or acquisition of all homes in a neighborhood significantly reduces the level of flood risk for a community, then there is expected to be a proportional reduction in future emergency management costs.

All of the categories of benefits discussed above in Section 3.1 for single residential structures also apply to groups of residential structures. The additional categories of benefits that may be applicable

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for some flood hazard mitigation projects for groups of residential structures are summarized below in Table 3.3.

**Table 3.3
Additional Categories of Benefits to be Counted for Groups of Residential Buildings^{1,2}**

Additional Types of Benefits to Consider	When to Count
1. Physical Damages Other physical damages: - infrastructure	Applicable only to some flood mitigation projects
2. Emergency Management Costs Emergency operations center costs Evacuation or rescue costs Security costs Temporary protective measure costs Debris removal and cleanup costs Other emergency management costs	Applicable only to some flood mitigation projects

Notes:

¹ These possible additional categories of benefits apply only when a mitigation project such as improvements in flood control infrastructure affects an entire town or entire neighborhood or when an acquisition project affects an entire neighborhood.

² These possible additional categories of benefits generally apply only to flood hazard mitigation projects. Mitigation projects for hurricanes and earthquakes generally affect only individual structures and do not reduce a community's infrastructure damages or emergency management costs.

3.3 Commercial Buildings

Most of the benefit categories counted for commercial buildings are the same as for residential buildings discussed above. One exception is that disruption costs, which may be counted for residential buildings, are not applicable to commercial buildings. The equivalent of disruption time

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for commercial businesses is already implicitly included in estimates of functional downtime and lost business income. To count disruption time for commercial structures would be double-counting.

For mitigation projects for commercial buildings, the suggested benefit-cost analysis strategy is to count first the largest and most easily counted benefits. For this type of project, these benefits include building damages, contents damages, and displacement costs. In addition, for seismic projects, casualties should always be counted. If the project is cost-effective, it may not be necessary to count additional benefits. If not, the categories of other physical damages, business income losses and wage losses are generally the most significant additional benefits to count. The other categories are likely to contribute only minor benefits or to not be applicable.

The categories of benefits to be counted for mitigation projects for single commercial buildings (or small groups of commercial buildings or a group of commercial buildings at scattered locations) are summarized below in Table 3.4.

**Table 3.4
Categories of Benefits to be Counted for Commercial Buildings¹**

Type of Benefits to Consider	When to Count
1. Physical Damages	
Building damages	Always counted
Contents damages	Always counted
Other physical damages ² - landscaping - outbuildings - vehicles, equipment - site contamination	Applicable to acquisition or flood control infrastructure projects only ³ . Consider counting if significant, especially for projects that are close to being cost-effective without counting these categories
2. Loss-of-Function Impacts	
Displacement costs	Always counted
Rental income losses	Can count if appropriate, but easier to include in displacement costs ⁴
Business income losses ⁵	Consider counting, but generally constitutes only a small fraction of benefits
Wage income losses ⁵	Consider counting, especially for projects that are close to being cost-effective, can add significantly to benefits

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Type of Benefits to Consider	When to Count
3. Casualties	Always counted for seismic projects, rarely applicable to other projects ⁶
4. Emergency Management Costs	Not applicable to single commercial structures ⁷

Notes:

¹ Guidance in table applies to single commercial structures, small groups of commercial structures, and groups of structures at scattered locations.

² Other physical damages can be counted by adding appropriate damage percentages to the damage function for building or contents. These damages may be significant and thus counting them may add significantly to the total benefits. This type of mitigation project does not reduce damages to off-site utilities or transportation systems and no benefits should be counted for such other physical damages.

³ Other physical damages are applicable only to acquisition or flood control infrastructure projects because mitigation projects to elevate or retrofit the primary structure have no impact on these other categories of damages - thus, there are no additional benefits.

⁴ Rental income losses are not necessary to count if the full costs of temporary quarters are included in displacement costs for both owners and renters. Double-counting must be avoided.

⁵ Business income losses and especially wage losses may be significant for commercial structures and thus counting them may add significantly to the total benefits.

⁶ Casualties may be important for seismic hazard mitigation projects. Counting the benefits of avoided casualties may be a substantial fraction of total benefits and thus they should always be counted. For most other mitigation projects, benefits of casualties avoided are non-existent or negligible and thus should be counted only in special circumstances.

⁷ Acquisition, elevation or retrofit of single commercial structures, small groups of structures, or groups at scattered locations does not significantly reduce a community's emergency management costs because the area affected by a disaster is not decreased, and the total population affected by disaster is not decreased or not decreased significantly.

For commercial businesses, the appropriate measure of business income losses is net business income not gross business income because loss of function of a commercial building (i.e., functional downtime) generally reduces costs as well as receipts.

Loss of wage income generally applies only to hourly employees, since most salaried employees are likely to continue to be paid during relatively short post-disaster business interruptions. Estimates of lost wages should include wages and benefits. If local data are not available, the national average value of \$21.16 for hourly wages and benefits may be used for benefit-cost analysis.

Only in rare circumstances are FEMA hazard mitigation projects likely to include an entire neighborhood of commercial structures. If, however, a flood infrastructure improvement project or flood acquisition project does affect an entire neighborhood of commercial structures (or a mix of

residential and commercial structures), then the additional benefits discussed above for groups of residential structures also apply to groups of commercial structures. These possible additional benefits, which include avoided infrastructure damages and avoided emergency management costs, are subject to the same caveats and the same calculation methods as for residential structures.

3.4 Public Buildings

Most of the categories of benefits to be counted for public buildings are the same as for commercial buildings discussed above. Two exceptions are that business income losses and wage income losses are generally not applicable to public buildings. For public buildings, the measure of the economic impact of loss of function of a building is the loss of public services.

For ordinary public buildings that do not provide critical services for disaster response and recovery, the measure of the value of loss of service is the cost of providing the public service. To value public services, FEMA makes the very simple and direct assumption that public services are worth what it costs to provide the services to the public. For example, if a public service costs \$1,000 per day to provide, then the value is assumed to be \$1,000 per day. If the service is lost because of damage to the building, the loss is assumed to be \$1,000 per day. If the loss of service is avoided because of a hazard mitigation project, then the benefit is assumed to be \$1,000 per day. This method for valuing the loss of public services applies to all public services.

The daily cost of services is estimated from the annual operating budget for the agencies occupying a building. The annual operating budget includes all of the direct costs necessary to provide the public services, including salaries and benefits, materials, supplies, utilities, equipment costs, and rent or the annual cost of owning the building. The only exclusion is for transfer payments. For example, if a public office distributes pension checks, the value of the service is not the value of the checks distributed, but rather the cost of providing the service.

The equivalent of wage income losses is already explicitly included in estimates of functional downtime and loss of public services, because wages and benefits are a large portion of the costs of providing public services. Thus, to count wage income losses separately for public structures would be double counting.

For ordinary public buildings, a continuity premium is not added to the normal cost of service. A continuity premium is added only for services such as police, fire and medical, that is critical to emergency response and recovery. However, if some fraction of the staff of an ordinary public building does provide emergency services, an appropriate continuity premium could be added to that proportionate fraction of the cost of services.

Counting Benefits for Ordinary Buildings

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For mitigation projects for public buildings, the suggested benefit-cost analysis strategy is to count first the most easily identifiable and quantifiable benefits. For this type of project, these benefits include building damages, contents damages, displacement costs, and loss of public services. In addition, casualties should always be counted for seismic projects. If the project is cost-effective, it may not be necessary to count additional benefits. If the project is not cost-effective, the category of other physical damages may add the most significant additional benefits to count. The other benefit categories generally contribute only minor benefits or aren't applicable.

The categories of benefits to be counted for mitigation projects for public buildings are summarized below in Table 3.5.

Table 3.5
Categories of Benefits to be Counted for Public Buildings

Types of Benefits to Consider	When to Count
1. Physical Damages	
Building damages	Always counted
Contents damages	Always counted
Other physical damages ¹ - landscaping - outbuildings - vehicles, equipment - site contamination	Applicable to acquisition or flood control infrastructure projects only ² . Consider counting if significant, especially for projects that are close to being cost-effective without counting these categories
2. Loss-of-Function Impacts	
Displacement costs	Always counted
Loss of public services	Always counted No continuity premium for ordinary services
3. Casualties	Always counted for seismic projects, rarely applicable to other projects ³
4. Emergency Management Costs	Not applicable to single public structures ⁴

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Notes:

¹ Other physical damages can be counted by adding appropriate damage percentages to the damage function for building or contents. These damages may be significant and thus counting them may add significantly to the total benefits. This type of mitigation project does not reduce damages to off-site utilities or transportation systems and no benefits should be counted for such other physical damages.

² Other physical damages are applicable only to acquisition or flood control infrastructure projects because mitigation projects to elevate or retrofit the primary structure have no impact on these other categories of damages - thus, there are no additional benefits.

³ Casualties may be important for seismic hazard mitigation projects. Counting the benefits of avoided casualties may be a substantial fraction of total benefits and thus they should always be counted. For most other mitigation projects, benefits of casualties avoided are non-existent or negligible and thus should be counted only in special circumstances.

⁴ Acquisition, elevation or retrofit of single public structures, does not significantly reduce a community's emergency management costs because the area affected by a disaster is not decreased, and the total population affected by disaster is not decreased or not decreased significantly.

3.5 Summary

Benefit-cost analysis of ordinary residential, commercial, or public buildings is straightforward. Many of the same benefits are counted, regardless of the function of the building. For ordinary buildings, the following benefits are always counted and are usually the largest categories of benefits: 1) building damages, 2) contents damages, and 3) displacement costs. In addition, for public buildings, the value of lost public services should always be counted. For seismic hazard mitigation projects, the benefits of avoided casualties are often very important, sometimes the largest single category of benefits, and should always be counted. The most important benefits to count are summarized in Table 3.6 below.

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Counting Benefits for Ordinary Buildings

**Table 3.6
The Most Important Benefits for Hazard Mitigation Projects for Ordinary Buildings**

Types of Benefits to Consider	When to Count
▪ Building damages	Always counted
▪ Contents damages	Always counted
▪ Displacement costs	Always counted
▪ Loss of public services	Always counted for public buildings
▪ Casualties	Always counted for seismic projects

In addition, there are several other categories of benefits that apply in more limited cases or are generally significantly smaller than those identified in Table 3.6. Possible additional benefits to count are summarized below in Table 3.7.

**Table 3.7
Possible Additional Benefits to Count
(if project is not cost-effective after counting benefits in Table 3.6)**

Types of Benefits to Consider	When to Count
▪ Other physical damages	Applicable for all building types, but only for acquisition or flood control infrastructure mitigation projects; may add significantly to total benefits.
▪ Rental income losses	Applicable to all building types, but not necessary to count; instead, it is easier to include in displacement costs.
▪ Business income losses	Applicable to commercial buildings and to home businesses; this category of benefits is generally small.
▪ Wage income losses	Applicable only to commercial buildings; may add significantly to total benefits.
▪ Disruption costs	Applicable to residential buildings; may add significantly to total benefits.

Counting Benefits for Ordinary Buildings

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Types of Benefits to Consider	When to Count
<ul style="list-style-type: none">▪ Emergency management costs	Applicable only to flood control infrastructure projects or acquisition projects that protect entire neighborhoods; this category of benefits is generally small.

SECTIONFOUR

Critical Facilities: Police, Fire and Medical Buildings

This section provides guidance and examples of how to count benefits for mitigation projects for buildings providing police, fire, and medical services. Such buildings are considered critical facilities because the services they provide are critical to disaster response and recovery.

Benefit-cost analysis for critical facilities is generally similar to that for ordinary public buildings. The same categories of benefits are typically counted, as summarized below in Table 4.1

Table 4.1
Categories of Benefits to be Counted for
Critical Facilities: Police, Fire and Medical Buildings

Types of Benefits to Consider	When to Count
1. Physical Damages	
▪ Building damages	<ul style="list-style-type: none">▪ Always counted▪ Building replacement values may differ from those for ordinary buildings▪ Specialized damage functions may be needed
▪ Contents damages	<ul style="list-style-type: none">▪ Always counted▪ Contents replacement values may differ from those for ordinary buildings▪ Specialized damage functions may be needed
▪ Other physical damages ¹ <ul style="list-style-type: none">- landscaping- outbuildings- vehicles, equipment- site contamination	Applicable to acquisition or flood control infrastructure projects only ² . Consider counting if significant, especially for projects that are close to being cost-effective without counting these categories
2. Loss-of-Function Impacts	
▪ Displacement costs	<ul style="list-style-type: none">▪ Generally counted▪ May not be applicable for some facilities
▪ Loss of public services	<ul style="list-style-type: none">▪ Always counted▪ A continuity premium must be added to the normal cost of providing service▪ In many cases, the continuity premium has a large impact on the benefit-cost analysis
3. Casualties	Always counted for seismic projects, rarely applicable to other projects ³
4. Emergency Management Costs	Not applicable to single public structures ⁴

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Critical Facilities: Police, Fire and Medical Buildings

Notes:

¹ Other physical damages can be counted by adding appropriate damage percentages to the damage function for building or contents. These damages may be significant and thus counting them may add significantly to the total benefits. This type of mitigation project does not reduce damages to off-site utilities or transportation systems and no benefits should be counted for such other physical damages.

² Other physical damages are applicable only to acquisition or flood control infrastructure projects because mitigation projects to elevate or retrofit the primary structure have no impact on these other categories of damages - thus, there are no additional benefits.

³ Casualties may be important for seismic hazard mitigation projects. Counting the benefits of avoided casualties may be a substantial fraction of total benefits and thus they should always be counted. For most other mitigation projects, benefits of casualties avoided are non-existent or negligible and thus should be counted only in special circumstances.

⁴ Acquisition, elevation or retrofit of single public structures, does not significantly reduce a community's emergency management costs because the area affected by a disaster is not decreased, and the total population affected by disaster is not decreased or not decreased significantly.

There are, however, important differences in benefit-cost analysis of mitigation projects for critical facilities as compared to analysis for ordinary buildings.

4.1 Physical Damage Estimates for Police, Fire and Medical Buildings

Physical damage patterns for these types of buildings are generally similar to those for ordinary buildings. However, in some cases critical facilities are designed to higher codes and standards than ordinary buildings and thus may be somewhat less vulnerable to damages. Building replacement values may also differ because of the specialized nature of these buildings. For example, building replacement values for hospitals can be as high as \$300 per square foot. On the other hand, building replacement values for fire stations can be quite low, because of the simple nature of most fire stations, with much of the space being garage space for fire apparatus. Building replacement values for police, fire, or medical facilities are generally available from the agencies providing such services, from local building officials, or from local building engineers.

Contents damage patterns for these types of buildings are generally similar to those for ordinary buildings. In some cases, professional judgment is necessary to adjust typical or default contents damage functions to reflect the specialized communications or medical equipment in these types of facilities. For hospitals and other medical facilities, the contents replacement value may be very high, in some cases similar to or exceeding the building replacement value. Appropriate contents

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Critical Facilities: Police, Fire and Medical Buildings

replacement values for police, fire, or medical facilities are generally available from the agencies providing such services, from local building officials, or from local building engineers.

For acquisition or flood control infrastructure mitigation projects, one of the benefits may be reductions in other physical damages. As for ordinary buildings discussed in Section 3, other physical damages for critical service buildings include damages to landscaping, outbuildings, vehicles, and equipment and possible site contamination. Such damages can be estimated, but are generally small compared to the other categories of benefits for critical service facilities. Thus, such benefits can generally be ignored except for projects that are very close to being cost-effective without counting this category. For mitigation projects other than acquisition or flood control infrastructure, there are no benefits in this category because elevation, retrofit or strengthening of a building itself does not reduce this category of damages.

4.2 Displacement Costs

When facilities housing police and fire services are damaged to an extent such that the buildings cannot be occupied during repairs, the services are moved to temporary quarters. The displacement costs for such temporary quarters are part of the damages and losses attributed to a disaster and these displacement costs become part of the benefits to the extent that they are avoided or reduced by a mitigation project.

Displacement costs for police and fire facilities are counted in the same manner as for ordinary buildings. Displacement costs include:

- Monthly costs of rent for temporary space
- Other monthly costs such as furniture rental
- One-time costs such as round-trip moving costs, utility connection fees and other such costs

For police and fire facilities, the one-time costs may be higher than for ordinary buildings because of the critical communications equipment that would have to be moved and reinstalled. Other monthly costs could also include extra transportation time and costs if the temporary facility is not as well located as the permanent facility.

For police facilities that include jails, the concept of displacement costs is somewhat more complicated. For security reasons, inmates probably cannot be housed in ordinary temporary quarters. Rather, displacement of jail inmates probably requires moving inmates to another correctional facility. In such cases, displacement costs would include the transportation or moving costs, any extra daily transportation time and costs, plus the monthly cost of housing inmates in the alternative facility.

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Critical Facilities: Police, Fire and Medical Buildings

For hospitals, the concept of displacement to temporary quarters is also somewhat more complicated. Some hospital facilities such as office space, storage space, residential quarter for staff and other ordinary functions can be relocated to temporary quarters. For such space, displacement costs are calculated as summarized above for police and fire services.

Some hospital services, including most patient care facilities cannot readily be located to temporary quarters. For such services, displacement probably requires moving patients and services to another medical facility. In this case, displacement costs would include the transportation or moving costs, any extra daily transportation time and costs, plus the extra monthly cost of housing patients in the alternative facility.

The typical values for displacement time assume that building damages of less than 10% of the building replacement value can be repaired without requiring displacement of occupants. For damages above 10%, a minimum displacement of 30 days is assumed, with the displacement time increasing linearly with damage percentage up to a cap of 365 days (one year) for displacement time. That is, regardless of the level of damages, it is assumed that public services will be back in the original (repaired) building or in a new permanent building within one year of the disaster. Professional judgment, experience, and many years of use confirm that these estimates appear reasonable in most cases, especially for small- to medium-sized facilities.

For major, complex or specialized facilities that suffer major damage or that require replacement with new facilities, or for large, monumental historical buildings, longer displacement times of up to two or three years are sometimes experienced. While such long displacement times are uncommon, they do occur and in such cases it is important to make realistic estimates of displacement time. Displacement time estimates for major complex projects can be based on construction duration estimates, construction bids, or on the professional judgment of the design and construction details of the repairs or of the replacement facility. Longer displacement time estimates are appropriate if and only if there is sound documentation of longer repair or replacement times for a specific facility under evaluation.

4.3 Loss of Public Services

For critical facilities, the first step in evaluating the benefits of reducing the loss of public service is exactly the same as that for ordinary buildings, as discussed in Section 3.4. The base value of public services, including police, fire and medical services, is estimated from the annual operating budget of the facility providing the service. The annual operating budget includes all of the direct costs necessary to provide the public services, including salaries and benefits, materials, supplies, utilities, equipment costs, and rent or the annual cost of owning the building. The only exclusion is for

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Critical Facilities: Police, Fire and Medical Buildings

transfer payments. For example, if a public office distributes pension checks, the value of the service is not the value of the checks distributed, but rather the cost of providing the service.

The equivalent of wage income losses is already explicitly included in estimates of functional downtime and loss of public services, because wages and benefits are a large portion of the costs of providing public services. Thus, to count wage income losses separately for public structures would be double-counting.

4.3.1 Continuity Premiums for Police, Fire and Medical Services

A continuity premium is a measure of the extra importance that some public services have during disasters. In simple terms, a continuity premium is a measure of how much extra a community would be willing to pay to continue to have critical services during a disaster.

In benefit-cost analysis, the effect of a continuity premium is to count more highly those services that are essential for disaster response and recovery, compared to ordinary services that are not more important to a community during disasters. A high continuity premium increases the benefits of a mitigation project by increasing the benefits of avoiding loss of public services.

In assigning continuity premiums for police, fire and hospital services, the following question must be answered:

In a disaster, how much more important are police, fire and hospital services compared to their value to the community in non-disaster circumstances?

Answering the above question and thereby determining an appropriate continuity premium for these services profoundly affects the determination of which hazard mitigation projects are or are not cost-effective.

For police and fire services, the maximum possible continuity premium is limited by the capacity of police and fire departments to respond to emergency calls. For example, police and fire departments cannot respond to 1,000 times more calls than normal during a disaster because of limited staff and apparatus. A more detailed analysis of continuity premiums for police and fire services is given in Chapter 1 of the Supporting Documentation (Technical Appendix: Guidance for Benefit-Cost Analysis of Mitigation Projects for Police, Fire, and Medical Service Facilities). In general, a continuity premium of ten times the normal cost of service is appropriate for police and fire services.

For medical services, similar concepts apply as discussed above for police and fire services, although appropriate continuity premiums for medical services vary with the disaster type as follows:

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Critical Facilities: Police, Fire and Medical Buildings

For earthquakes, the potential for mass casualties means that an appropriate continuity premium will be governed by the capacity to provide emergency medical services. A continuity premium of 10 times the normal cost of service is suggested for medical facilities providing direct patient care.

For floods, there is very little likelihood of significantly more than normal demand for emergency medical services and therefore no continuity premium should be applied.

For hurricanes, the typical number of casualties is low because of the widespread evacuations that are commonly ordered in advance of a hurricane. Thus, there is very little likelihood of significantly more than normal demand for emergency medical services and no continuity premium should be applied.

For tornadoes and fires, some casualties are likely. However, such events typically impact only very small segments of a hospital service area and thus, there is very little likelihood of significantly more than normal demand for emergency medical services and no continuity premium should be applied

Thus, for hospitals and other patient care medical facilities, a continuity premium is suggested only for seismic hazard mitigation projects. For seismic hazard mitigation projects for hospitals, a continuity premium of 10 is suggested only for facilities providing direct patient care. For a hospital complex as a whole, many facilities are support facilities not directly related to immediate patient care; therefore for hospital complexes as a whole, a continuity premium of 5 is suggested. For non-patient care buildings within a hospital complex, continuity premiums from none to perhaps 5 are suggested, depending on the strength of the linkage between the building's services and patient care. A more detailed analysis of continuity premiums for hospitals and other medical care services is given in Chapter 1 of the Supporting Documentation (Technical Appendix: Guidance for Benefit-Cost Analysis of Mitigation Projects for Police, Fire, and Medical Service Facilities).

Suggested continuity premiums for police, fire and medical services are summarized below in Table 4.2.

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Critical Facilities: Police, Fire and Medical Buildings

**Table 4.2
Continuity Premiums
Police, Fire, and Medical Services**

Type of Facility	Continuity Premium
Police Services	10
Fire Services	10
Medical Services	<ul style="list-style-type: none">▪ 0 for non-seismic mitigation projects▪ 10 for seismic mitigation projects for patient care facilities▪ 5 for seismic mitigation projects for whole hospital complex▪ 0 to 5 for seismic mitigation projects for non-patient care buildings, depending on linkage between services provided and patient care

4.3.2 Functional Downtime Estimates for Police, Fire and Medical Services

Functional downtime is the number of days that a public service is not available because of disaster damage. Functional downtime days may be fractional. For example, one day of functional downtime may be one day with 100% loss of service or two days with 50% loss of service or 10 days with 10% loss of service.

Functional downtime is not the same as displacement time. For example, a building providing a public service is damaged in a flood and occupants are displaced to temporary quarters for 3 months while repairs are made. The public service, however, is restored in two weeks from the temporary quarters. In this simple example, the functional downtime is two weeks, while the displacement time is three months.

Estimates of functional downtime are substantially different for critical services than for ordinary services. For example, if a library suffers damage in a flood or an earthquake, the library may close for several weeks or several months. Loss of library service may be tolerable to a community for an extended period of time. However, if a police or fire station suffers a similar level of damage, the police or fire services cannot be closed down for an extended period of time because these services are simply too important to the community. Thus, in the case of damage to a police or fire station, the essential police or fire services are generally reestablished quickly in temporary quarters. Essential services will be reestablished much more quickly than would less important services.

A general rule of thumb is that the more important a public service is to a community, the shorter the functional downtime will be.

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Critical Facilities: Police, Fire and Medical Buildings

Police and fire services are in large part provided away from the facility housing the staff and apparatus. This aspect of such services is very important because it means that, to a considerable degree, service can be continued even when the facility housing the service has considerable damage. In an emergency, many operations can be run from a parking lot with manual dispatch or cell phone dispatch in the event that a station is heavily damaged in a disaster.

For the reasons cited above, loss of police and fire services is almost always partial. It would be very rare for a police or fire department to provide no service for any significant period of time. Rather, damage to facilities or disruption of communication links commonly result in delays or disruption of normal service. For any given disaster event, days of loss of service are not likely to be complete days with 100% loss of service. More likely there might be, for example, one day with 50% service, several days with 80% service and several days with 90% service. When historical data on service disruption are available, the functional downtime can be calculated by summing up the fractional days of lost service over the service restoration time period after the disaster.

The concepts discussed above and the analysis of functional downtime for police and fire services suggests that functional downtimes for these services are expected to be significantly shorter than for ordinary (non-critical) public services. A common sense rule of thumb, based on professional judgment and experience, is that functional downtimes might average a factor of three less than for ordinary public services.

Functional downtime estimates for hospitals are, in some regards, similar to those for police and fire services. Because hospital services, like police and fire services, are obviously important to a community in a disaster situation, functional downtimes are likely to be shorter for hospitals than for ordinary facilities. That is, repair and restoration of damaged hospital facilities almost always has a very high priority.

However, the shorter functional downtimes expected for hospitals because of their importance to the community is counterbalanced by the fact that many critical hospital services require special, sterile medical conditions and complex modern medical equipment. Thus, while police and fire staff and apparatus can be dispatched from a parking lot, if necessary, few major medical, surgical, or diagnostic procedures requiring specialized equipment and/or sterile conditions can be performed in a parking lot.

Similarly, a few inches of water or even a foot or two of water in a police or fire station will disrupt service, but will not result in complete loss of service. However, a few inches of water in an operating room, a diagnostic room with specialized medical equipment, or a patient care room, would almost certainly result in complete loss of service.

Combining the importance of hospital services to a community and the medical requirements for sterile conditions and other operating constraints for medical facilities suggests that functional downtimes for hospitals are likely to be shorter than those for ordinary buildings but longer than

those for police and fire services. A common sense rule of thumb, based on professional judgment and experience, is that functional downtimes for hospitals might average a factor of two less than for ordinary public services.

4.4 Casualties

In some disaster events, occupants of facilities housing police and fire services and hospitals and other medical facilities are at risk of injury or death. Casualty estimates for such facilities are made in exactly the same manner as for ordinary buildings. Casualties are estimated from the average occupancy (24 hours per day, 365 days per year) of a facility and the estimated casualty rate as a function of severity of disaster.

For these critical facilities, casualty estimates are most important for earthquakes. Major earthquakes may pose a significant life safety risk for occupants of buildings with seismic vulnerabilities. For seismic hazard mitigation projects, the benefits of reduced or avoided casualties may be a major component of total benefits for any of these critical facilities, which usually have 24-hour occupancy. However, the benefits of avoided casualties are particularly important for hospitals because of their typically very high occupancy levels (patients, staff, and visitors). In some cases, especially for hospitals, the benefits of reduced casualties may be the largest single benefit of a mitigation project. For seismic mitigation projects, the benefits of reduced casualties are important and these benefits should always be counted.

For floods and hurricanes, casualties are generally low and many casualties that do occur are a result of individuals ignoring evacuation warnings (in the case of hurricanes) or ignoring road or bridge closures (in the case of floods). For most flood and hurricane hazard mitigation projects the benefits of reduced casualties are generally not significant and are not considered in the benefit-cost analysis. However, critical facilities such as those for police and fire services and hospitals are probably less likely to be evacuated in hurricanes than are ordinary facilities. Especially for mitigation projects that are designed to harden such facilities to withstand hurricane winds or tornadoes, the benefits of reduced casualties may be significant and should be considered in the analysis. In these circumstances, casualty rate estimates should always be made in close consultation with an engineer knowledgeable about the wind design characteristics of the existing building and the capacity of the post-mitigation building.

For benefit-cost analyses where reductions in casualties are included, the benefits of casualties avoided are often a large component of total benefits and thus estimates of casualty rates before and after mitigation become a very important determinant of the overall benefit-cost analysis and results. Making realistic estimates of casualty rates is difficult and requires a substantial understanding of the failure modes of buildings and the likely casualty rates that would result. Estimates of casualty rates

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should always be made by an engineer or analyst very knowledgeable about such issues, with a considerable amount of experience.

For seismic mitigation projects, the casualty rate estimates in the FEMA-sponsored HAZUS program (HAZUS, Earthquake Loss Estimation Methodology, National Institute of Building Science and Federal Emergency Management Agency, 1997) provide the best available consensus estimates of casualty rates for different structural types of buildings designed to varying seismic design levels. However, using these estimates is possible if and only if a building's seismic vulnerability is expressed as a fragility curve. A fragility curve is a mathematical representation that states the probability that a building will sustain a given level of damage as a function of the level of ground motion. Fragility curve-based estimates of casualty rates are the best available, but the necessary calculations are mathematically complicated and should not be attempted by analysts not thoroughly familiar with this mathematics.

Damage to critical facilities may also result in a loss of function that may pose a life safety threat to the community served by the facility. This potential casualty risk is separate from casualty risk faced by the occupants of the building. Police, fire and medical services are directly related to life safety in the community as a whole. The high operating budgets of such facilities reflect, in large part, the life safety aspects of these services. However, the life safety impacts of losing service from such facilities are already included in the value of public services calculation discussed above in Section 4.3. The high normal daily cost of service and the high continuity premiums for these critical services include the importance of these facilities in preserving life safety in the community. Thus, separate casualty estimates for the community as a whole should not be done for benefit-cost analysis and to do so would be to incorrectly double-count life safety benefits.

4.5 Summary Guidance

The major categories of benefits to be counted for mitigation projects for public buildings providing police, fire, and medical services are summarized below in Table 4.3.

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Critical Facilities: Police, Fire and Medical Buildings

Table 4.3
Summary Guidance
Benefit-Cost Analysis of Mitigation Projects for Police, Fire, and Medical Facilities

Damages/Benefits Categories	Data Sources and Guidance
1. Physical Damages	
▪ Building replacement value and contents value	Values from local officials.
▪ Building and contents damage functions	Historical data and professional judgment, as necessary.
▪ Other physical damages	For acquisition and flood control infrastructure projects only, generally of minor importance, estimates based on historical data and professional judgment.
2a. Economic Impact of Loss of Function (i.e., Displacement Costs)	
▪ Displacement time	Historical data and professional judgment, as necessary.
▪ Displacement costs	Estimates of monthly rent, other costs, and one-time costs from local officials. Costs may differ for critical service facilities.
2b. Economic Impact of Loss of Function (i.e., Loss of Public Services)	
▪ Normal cost of service	Annual operating budgets from local officials
▪ Functional downtime	▪ Police services: 1/3 of typical values ▪ Fire services: 1/3 of typical values ▪ Medical services: 1/2 of typical values
▪ Continuity Premiums - police and fire services	10x cost of normal service
▪ Continuity Premiums - medical services, seismic projects	▪ Patient care facilities: 10x cost of normal services ▪ Whole medical complex: 5x cost of normal services ▪ Non-patient care bldgs: 0 to 5x cost of normal services
▪ Continuity Premiums - medical services, other projects	None, demand for services is typically not significantly greater than normal

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Critical Facilities: Police, Fire and Medical Buildings

Damages/Benefits Categories	Data Sources and Guidance
3. Casualties	
▪ Average Facility occupancy	Local officials or applicant
▪ Casualty rates	HAZUS casualty rates for earthquakes, professional judgement for other hazards
▪ Statistical values of deaths, injuries, and illnesses	FEMA values, updated to 2001 values, see Section 2.3 - deaths: \$2,710,000 - major injuries/illnesses: \$15,600 - minor injuries/illnesses: \$1,560

Mitigation projects for critical facilities are, by definition, important projects to communities. The guidance for benefit-cost analysis presented above makes it more likely that mitigation projects are cost-effective, compared to similar mitigation projects for ordinary facilities. Most importantly, the continuity premium places a greater value on avoiding loss of service, thus substantially increasing benefits. Furthermore, especially for hospitals, the greater building values, contents values, and high occupancy all result in higher benefits when mitigation projects will reduce damages and casualties. Benefit-cost analysis properly and fully recognizes and counts the importance of these critical facilities to a community.

However, regardless of how important these facilities may be to a community, not every mitigation project for a critical facility will be cost-effective. For example, consider a mitigation project for a seismic upgrade or replacement of a fire station built below the current building codes. If the building is located in a high seismic hazard area and is constructed of unreinforced masonry, subject to collapse during an earthquake with resulting casualties and substantial loss of the important services, then the benefits of retrofit or replacement will be very high. In many such cases, even a complete replacement of the building with a new building may be cost-effective. On the other hand, if the existing fire station has only minor seismic deficiencies, with little potential for casualties, and only limited potential for loss of service, then a very expensive seismic retrofit (e.g., \$100 or \$150 per square foot) to bring the entire building up to current code requirements will almost certainly not be cost-effective. In these circumstances a more modest seismic retrofit to address the specific deficiencies has a higher likelihood of being cost-effective.

Mitigation projects for critical facilities, which are reasonable in cost and address specific deficiencies in high hazard areas, have a high likelihood of being cost-effective. On the other hand, expensive mitigation projects that correct only minor deficiencies or located in areas with only minor exposure to hazards are unlikely to be cost-effective, even for critical facilities. It is important to understand that a benefit-cost analysis indicating that a mitigation project for a critical facility is not

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Critical Facilities: Police, Fire and Medical Buildings

cost-effective does not mean that the benefit-cost analysis is flawed but may instead indicate that the mitigation project is poorly conceived and, indeed, not worth doing.

In many regards, benefit-cost analysis of mitigation projects for emergency operations centers (EOCs) and emergency shelters is similar to that for other critical facilities. For EOCs and emergency shelters, however, there are two very important differences: 1) such facilities often occupy only part of a building, and 2) such facilities are in function only immediately before, during or immediately after disaster events. Both of these differences affect benefit-cost analysis of mitigation projects for EOCs and emergency shelters.

Many mitigation projects for EOCs and emergency shelters address only the portion of a building used for the EOC or shelter. In this case, the benefit-cost analysis should consider only the portion of the building used for the EOC or shelter, because such a mitigation project has no effect on the remainder of the building. Estimates of building damages, contents damages, displacement costs, casualties, loss of public services and any other categories of benefits should consider only the portion of the building used as an EOC or shelter.

If a mitigation project affects the entire building housing an EOC or shelter and other non-critical public functions, then the easiest way to approach the benefit-cost analysis is to consider separately the parts of the building providing ordinary services and critical services and then add the benefits together. For benefit-cost analysis, the part of the building providing ordinary services is evaluated in exactly the same manner as “ordinary” public buildings, with guidance as outlined in Section 3.

For benefit-cost analysis, the portion of a building providing EOC or shelter services is treated conceptually as a separate building.

The guidance in this section focuses only on portions of a facility providing EOC or shelter services, or the whole building if the whole building provides EOC or shelter services.

Benefit-cost analysis for these buildings or parts of buildings providing EOC or emergency shelter services is generally similar to that for ordinary public buildings. The same categories of benefits are typically counted, as summarized below in Table 5.1

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Critical Facilities: Emergency Operations Centers and Emergency Shelters

Table 5.1
Categories of Benefits to be Counted
Critical Facilities: EOCs and Emergency Shelters

Types of Benefits to Consider	When to Count
1. Physical Damages	
▪ Building damages	<ul style="list-style-type: none">▪ Always counted▪ Building replacement values may differ from those for ordinary buildings▪ Specialized damage functions may be needed
▪ Contents damages	<ul style="list-style-type: none">▪ Always counted▪ Contents replacement values may differ from those for ordinary buildings▪ Specialized damage functions may be needed
▪ Other physical damages ¹ <ul style="list-style-type: none">- landscaping- outbuildings- vehicles, equipment- site contamination	<ul style="list-style-type: none">▪ Applicable to acquisition or flood control infrastructure projects only²▪ Consider counting if significant, especially for projects that are close to being cost-effective without counting these categories
2. Loss-of-Function Impacts	
▪ Displacement costs	<ul style="list-style-type: none">▪ May be applicable for some facilities,▪ Displacement time estimates are different than for ordinary buildings: limited to normal duration of use during disasters
▪ Loss of public services	<ul style="list-style-type: none">▪ Always counted▪ A continuity premium must be added to the normal cost of providing service▪ In many cases, the continuity premium has a large impact on the benefit-cost analysis▪ Functional downtime estimates are different than for ordinary buildings: limited to normal duration of use during disasters
3. Casualties	Always counted for seismic projects, may be applicable for hurricane and tornado projects as well ³
4. Emergency Management Costs	Not applicable to single public structures ⁴

Notes:

- ¹ Other physical damages can be counted by adding appropriate damage percentages to the damage function for building or contents. These damages may be significant and thus counting them may add significantly to the total benefits. This type of mitigation project does not reduce damages to off-site utilities or transportation systems and no benefits should be counted for such other physical damages.
- ² Other physical damages are applicable only to acquisition or flood control infrastructure projects because mitigation projects to elevate or retrofit the primary structure have no impact on these other categories of damages - thus, there are no additional benefits.
- ³ Casualties may be important for seismic hazard mitigation projects. Counting the benefits of avoided casualties may be a substantial fraction of total benefits and thus they should always be counted. Benefits of avoided casualties may also be important for hurricane and tornado mitigation projects because EOCs and emergency shelters are intended to be occupied during disaster events.
- ⁴ Acquisition, elevation or retrofit of single public structures, does not significantly reduce a community's emergency management costs because the area affected by a disaster is not decreased, and the total population affected by disaster is not decreased or not decreased significantly.

5.1 Physical Damage Estimates for EOC and Emergency Shelter Buildings

Physical damage estimates for EOCs and emergency shelters are generally similar to those for ordinary buildings. If the EOC or shelter is designed to higher than normal building code standards, then professional judgement must be used to make appropriate estimates of damages, before and after mitigation.

Contents damage estimates for EOCs and emergency shelters are also generally similar to those for ordinary buildings. For EOCs, the extra value of communications and other EOC equipment must be considered in the analysis.

Acquisition projects are uncommon for EOC or shelters. However, if a mitigation project is acquisition or is a flood control infrastructure project that provides better flood protection for an EOC or shelter, other physical damages (landscaping, outbuildings, etc.) can also be counted. However, for typical mitigation projects for EOCs and shelters, that involve hardening of the building itself, there are no additional benefits in this category and they should not be counted.

5.2 Displacement Costs

In principle, the public services provided by EOCs and emergency shelters are subject to being displaced to temporary quarters due to disaster damages, just like any other public service. In practice, however, the operation of EOCs or emergency shelters is typically only for short periods of time immediately before, during, or after disaster events. Furthermore, because of the specialized, temporary function of EOCs and shelters, displacement to temporary quarters may not be physical possible, during the brief periods that EOCs and shelters would normally operate in a single disaster event. Typically, there is ample time between disasters to allow for repairs between uses of EOCs or shelters.

Because of the operating characteristics of EOCs and emergency shelters, the possible benefits of reduced displacement time are likely to be substantially less than for ordinary buildings. For ordinary buildings, the benefits of reduced displacement time generally constitute only a small fraction of total benefits. Thus, for EOC or emergency shelter mitigation projects the benefits of reduced displacement time are likely to be very minor. Except for mitigation projects that are very close to being cost-effective without counting the benefits of reduced displacement time, it may not be necessary to count displacement benefits for most mitigation projects for EOCs and emergency shelters.

5.3 Loss of Public Services for EOCs

In principle, the benefits of avoiding loss of public services provided by EOCs and emergency shelters are calculated from the daily cost of public services, just like any other public service. In addition, since EOCs and emergency shelters are critical facilities, an appropriate continuity premium must be added to reflect properly the greater importance of EOCs and emergency shelters during disasters.

5.3.1 Functional Downtime Estimates for EOCs and Shelters

Functional downtime estimates for EOCs and shelters are different from those for ordinary buildings because EOCs and shelters are typically used only for short periods of time before, during and/or after disaster events. Functional downtimes for EOCs and shelters cannot be longer than the typical duration of use.

5.3.2 Value of Services

As with any public building, the base value of the service provided by an EOC or shelter is estimated from the daily cost of providing the service. However, unlike other public services, EOCs and shelters are used only for brief periods of time before, during or after disaster events. For ordinary public buildings, the daily cost of service is estimated by dividing the annual operating budget of a facility by 365 days per year.

For EOCs the daily cost of service is estimated by dividing the annual operating budget by the typical or average number of days of use per year.

For example, if an EOC has an annual operating cost of \$36,500 per year and operates an average of only 2 days per year, based on historical data, then the average daily cost of service is \$17,500 per day (when used). In this case, the average value of the EOC services is estimated at \$17,500 per day. As with any public services, the annual operating budget for an EOC includes annual costs for equipment, supplies, utilities, administrative and training costs and other operating costs, as well as the salary and benefit-costs of personnel when the EOC is activated.

Rather than trying to estimate an annual operating budget for emergency shelters, a different approach is suggested for estimating the base value of emergency shelter. For Federal travel, the GSA establishes standard rates for lodging and meals. For the continental U.S., the base CONUS daily rates are \$55 for lodging and \$30 for meals and incidentals. Higher rates are published for counties with higher than these typical values (i.e., many medium- to large- urban areas). The simplest measure of the value of temporary lodging and meals provided by an emergency shelter would be \$85 per day (the base CONUS rate). A more accurate measure could be obtained by using the GSA rate appropriate for the county in which the emergency shelter is located. Current GSA lodging and meals rates are available at several websites, including a DOD site (www.dtic.mil/perdiem).

For emergency shelters, the base daily value of the public service is estimated by multiplying the average number of people given shelter by the \$85 per day CONUS value (or the appropriate local value of lodging and meals from the GSA data).

5.3.4 Continuity Premiums for EOCs and Shelters

Determining an appropriate continuity premium for an EOC is difficult. In many ways, evaluating a mitigation project for an EOC is similar to evaluating a mitigation planning project. An EOC does not, by itself, directly reduce damages, losses, or casualties in a disaster. Rather, by coordinating response efforts, an EOC makes a community's disaster response more efficient and thus is beneficial to the community. Indirectly, an EOC may reduce damages by targeting and

implementing preventative measures more efficiently or reduce casualties by focusing search and rescue operations more efficiently.

Clearly, an EOC is important to a community during disasters. However, because of the indirect connection between and EOC and reductions in damages, losses, and casualties, it is difficult to estimate a suitable continuity premium. For consistency, we suggest assuming that a functioning EOC has the same continuity premium, relative to the cost of service, as police and fire services. This assumption then assigns a common continuity factor of 10 times the daily cost of services to each of the primary emergency response functions: police, fire and EOCs.

In a disaster, there are several reasons why emergency shelter is clearly worth more to residents and to the community than during ordinary times. First, hotels and motels are likely to be filled to capacity, or unavailable due to closures and/or damage. Second, emergency shelter is more important than discretionary temporary shelter. Discretionary travel and shelter can be postponed, but the need for emergency shelter is immediate and cannot be postponed. Third, there is a life safety impact of emergency shelter. Availability of safe emergency shelters in tornadoes and hurricanes reduces casualties because people move from less safe structures to safer emergency shelters. In hurricanes, the availability of shelters undoubtedly reduces the number of people who are at risk because they ignore evacuation warnings. That is, the availability of emergency shelter makes it more likely that people will evacuate when so ordered by local officials.

Estimating the value of emergency shelter to a community and determining an appropriate continuity premium depends primarily on common sense and professional judgement. Clearly, people displaced from their homes or evacuated would be willing to pay more than the normal cost of shelter and food - perhaps twice normal costs, or several times normal costs or even ten times normal costs, but not 100 or 1000 times normal costs. At 100 or 1000 times normal costs, the value per day of temporary shelter would be \$8,500 or \$85,000 per person per day, respectively, and clearly such numbers exceed the bounds of common sense for the typical or average value of emergency shelter in disasters.

For emergency shelters, a continuity premium similar to, but not larger than, those assigned to police and fire services and EOCs appears reasonable. Thus, a continuity premium of 10 times the normal cost of service for emergency shelters should be used.

5.4 Casualties

In some disaster events, occupants of EOCs and shelters may be at risk of injury or death. In estimating casualties, the occupancy characteristics of EOCs and shelters must be carefully considered. Methods for estimating casualties depend on whether or not the facility has alternative

uses during non-disaster times and whether or not the expected types of disasters occur with or without warnings.

For seismic hazard mitigation projects for EOCs and shelters, the appropriate occupancy value is the typical year-round occupancy for the normal function of the facility. In other words, casualty estimates are made in exactly the same manner as for any other building. For seismic mitigation projects, the best available casualty rate estimates are those in the FEMA-sponsored HAZUS program (HAZUS, Earthquake Loss Estimation Methodology, National Institute of Building Sciences and FEMA, 1997). HAZUS has consensus estimates of casualty rates for different structural types of buildings designed to several seismic design levels. However, using these estimates is possible if and only if a building's seismic vulnerability is expressed as a fragility curve. A fragility curve is a mathematical representation of a damage function expressed as the probabilities that a building will sustain a given level of damage as a function of the level of ground motion. Fragility curve-based estimates of casualty rates are the best available, but the necessary calculations are mathematically complex and should not be attempted by analysts not thoroughly familiar with this specialized mathematics and methodology.

For hurricane or tornado mitigation projects for EOCs and shelters, the appropriate occupancy value would be the occupancy during hurricane or tornado warnings, which may differ significantly from the normal occupancy of the facility. For hurricane winds and tornadoes, there are no currently available resources such as the earthquake HAZUS model to assist in casualty rate estimates.

Rather, casualty rate estimates must be made for each building, based on the capacity of the specific building to withstand wind forces. In these circumstances, casualty rate estimates should always be made only in close consultation with an engineer very knowledgeable about the wind design characteristics of the existing building and the ability of the post-mitigation building to withstand wind forces.

For flood hazard mitigation projects for EOCs and shelters, life safety is generally not an issue and thus it is not necessary to make casualty estimates.

5.5 Summary Guidance

The major categories of benefits to be counted for mitigation projects for EOCs and emergency shelters are the same as those addressed for ordinary public buildings (Section 3) and for police, fire and medical facilities (Section 4). However, because of the function and occupancy characteristics of EOCs and shelters, there are several significant differences in benefit-cost analysis. These special considerations for EOC and shelter mitigation projects are highlighted in the summary Table 5.2 below.

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Critical Facilities: Emergency Operations Centers and Emergency Shelters

Table 5.2
Special Considerations for Benefit-Cost Analysis
of Mitigation Projects for EOCs and Emergency Shelters

Types of Benefits to Consider	Data Sources and Guidance
1. Economic Impact of Loss of Function (i.e., Displacement Costs)	May not be applicable for EOCs and shelters, because of short period of use of these services.
▪ Displacement time	Maximum possible displacement times are limited by the typical duration of use of EOCs or shelters.
▪ Displacement costs	If appropriate, the extra costs of providing service from temporary locations.
2. Economic Impact of Loss of Function (i.e., Loss of Public Services)	
▪ Normal cost of service	▪ EOCs: daily base cost of service is annual operating budget divided by average number of days of use, plus daily costs during operation. ▪ Shelters: \$85 per day CONUS cost of temporary lodging and meals or local GSA values.
▪ Functional downtime	Maximum possible displacement times are limited by the typical duration of use of EOCs or shelters
▪ Continuity Premiums	10 x cost of normal service, calculated as above, differently than for other public services
3. Casualties	
▪ Facility occupancy	▪ Earthquakes: normal occupancy for all functions ▪ Hurricanes and tornadoes: occupancy during warnings ▪ Floods: not necessary to estimate, minimal life safety benefits
▪ Casualty rates	HAZUS casualty rates for earthquakes, professional judgement for other hazards
▪ Statistical values of deaths, injuries, and illnesses	FEMA values, updated to 2001 values, see Section 2.3 - deaths: \$2,710,000 - major injuries/illnesses: \$15,600 - minor injuries/illnesses: \$1,560

6.1 Overview

In the context of emergency planning, disaster response, and disaster recovery, utilities are often characterized as lifelines. This characterization reflects the great importance that such systems have on the functioning of modern society. For example, loss of electric power greatly reduces economic activity in a community, as well as having a direct and major impact on affected residents. Similarly, loss of function of water or wastewater systems generally has direct economic impacts on a community that are far larger than the cost of repairs of the physical damages alone.

Electric power, potable water and wastewater systems are subject to physical damages from natural disasters such as earthquakes, hurricanes and floods. More importantly, however, such systems are subject to loss of function; that is, loss of utility service. Such loss-of-function disruptions often have major negative impacts on affected communities.

Hazard mitigation projects for utility systems may eliminate or reduce physical damages in future disasters. However, in many cases, an important motivation or even the primary motivation in undertaking hazard mitigation projects for utility systems is not to reduce the physical damages alone, but rather to reduce the tremendous impacts that the loss of function of such systems may have on the affected communities.

The basic concepts of benefit-cost analysis of mitigation projects for utilities are the same as those for buildings. The general principles and categories of benefits outlined in Section 2 apply to utilities as well as to ordinary buildings (Section 3) and critical facilities (Sections 4 and 5).

Mitigation projects for utility administration buildings are evaluated in the same manner as for an ordinary commercial or public building, as discussed in Section 3. Mitigation projects for utility control or command centers are evaluated in the same manner, except that a continuity premium should be added to reflect the importance of such centers in providing utility services. By analogy to the continuity premiums assigned to EOCs, a continuity premium of 10 times the normal cost of operations appears reasonable for utility control or command centers.

, Most mitigation projects for utilities, however, deal with the complex infrastructure of the utility systems and not with buildings.

The guidance in this section focuses specifically on mitigation projects for utility infrastructure (not on mitigation projects for utility buildings).

Some of the details of benefit-cost analysis differ between mitigation projects for electric power systems, potable water systems, and wastewater systems. These details are discussed below. Benefit-cost analysis for all three of these utilities considers four primary categories of possible benefits, as

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summarized below in Table 6.1. These are the same primary categories of benefits that were defined and discussed in Section 2.

**Table 6.1
Primary Categories of Benefits
Mitigation Projects for Utilities.**

Types of Benefits to Consider	Notes for Utility Mitigation Projects
1. Physical damages	Damage estimates made using professional judgement in consultation with those knowledgeable about utility system components and their vulnerability.
2a. Loss-of-Function Impacts (i.e., Displacement costs)	Not applicable to utility infrastructure mitigation projects; utility system components cannot be displaced to temporary quarters.
2b. Loss-of-Function Impacts (i.e., Economic impacts of loss of service)	<ul style="list-style-type: none">▪ Economic impacts of loss of service are generally the largest category of benefits.▪ See detailed guidance for each of the three utility systems evaluated.
3. Casualties	<ul style="list-style-type: none">▪ May be significant for some types of projects, for some utility systems, for some hazards.▪ See detailed guidance for each of the three utility systems evaluated.
4. Emergency Management Costs	<ul style="list-style-type: none">▪ Not generally considered.▪ Most utility mitigation projects have a negligible impact on a community's overall emergency management costs.

6.2 Physical Damage Estimates

Utility systems contain a wide range of highly specialized components. Electric power systems have generating plants, transmission and distribution lines, high voltage substations and a host of specialized ancillary equipment. Potable water systems have storage reservoirs, storage tanks, wells, treatment plants, aqueducts and transmission pipes, distribution pipes, pumping plants, valves and a host of specialized ancillary equipment. Wastewater systems have treatment plants, systems of collection pipes, pumping plants (lift stations) and a host of specialized ancillary equipment.

Because of the complex, technical, and specialized nature of the components of utility infrastructure systems, damage estimates should always be made in close consultation with qualified individuals familiar with the specific systems under evaluation.

6.3 Functional Downtime Estimates

Functional downtime estimates for utility systems differ fundamentally from functional downtime estimates for buildings because of the network characteristics of utility systems. In order for an electric power or potable water or wastewater system to deliver service and to function as intended, a myriad of interconnected components has to work together as designed. Utility system networks are generally described in terms of links and nodes. Links are the lines or pipes that connect the other elements of the system, defined as nodes. Nodes include generating plants, treatment plants, substations, pumping plants and other facilities that are necessary to provide utility service.

In complex, networked utility systems, some components may be redundant; that is, there is an alternative, functionally equivalent component that can serve the same function if the first component fails. Other components are unique; that is, alternative components are not available if the first component fails. Therefore, the extent of loss of utility service that results from specific levels of damage depends on the detailed network operating characteristics of each specific utility system. For example, damage to one substation or pumping plant might result in little or no loss of function if the component is redundant. However, the same level of damage to another substation or pumping plant might result in loss of service to an entire neighborhood or city.

Because of the networked nature of utility systems, estimating functional downtime requires a thorough understanding of the network operating characteristics of the specific utility system under evaluation. Functional downtime estimates for utility systems should always be made in conjunction with qualified individuals knowledgeable about the specific utility system under evaluation and in close cooperation with local utility staff.

For utility systems, functional downtimes are best expressed as “system days” of lost service. A “system day” of lost service is defined as one day in which the entire system is without service. However, system days are usually fractional. For example, one system day may be one day of complete loss of service, or two days with 50% loss of service, or 10 days with 10% loss of service, and so on. Loss of service is generally defined as the percentage of customers without service. For example, if 20% of a utility’s customers have no service for 2 days, with 5% having no service for a third day, then the functional downtime is 0.45 system days. In this example the system days are calculated as 20% (0.20) times two days plus 5% (0.05) times one day or 0.45 days.

6.4 Economic Impact of Loss of Utility Services

The economic impact of loss of utility services is analogous to estimating the impact on a community of loss of public services provided from a building. The estimated economic impacts of loss of utility services differ for electric power systems, potable water systems, and wastewater systems. Thus, guidance for each of these types of utility systems is presented separately.

6.4.1 Economic Impacts of Loss of Electric Power

The base economic value of electric power is the cost of service. Recent data from the U.S. Department of Energy show a national average price of electricity of 6.74 cents per kilowatt-hour. However, electric power is extremely important for the functioning of a modern community. The economic impacts of loss of electric power are far greater than the simple cost of electric power. The primary motivation for most mitigation projects for electric power is to minimize the loss of electric power service to the community. Reductions in damage to the electric power system are an important objective, but generally secondary to preserving the delivery of electric power to the community.

The direct economic impact of loss of electric power is estimated from nationwide data on economic activity by sector of the economy (1997 Economic Census, North American Industry Classification System, and NAICS). These data were combined with electric power importance factors for each major economic sector. These importance factors reflect the reality that different sectors of the economy have varying degrees of dependence on electric power. Importance factors were taken from the FEMA-sponsored publication ATC-25 (Applied Technology Council, Seismic Vulnerability and Impact of Disruption of Lifelines in the Conterminous United States, 1991). These estimated economic impacts include both wage and business income losses.

For purposes of benefit-cost analysis, the economic impacts calculated as described in the previous paragraph were updated to 2000 values and then adjusted downwards. The downwards adjustments were made because: 1) some facilities have on-site generation or back-up power sources, 2) some lost economic production can and will be made up after restoration of electric power, and 3) there is a high potential for double-counting of reasons for the loss of economic production. With these corrections, the direct economic impact of loss of electric power is estimated to be \$87 per capita per day. Following this approach, the direct regional economic impact of one system day of complete loss of electric service for a community of 100,000 people would be estimated at \$8,700,000 (100,000 times \$87).

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In addition to these regional economic impacts, loss of electric power service also has direct economic impacts on residents, separate from the regional economic impacts estimated above. Examples of these impacts include food spoilage during prolonged outages, extra costs for meals or temporary lodging for some people, water damages due to frozen pipes and so on. Rough, common sense estimates outlined in the Supporting Documentation Volume Chapter 3 (to be available in late 2001) suggest that these impacts may total about \$30 to \$35 per capita per day, on average.

In addition, there is an economic value to the major disruption of normal activities that result from loss of electric power. The key point is that people's time has economic value, whether such time is devoted to remunerative work or to personal leisure and recreation.

The estimated economic value per person per hour of disruption from loss of electric power is estimated using an approach similar to that used by the U.S. Department of Transportation (DOT) for highway planning purposes. Technical details of this approach are given in the DOT memo: The Value of Travel Time: Departmental Guidance for Conducting Economic Evaluations (U.S. Department of Transportation, memo from Frank E. Kruesi, Assistant Secretary for Transportation Policy, April 9, 1997).

The simplest assumption consistent with economic theory is that each hour of people's time is worth the same amount, whether such time is personal or business time. In other words, the last hour of work time and the first hour of leisure or recreation time are assumed to have equal value. This is the assumption that should be used when valuing the direct economic impact of the disruption time for residents subjected to electric power outages.

Following the DOT approach, the average hourly compensation rate (wages and benefits) is the best available measure of the economic value of people's time. The latest available data, for March 2000, of average employer cost for employee compensation for civilian workers (private industry and state and local government) is \$21.16 per hour (U.S. Department of Labor, Bureau of Labor Statistics News, USDL: 00-186, June 29, 2000). A value of \$21.16 per person per hour should be used as the value for the economic impact of disruption time for customers subject to loss of electric power service.

Loss of electric power has a major disruptive impact on residential customers. The impacts include loss of lighting and in many cases loss of cooking capability, hot water and heating. Almost all normal daily activities, including preparing food, cleaning, reading, watching television, listening to music, and using computers, are disrupted. As a conservative estimate, such disruptions total at least 3 to 4 hours per person per system day of electric power outage. At slightly more than \$21 per hour, such disruption of normal activities would add \$63 to \$85 per capita per day to the estimated direct economic impacts of \$30 to \$35 for residential customers estimated above. The resulting total estimated economic impacts for residential customers are approximately \$93 to \$110 per capita per day. The midpoint of this range of estimates is \$101 per day per person.

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Combining the estimated impact of losing electric power on regional economic activity and the estimated impact on residential customers yields a total estimated impact of \$187 per person per day of lost service. These estimates are summarized below in Table 6.2.

Table 6.2
Economic Impacts of Loss of Electric Power
Per Capita Per Day

Category	Estimated Economic Impact
Reduced regional economic activity¹	\$87
Impacts on Residential Customers	
▪ Direct economic losses	\$30 to \$35
▪ Disruption economic impact	<u>\$63 to 85</u>
▪ Total Best estimate	\$101
Total economic impacts	\$188

¹ This value of reduced regional economic activity is based on national economic data. If desired, more detailed estimates could be made for specific metropolitan areas using NAICS data in the economic census referenced above.

As an example, consider a community of 40,000 people that suffers a partial loss of electric power due to flood damage at one substation. If 50% of the customers have no power for 1 day, 15% have no power for an additional day, and 5% have no power for two additional days, then the number of system days of loss of power is calculated as 0.50 times 1 plus 0.15 times 1 plus 0.05 times 2 or 0.75 system days. With 0.75 system days of lost service, total economic impacts of \$188 per person per day and 40,000 customers, the total economic impacts are calculated as 0.75 times 40,000 times \$188 or \$5,640,000.

6.4.2 Economic Impacts of Loss of Potable Water

The economic impacts of loss of potable water service are estimated in the same manner as for electric power service above. For potable water systems, two levels of loss of service are evaluated: 1) complete loss of water service, and 2) water unsafe for drinking.

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The impact of loss of water service on regional economic activity is estimated using nationwide economic data by economic sector and water importance factors from the same sources as referenced in Section 6.4.1. The economic impact of loss of water service is large, but smaller than that for electric power. For complete loss of water service, and water unsafe for drinking, the regional economic impacts are estimated at \$35 and \$8.75 per person per day, respectively.

In addition to these regional economic impacts, loss of potable water service also has direct economic impacts on residents, separate from the regional economic impacts estimated above. Examples of these impacts include costs of bottled water for drinking, cleaning and sanitation purposes, increased meal costs for restaurant meals, temporary lodging for some people, increased transportation costs to obtain water, meals, and sanitation facilities and so on. Prolonged outages could also cause landscaping damage in climates where irrigation is necessary. Rough, common sense estimates outlined in the Supporting Documentation Volume (Chapter 4) (to be available in late 2001) suggest that these impacts may total about \$15 per capita per day, on average.

In addition, there is an economic value to the major disruption of normal activities that result from loss of potable water service. As described in Section 6.4.1, people's time has economic value, whether such time is devoted to remunerative work or to personal leisure and recreation. As a conservative (lower bound) estimate, we suggest that such disruptions would total about 2 to 3 hours per person per system day of complete loss of water service. At about \$21 per hour (the average hourly wage, as described in Section 6.4.1), the economic impact of such disruption would add \$42 to \$63 per day to the estimated direct economic impacts of \$15 per day. The resulting total estimated economic impacts of complete loss of water service for residential customers are approximately \$57 to \$78 per day. The midpoint of this range is about \$68 per person per day.

For loss of water quality, such that water is unsafe for drinking, the estimated economic impacts on residential customers are about 50% of the estimates for complete loss of service, or about \$34 per person per day.

The above estimates of the economic impact of loss of potable water service apply to all types of natural hazard events. For earthquakes, there are additional potential losses arising from fire following the earthquake event. Earthquakes commonly cause fire ignitions, due to building damage, downed power lines, and gas line breaks. For earthquake-induced fires, loss of water service reduces fire suppression capability and leads to a statistical expectation of higher fire losses. The extent of fire following earthquake losses arising from loss of water service is possible to model mathematically, with inputs on building stock, building density, climate and wind conditions, and fire suppression capability. As a first level estimate, fires following earthquake losses due to loss of water service are estimated at \$35, \$17.50, and \$8.75 per person for dry, moderate and wet climates, respectively.

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Fire following earthquakes occurs predominantly during the first few hours or first day after a major earthquake, although some ignitions may occur later. For example, reconnecting gas lines may lead to fires if leaks are present in the distribution lines.

Loss of water service also reduces fire suppression capability for normal fires, but such fires are relatively infrequent. Thus, the effective number of days of functional downtime to be considered for fire following earthquake should logically be capped at a smaller number than the total system restoration time.

For purposes of benefit-cost analysis, a maximum of one system day should be used for estimating fire following earthquake losses.

**Table 6.3
Economic Impacts of Loss of Potable Water Service
Per Capita Per Day**

Category	Complete Loss of Water Service	Water Unsafe for Drinking
Reduced regional economic activity ¹	\$35	\$8.75
Impacts on Residential Customers <ul style="list-style-type: none">▪ Direct economic losses▪ Disruption economic impact▪ Total Best estimate	\$15 <u>\$42 to 63</u> \$68	\$7.50 <u>\$21 to 42</u> \$34
Total economic impacts (all hazards)	\$103	\$43
Fire following earthquake losses <ul style="list-style-type: none">▪ Dry climates▪ Moderate climates▪ Wet climates	\$35 \$17.50 \$8.75	None None None

¹ This value of reduced regional economic activity is based on national economic data. If desired, more detailed estimates could be made for specific metropolitan areas using NAICS data in the economic census referenced above.

The estimated economic impacts of loss of water service, as summarized above in Table 6.3 are large, but somewhat lower than those for loss of electric power.

As an example, consider a community of 500,000 people that has a partial loss of potable water service in an earthquake. The loss of service is primarily because of pipe breaks in the distribution system, coupled with minor damage at pumping plants. If 20% of the customers have no power for 1 day and 5% have no power for an average of three additional days, then the number of system days of loss of potable water service is calculated as 0.20 times 1 plus 0.05 times 3 or 0.35 system days. With 0.35 system days of lost service, total economic impacts of \$103 per person per day and 50,000 people affected, the total economic impacts are calculated as 0.35 times 500,000 times \$103 or \$18,025,000.

In this example, there are also earthquake-induced fires resulting from the loss of water service. The community is a moderate climate. The fire losses only occur on the first day (0.20 system day of lost service); therefore the estimated fire losses are 0.20 times 500,000 times \$17.50 or \$1,750,000. In this example, fire losses are slightly less than 10% of the total estimated economic impacts of loss of water service.

6.4.3 Economic Impacts of Loss of Wastewater Service

The economic impacts of loss of wastewater service are estimated in the same manner as for electric power and potable water service above. A detailed examination of the economic impacts of loss of wastewater service is given in the Supporting Documentation Volume (Chapter 5) (to be available in late 2001). A brief summary is presented below.

The impact of loss of wastewater service on regional economic activity is estimated using nationwide economic data by economic sector and water importance factors from the same sources as referenced sections 6.4.1 and 6.4.2. The economic impact of loss of wastewater service is large, similar to that for potable water, but smaller than that for electric power. The regional economic impacts of loss of wastewater service are estimated at \$33.50 and \$8.50 per person per day for complete loss of treatment and partial loss of treatment, respectively.

As discussed above in Sections 6.4.1 and 6.4.2, loss of electric power and potable water services has direct impacts on residential customers, separate from the impacts on regional economic activity. For wastewater services, however, impacts on residential customers are generally non-existent or negligible. Temporary loss of wastewater treatment capability (complete or partial loss of treatment) does not generally interrupt residential customer's ability to dispose of sewage or other wastewater.

The above estimates of the economic impact of loss of potable water service apply to all types of natural hazard events. These estimates are summarized below in Table 6.4

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**Table 6.4
Economic Impacts of Loss of Wastewater Service
Per Capita Per Day**

Category	Complete Loss of Treatment	Partial Loss of Treatment
Reduced regional economic activity ¹	\$33.50	\$8.50
Impacts on Residential Customers <ul style="list-style-type: none">▪ Direct economic losses▪ Disruption economic impact▪ Total Best estimate	None None None	None None None
Total economic impacts (all hazards)	\$33.50	\$8.50

¹ This value of reduced regional economic activity is based on national economic data. If desired, more detailed estimates could be made for specific metropolitan areas using NAICS data in the economic census referenced above.

The estimated total economic impacts of loss of wastewater service, as summarized above in Table 6.4 are large, but significantly smaller than those for loss of potable water or electric power service.

As an example, consider a community of 27,000 people with flood damage to a wastewater treatment plant. There is complete loss of service for 2.5 days and then partial loss of treatment capability for an additional 5 days. These losses of service affect the entire community. The estimated economic impact of complete loss of service for 2.5 days is 2.5 times 27,000 times \$33.50 or \$2,261,250. The estimated economic impact of partial loss of service for 5 additional days is 5.0 times 27,000 times \$8.50 or \$1,147,500. The total estimated economic impact of loss of wastewater services is \$3,408,750.

The above analysis does not explicitly consider environmental impacts of loss of wastewater treatment services. Discharge of untreated or partially treated wastewater has potential negative environmental impacts. Flooding of wastewater treatment plants is the most common reason for loss of wastewater treatment services. Discharges of untreated or partially treated wastewater most commonly occur during periods of high water flows, when dilution of wastes is maximized and potential environmental impacts are minimized.

The scope of the present guidance does not include evaluating environmental damages or the benefits of reducing or avoiding such damages. However, in effect, such environmental impacts are partially considered in the present analysis of the economic impacts of loss of function of wastewater treatment facilities, as described below.

The analysis of the regional economic impacts of loss of wastewater services implicitly assumes that business activity will be curtailed during periods of loss of wastewater service. When wastewater services are lost, communities sometimes impose operating restrictions on industrial and large commercial facilities to reduce the inflow of waste. More commonly, however, communities simply discharge partially treated or completely untreated waste.

In making a public policy decision to discharge partially treated or completely untreated waste, rather than to impose drastic restrictions to curb waste inflows, communities are implicitly deciding that possible environmental impacts are less than the economic losses that would arise from imposing more drastic reductions to curb waste inflows. To the extent that communities choose to release completely untreated or partially treated waste instead of curbing economic activity to reduce waste inflow, the estimated regional economic impacts of loss of wastewater service, as outlined above, will be over-estimated.

Following the above analysis, the estimated regional economic impacts of loss of wastewater treatment services probably overestimate the actual economic impacts. However, the estimated regional economic impacts implicitly are deemed equal to or greater than possible environmental damages. In effect, possible environmental impacts are counted indirectly (at least roughly) in the proposed methodology for estimating regional economic impacts.

6.5 Casualties

Loss of function of utilities - electric power, potable water and wastewater - has potential life safety impacts on affected communities. In some cases there may be deaths, injuries or illnesses arising from loss of utility services.

Loss of electric power may result in casualties. However, facilities for which electric power is a critical life safety issue (such as acute care in hospitals) always have redundant backup power supplies (e.g., battery back-ups and emergency generators). An upper bound analysis of potential casualties due to loss of electric power in Chapter 3 of the Supporting Documentation Volume (to be available in late 2001), suggests that the economic value of casualties is likely to be well below \$2.50 per person per day of lost service. This upper bound value is very low compared to the estimated economic impacts of loss of electric power, \$188 per person per day, and thus may be ignored as negligible for benefit-cost analysis. Actual casualties are likely to be less than these upper bound estimates.

Loss of potable water service may also result in casualties, most commonly illness from drinking contaminated water. Deaths from contaminated water are possible, but extremely rare. A rather extreme upper bound analysis of potential casualties due to loss of potable water service in Chapter 4 of the Supporting Documentation Volume (to be available in late 2001), suggests that the economic

value of deaths is likely to be well below \$2.50 per person per day of lost service, with the economic value of illnesses likely to be well below \$1.50 per person per day. These upper bound values is low compared to the estimated economic impacts of loss of potable water service, \$103 per person per day, and thus can probably be ignored as negligible for benefit-cost analysis. Actual casualties are likely to be less than these upper bound estimates.

Loss of wastewater service also has the potential for casualties, most commonly illness from drinking or exposure to contaminated water. However, any such illnesses are likely to be much less than those estimated above for potable water systems, since few people are likely to drink raw untreated water. Casualties arising from loss of function of wastewater treatment plants appear to be negligible for purposes of benefit-cost analysis.

6.6 Summary Guidance

The basic concepts of benefit-cost analysis of mitigation projects for utilities are the same as those for buildings (as discussed in previous sections). Significant differences are as follows:

Physical damage estimates for utility systems must be estimated by qualified individuals thoroughly familiar with the specific utility systems under evaluation, based on historical damage data, professional judgement and engineering calculations.

Displacement costs are not applicable to utility systems, since utility system components cannot be displaced to temporary quarters. Displacement costs should not be counted in benefit-cost analysis of mitigation projects for utility systems.

Loss of function of utility services has a great economic impact on regional economic activity in general and residential customers in particular. In addition, for loss of potable water service in earthquakes, there are additional losses due to fires following earthquakes. These economic impacts are summarized in Table 6.5 below.

SECTION SIX

Utilities: Electric Power, Potable Water, Wastewater

Table 6.5
Economic Impacts of Loss of Utility Services
per Person Per Day of Lost Service

Loss of Electric Power	Cost of Complete Loss of Service	
Reduced Regional Economic Activity ¹	\$87	
Impacts on Residential Customers	\$101	
Total Economic Impact	\$188	
Loss of Potable Water Service	Cost of Complete Loss of Service	Cost of Water Unsafe for Drinking
Reduced Regional Economic Activity ¹	\$35	\$8.75
Impacts on Residential Customers	\$68	\$34
Total economic impact (all hazards)	\$103	\$43
Fire Following Earthquake Losses	Cost of Fire Damage	
- Dry Climates	\$35	
- Moderate Climates	\$17.50	
- Wet Climates	\$8.75	
Loss of Wastewater Service	Cost of Complete Loss of Service	Cost of Partial Treatment Only
Reduced Regional Economic Activity ¹	\$33.50	\$8.50
Impacts on Residential Customers	None	None
Total Economic Impact	\$33.50	\$8.50

¹ This value of reduced regional economic activity is based on national economic data. If desired, more detailed estimates could be made for specific metropolitan areas using NAICS data in the economic census referenced above.

7.1 Overview

In the context of emergency planning, disaster response, and disaster recovery, roads and bridges are often characterized as lifelines. This characterization reflects the importance that roads and bridges have on the functioning of modern society. Especially in a disaster, roads and bridges are often critical for disaster response and evacuation.

Roads and bridges are subject to physical damages from natural disasters such as earthquakes, hurricanes and floods. More importantly, however, roads and bridges are subject to loss of function; that is, closure to traffic. Such closures often have significant negative impacts on affected communities.

Hazard mitigation projects for roads and bridges may reduce physical damages in future disasters. However, in many cases, an important motivation or even the primary motivation in undertaking hazard mitigation projects for roads and bridges is not to reduce the physical damages alone, but rather to reduce the negative impacts that the closures of roads and bridges may have on the affected communities. That is, mitigation projects for roads and bridges are often focused primarily on keeping the roads and bridges open during disaster events.

The basic concepts of benefit-cost analysis of mitigation projects for roads and bridges are the same as those for buildings and are summarized in Table 7.1. The general principles and categories of benefits outlined in Section2 apply to roads and bridges as well as to ordinary buildings (Section3), critical facilities (Sections4 and 5), and utilities (Section6).

Table 7.1
Primary Categories of Benefits
Mitigation Projects for Roads and Bridges

Primary Categories of Damages/Benefits	Notes for Utility Mitigation Projects
1. Physical Damages	Damage estimates must be made by engineers knowledgeable about roads and bridges and their vulnerability to each type of hazard.
2a. Loss-of-Function Impacts (i.e., Displacement costs)	Not applicable to road and bridge mitigation projects; roads and bridges cannot be displaced to temporary quarters.
2b. Loss-of-Function Impacts (i.e., Economic impacts of loss of service)	Economic impacts of road or bridge closures are the generally the largest category of benefits; see detailed guidance in this section.
3. Casualties	Not generally significant, except for seismic mitigation projects for bridges.
4. Emergency Management Costs	Not generally considered; most road and bridge mitigation projects have a negligible impact on a communities overall emergency management costs

7.2 Physical Damage Estimates

Roads and bridges vary in their materials and designs. The vulnerability of roads and bridges to flood, wind, or seismic damage varies drastically depending on the type of components, their age, their design and condition. As such, it is necessary to make facility-specific estimates based on historical damage data and professional judgement. Because of the somewhat specialized nature of road and bridge engineering, damage estimates should always be made in close consultation with qualified individuals thoroughly familiar with the specific components under evaluation.

7.3 Functional Downtime Estimates

Functional downtime estimates for roads and bridges are somewhat different than for buildings or utilities. For roads and bridges there are two aspects of functional downtime. The first aspect is the closure time or the time period during which the road or bridge is closed to normal traffic while

repairs are made. Closure times may range from a few hours to several days to several weeks in unusual cases. The second aspect is the delay or detour time. Delay or detour time is the average amount of extra time that motorists spend taking alternative routes because of road or bridge closures. Delay or detour time may be only a few minutes if an alternative route is only a block or two away. Typically delay or detour times are fractions of an hour. In rare cases, delay or detour times may be an hour or more if, for example, a bridge is closed and the nearest alternative bridge is a long distance away.

For road and bridge closures, functional downtime is expressed in two steps:

1. Estimate the number of days for the damaged road or bridge to be repaired and reopened to normal traffic flow
2. Estimate the average delay or detour time for motorists while the bridge is closed.

For example, assume that a culvert fails in a flood and a road is washed out. A county highway department estimates that the repair time is one week and that the average delay or detour time caused by the closure is about 20 minutes. When a disaster event causes numerous road or bridge closures, repairs are almost always made first to the most important roads or bridges. Thus, secondary or rural roads and bridges are generally expected to have longer closure times than primary roads.

Estimates of repair times and delay or detour times are made based on historical data and experience. Local highway department staff is generally very experienced with closures and is the best source of repair time estimates and delay or detour times.

7.4 Economic Impact of Road and Bridge Closures

The economic impact of road and bridge closures is analogous to estimating the impact on a community of loss of public services provided from a building. Closure of a road or bridge represents loss of a public service - the availability of a transportation route.

The economic impact of road and bridge closures is estimated from the number of vehicles per day using the route, the average delay or detour time, and the average value of people's time. The primary economic impact of road and bridge closures is loss of time.

There are four steps in estimating the direct economic impacts of road or bridge closures:

1. Estimate the functional downtime; that is, the repair time to restore normal traffic flow on the road or bridge

2. Determine the average daily traffic count for the closed road or bridge
3. Estimate the average delay or detour time arising because of the closure
4. Place a typical or average dollar value per person hour or per vehicle hour of delay or detour

Each of these steps is discussed in detail below.

7.4.1 Functional Downtime (Repair Time) for Roads and Bridges

For roads and bridges, functional downtime is the time period for which the road or bridge is closed to normal traffic flow. For a given road or bridge that is damaged in a disaster event, the repair time depends on the severity of damage, on the number of other damaged roads or bridges, and, very importantly, on the priority placed on repair and reopening by the local highway department. When there are multiple outages, local highway departments almost always prioritize repairs so that the most important roads or bridges are reopened first. Small residential or rural roads are likely to be repaired much later than major arteries with high traffic flows.

Repair times can range from a few hours if there are only a few outages, to several days to several weeks, depending on the number of damaged roads or bridges. Repair times are very rarely longer than two or three weeks, except for major bridge structures, which might take many months or even a year or two to replace if destroyed.

Estimating repair times requires somewhat specialized knowledge of the local highway transportation system, of the availability of local resources, and of local priorities, and is thus best made in close cooperation with local traffic officials.

7.4.2 Average Daily Traffic Counts

Average daily traffic counts for most roads or bridges are available from local highway officials. Traffic counts are used for road/bridge design purposes and for traffic control, planning and management purposes. Local highway officials generally can provide actual traffic counts for specific segments of roads or bridges, or at least reasonable estimates based on traffic counts for similar nearby roads and bridges.

Traffic counts are usually presented as the number of vehicles per day or per hour. Traffic counts may be presented as total vehicles or separately for different classes of vehicles (e.g., cars, light trucks, heavy trucks). Traffic counts are usually presented as the number of single (one-way) trips,

but are sometimes presented as the number of round trips. The difference between one-way and round-trip counts is important and the unit of measure (one-way or round-trip) must always be noted carefully.

7.4.3 Average Delay or Detour Times

When a given road or bridge is closed because of high water, unsafe conditions, or physical damage, the delay or detour varies markedly, depending on local conditions. Delay or detour times can range from five minutes or less to several hours (in rare cases).

Road and systems are networked systems of interconnected elements. In, networked systems, some elements may be redundant; that is, alternative paths may be available if such elements fail. Other elements may be nearly unique; that is, no practical alternative paths are available. The extent of loss of function that results from specific damage depends on the characteristics of each specific road and bridge system. For example, damage that closes one city street may have very little impact on traffic if the resulting detour is only one city block while repairs are made. However, closure of a rural road or a bridge may result in a substantial detour (duration and mileage) with a correspondingly significant economic impact.

The length of delay or detour that is likely to result from the closure of a particular road or bridge depends entirely on specific local conditions and so no generalizations can be drawn. The length of delay or detour depends on:

The traffic count for the closed road or bridge

The layout of the local road and bridge system (what alternative routes are available, how suitable the alternative routes are, how heavy the normal traffic is on these routes, and the distance between the closed road or bridge and the alternative route)

Local highway officials are the best source of delay or detour time estimates. Local highway officials have knowledge of past closures, of what detours or alternative routes are available, and knowledge of the local road and bridge system and local traffic patterns. Estimated delay or detour times will never be exact and will vary depending on the time of the day and on the day of the week. However, knowledgeable local highway officials should be able to make reasonable estimates: Will closure of this bridge result in a 5 minute detour, a 30 minute detour, or a several hour detour?

7.4.4 Economic Impact Per Person Per Hour of Delay or Detour Time

The economic impacts of road or bridge closures are estimated by combining the number of days of road or bridge closure, the average daily number of vehicles using the road, the average delay or detour time per vehicle, and the estimated economic value per person per hour of delay or detour.

The estimated economic value per person hour of delay or detour is estimated using an approach similar to that used by the U.S. Department of Transportation (DOT) for highway planning purposes (*The Value of Travel Time: Departmental Guidance for Conducting Economic Evaluations*, U.S. Department of Transportation, memo from Frank E. Kruesi, Assistant Secretary for Transportation Policy, April 9, 1997).

The DOT memo referenced above has a detailed analysis of economic theory and references to its approach. For the present purposes, a condensed summary of the analysis is presented. The key point is that time saved from travel has economic value, whether such time is devoted to remunerative work or personal leisure/recreation. Furthermore, if travel is associated with unpleasant conditions of crowding (or delays and detours), exposure to weather, risk, effort or boredom, cutting the time it requires will be beneficial. In simple terms, people would, on average, be willing to pay something to avoid such unpleasant travel conditions.

The simplest assumption consistent with economic theory is that each hour of time lost in travel delays or detours is worth the same amount, whether such time is personal or business time. In other words, the last hour of work time and the first hour of leisure/recreation time are assumed to have equal value. This is the assumption that should be used for valuing the direct economic impact of the time lost by closures of roads and bridges. For benefit-cost analyses of FEMA-funded hazard mitigation projects, 100% of the national average hourly wage (plus benefits) should be the value of travel time lost by road and bridge closures. As described in Section 6.4.1, the average employer cost for employee compensation is \$21.16 per hour according to U.S. Department of Labor.

The U.S. DOT also has data on average vehicle occupancies. For 1996, the total highway passenger miles were 3.962 trillion. A passenger mile is one person traveling one mile by automobile, motorcycle, light truck, heavy truck, or bus. For 1996, the total highway vehicle miles were 2.482 trillion. The ratio of these two numbers, 1.596 is the average vehicle occupancy. Applying this occupancy value and the \$21.16 per person per hour value derived above yields a value of \$33.78 per vehicle hour of lost travel time.

The U.S. Census Bureau population estimate for November 2000 indicates that 74.47% of the population is 18 or over, with 25.53% under 18. If these ratios are applied to the average vehicle occupancy, assuming that drivers are 18 or over, then the average vehicle occupancy is 1.444 adults

and 0.152 children under 18. This estimated proportion of adult and child passengers does not consider that some drivers are under 18 (about 3% of the total population is between 16 and 18) but this is offset by the fact that the proportion of children as passengers is likely lower than in the population as a whole, because there are few children as passengers for commuting or business travel. Combining these data, we estimate that the average vehicle occupancy is about 1.45 adults and 0.15 children.

If lost time for children were assumed to have no economic value (a somewhat extreme assumption), then the estimate of \$33.78 per vehicle hour of lost travel time would be reduced by nearly 10% to \$30.68. More reasonably, lost time for children has an economic value, but less than that for adults. Taking the midpoint of these two extremes (counting children's lost time the same as adults or counting children's lost time at zero) yields an estimate of \$32.23, which appears to be a reasonable estimate. Thus, the average economic value of lost travel time as \$32.23 per vehicle hour of delay or detour due to road and bridge closures.

The above analysis considers all traffic to be of equal economic value. However, there are two other possible economic impacts from closures of roads and bridges that need to be evaluated for possible inclusion in benefit-cost analysis, namely:

1. Economic impacts for commercial traffic
2. The impact of road and bridge closures on emergency vehicles

For commercial travel (including heavy trucks) the analysis presented above includes only the value of the driver's time. As discussed above, typical delay or detour times are short, on the order of a few minutes to perhaps an hour or two. For such short delays there are unlikely to be major economic impacts such as spoilage of perishable goods or interruption of normal economic activity. Therefore, no adjustments for commercial traffic need be made.

For emergency vehicles, the delay or detour times may increase the response time and thus lower the quality of emergency response. However, the fraction of normal traffic that is emergency vehicles is extremely small, a very small fraction of 1% of total traffic. Furthermore, delays and detours may be shorter for emergency vehicles as such vehicles typically have expedited access to the transportation system and some emergency response vehicles have off-road capabilities or higher ground clearances and thus can travel on roads closed to normal traffic. Thus, the impact of road and bridge closures on emergency vehicle response is assumed to be minor.

For purposes of benefit-cost analysis, the economic impact of road or bridge closures is estimated as \$32.23 per vehicle hour of delay.

7.5 Casualties

Failure of a road or bridge may occasionally result in deaths or injuries from vehicular accidents at the failure location. However, such incidents are extremely rare. Closure of a road or bridge, or even a major washout of a section of road or complete washout of a bridge very rarely results in casualties. Historical experience suggests that deaths from such accidents would be many times less than 1 person per 1,000,000 in a community affected by a typical road or bridge closure. Based on the statistical value of human life (deaths and injuries), such rare incidents are generally negligible compared to the economic impact of delay and detour times discussed above.

The statistical value of casualties avoided may be important for one type of hazard mitigation project: seismic retrofit of bridges subject to collapse in earthquakes. For example, if one of the approximately 300-foot long segments of the Bay Bridge between Oakland (CA) and Treasure Island were to fail completely in an earthquake, the expected death rate would be a very high percentage of the average “occupancy” of the bridge segment. For high traffic bridges that could be subject to complete failure in earthquakes, the value of casualties avoided should be evaluated individually for each mitigation project.

Estimating casualty rates from bridge failures from earthquakes requires professional judgement. Such estimates should be made in close consultation with seismic engineers thoroughly familiar with seismic bridge engineering.

7.6 Summary Guidance

The suggested approach for benefit-cost analysis of hazard mitigation projects for roads and bridges has five steps, each of which must be done for both the before and after mitigation states of the road or bridge, as a function of the severity of disaster:

1. Estimate the physical damages to road or bridges in dollar terms
2. Estimate the repair time to restore normal traffic flow,
3. Estimate the average delay or detour time
4. Obtain the average daily traffic count for the road or bridge
5. Calculate the economic impacts of loss of function of the road or bridge, using the above data and the per vehicle per hour value of lost travel time of \$32.23

For floods, these estimates are made as a function of flood depth or flood frequency. For hurricanes or earthquakes, these estimates are made as a function of wind speed or peak ground acceleration

(PGA), respectively. Data sources and guidance for making these estimates calculations are summarized in Table 7.2 below. For earthquakes only, the additional category of casualties losses is also considered for bridge mitigation projects.

Table 7.2
Summary Guidance for Benefit-Cost Analysis
of Hazard Mitigation Projects for Roads and Bridges

Parameter	Data Sources
1. Physical damages to road or bridge	Historical data and professional judgement from individuals knowledgeable about roads and bridges
2. Repair time to restore normal traffic flow	Historical data and professional judgement or estimates from local traffic officials
3. Average delay or detour time	Historical data or estimates from local traffic officials
4. Average daily vehicle count	Historical data or estimates from local traffic officials
5. Economic impact of road or bridge closure	\$32.23 per vehicle hour of delay or detour

As an example, consider a situation in which a culvert washout closes a road until repairs are made. For benefit-cost analysis, estimates are made of the physical damage costs and loss-of-function economic impacts for each flood depth or flood frequency, both before and after mitigation. As an example, we show a typical calculation of the damages and losses before mitigation for one flood frequency (a 25-year event).

Example

Physical damages, the actual cost to repair the road and culvert, are estimated from historical sources to be **\$6,500**. Local traffic officials estimate the number of days of closure to be **3 days**, the average delay or detour time to be **30 minutes**, and the average daily vehicle count to be **1,200**.

To determine the economic impact of the road closure, we take the product of the repair time (3 days), average delay or detour time (0.5 hours), average daily vehicle count (1,200 vehicles per day), and the cost per vehicle hour of the delay or detour (\$32.23) (see Table 7.2), or:

$$3 \times 0.5 \times 1,200 \times \$32.23 = \$58,014 \quad \text{for the economic impact of the road closure.}$$

Add the physical damage cost:	<u>+ 6,500</u>	
for total damages and losses:	\$64,514	

In this example, nearly 90% of the total damages and losses arise from the economic impact of the road closure. Only 10% of the total damages and losses are from the repair costs. For benefit-cost analysis of mitigation projects for roads and bridges, it is always extremely important to count the benefits of avoiding road closures. To not do so would be to grossly undercount the benefits of mitigation projects for roads and bridges.

Using Benefit-Cost Review in Mitigation Planning

State and Local Mitigation Planning
How-To Guide Number Five
FEMA 386-5 *May 2007*



FEMA

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INTRODUCTION

The **Disaster Mitigation Act of 2000** (DMA 2000) provides an opportunity for States, Tribal governments, and local jurisdictions to significantly reduce their vulnerability to natural hazards. It also allows them to streamline the receipt and use of Federal disaster assistance through pre-disaster hazard mitigation planning. DMA 2000 places new emphasis on State, Tribal, and local mitigation planning by requiring these entities to develop and submit mitigation plans as a condition of receiving various types of pre- and post-disaster assistance (such as the Pre-Disaster Mitigation [PDM] program and the Hazard Mitigation Grant Program [HMGP]) under the Stafford Act.

On February 26, 2002, the Department of Homeland Security's Federal Emergency Management Agency (FEMA) published an **Interim Final Rule** (the Rule) to implement the mitigation planning requirements of DMA 2000. The Rule outlines the requirements for State, Tribal and local mitigation plans.

FEMA has developed a series of guides, called the **Mitigation Planning “How-To” Guides**, to provide State, Tribal, and local governments with easy-to-understand information needed to initiate and maintain a hazard mitigation planning process and meet the requirements of the Rule. The guides can be ordered free of cost by calling 1-800-480-2520, or they can be downloaded from http://www.fema.gov/plan/mitplanning/planning_resources.shtml#1.

The first four How-To Guides are known as the “core four” guides. They provide the basic instructions for preparing a natural hazard mitigation plan. They are:

- *Getting Started: Building Support for Mitigation Planning* (FEMA 386-1)
- *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA 386-2)
- *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies* (FEMA 386-3)
- *Bringing the Plan to Life: Implementing the Hazard Mitigation Plan* (FEMA 386-4)

This How-To Guide, *Using Benefit-Cost Review in Mitigation Planning* (FEMA 386-5), supplements FEMA 386-3 and focuses on guidance for using Benefit-Cost Review when prioritizing mitigation actions in a hazard mitigation plan.

INTRODUCTION

About This Document

Purpose

The purpose of a mitigation plan is to reduce the community's vulnerability to hazards. After assessing its risks, a community may consider many mitigation options. However, due to monetary as well as other limitations, it is often impossible to implement all mitigation actions. Hence, the Planning Team needs to select the most cost-effective actions for implementation first, not only to use resources efficiently, but to make a realistic start toward mitigating risks.

The Rule supports the principle of cost-effectiveness by requiring hazard mitigation plans to have an action plan that includes a prioritization process that demonstrates a special emphasis on maximization of benefits over costs. The requirement states:

The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. [§201.6(c)(3)(iii)]

The purpose of this guide is to help local jurisdictions understand how to apply the concepts of Benefit-Cost Review to the prioritization of mitigation actions, and thereby meet the requirement of the Rule.

Benefit-Cost Review vs. Benefit-Cost Analysis

The Benefit-Cost Review for mitigation planning differs from the benefit-cost analysis (BCA) used for specific projects. BCA is a method for determining the potential positive effects of a mitigation action and comparing them to the cost of the action. To assess and demonstrate the cost-effectiveness of mitigation actions, FEMA has developed a suite of BCA software, including hazard-specific modules. The analysis determines whether a mitigation project is technically cost-effective.

The principle behind the BCA is that the benefit of an action is a reduction in future damages. The Benefit-Cost Review method described in this guide is based on the same principle, but this guide does NOT explain how to conduct a BCA. DMA 2000 does not require hazard mitigation plans to include BCAs for specific projects.

A Benefit-Cost Review can satisfy the DMA 2000 requirements even if it is relatively simple. Remember that a Benefit-Cost Review can be broad and need not be complex. It needs to be comprehensive so that it covers

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monetary as well as non-monetary costs and benefits associated with each action. Some projects can be extremely cost-effective but not as beneficial for the community at large. The Planning Team should think through a wide variety of questions, such as: How many people will benefit from the action? How large an area is impacted? How critical are the facilities that benefit from the action (e.g., is it more beneficial to protect the fire station than the administrative building, even though it costs more)? Environmentally, does it make sense to do this project for the overall community?

A hazard mitigation plan must demonstrate that a process was employed that emphasized a review of costs and benefits when prioritizing the mitigation actions. This requirement allows the Planning Team flexibility in determining which method to use. Four methods are described in this document, ranging from qualitative to more quantitative. These examples are intended to be illustrative of acceptable processes, but do not cover all possible methods that are approvable under DMA 2000.

How to Use This How-To Guide

The Rule states, “The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of mitigation actions.” However, no specific methodology for the analysis is specified or required. FEMA 386-3 discusses some ways to conduct an analysis. This How-To Guide, Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5), provides methods and examples to review benefits and costs, prioritize actions and document the entire process.

This guide is organized as follows:

Part 1 - Review Benefits and Costs – This section explains how to review benefits and costs for each action.

Part 2 A - Prioritize Actions – Qualitative Methods – This section provides two qualitative methods to prioritize actions (Methods A and B).

Part 2 B - Prioritize Actions – Quantitative Methods – This section provides two quantitative methods to prioritize actions (Methods C and D).

Part 3 - Document the Review and Prioritization Process – This section discusses documentation of the Benefit-Cost Review process in the plan to meet DMA 2000 requirements.

Worksheets (Review Tools) like the ones in Part 1 can be used to summarize the costs and benefits. After the review of benefits and costs for each action, the Planning Team will be able to prioritize the actions.

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They can then use one of the four methods (A to D), which range from simple to complex. See Figure 1 for an illustration of how to use this guide. Blank worksheets are included in Appendix A, Exhibits. The worksheets can be duplicated and used to record the progress of prioritizing mitigation actions for the hazard mitigation plan.

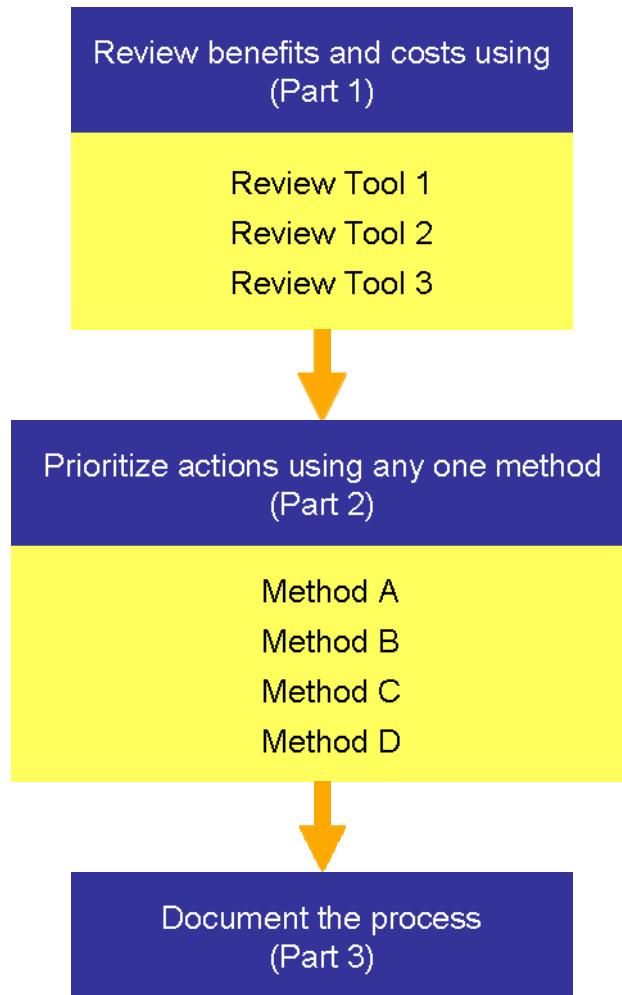


Figure 1. How to Use This How-To Guide

Therefore, a hazard mitigation plan will meet the requirements of the Rule by:

- Using Review Tools 1, 2, and 3 from Part 1,
- Using any one prioritization method from Part 2 (Method A, B, C, or D), and
- Documenting the process (as described in Part 3).

PART 1: REVIEW BENEFITS AND COSTS

To assess the measurable and non-measurable benefits and costs associated with each action, use Review Tools 1, 2, and 3. Then, summarize the analysis of each action's benefits and costs and use this review later when prioritizing the actions.

Review Tool 1: Measuring Vulnerability Before and After Mitigation

Action: _____

Vulnerability	Before the Action is implemented*	After the Action is implemented*	Difference
Number of people affected by the hazard			
Area affected (acreage) by the hazard			
Number of properties affected by the hazard			
Property damage (amount in \$)			
Loss of use (number of properties/physical assets [e.g., bridges] in number of days)			
Loss of life (number of people)			
Injury (number of people)			
**			

*Include measurable items, where possible, based on experience, professional estimate, or judgment.

**Add more categories of risk as appropriate for the specific community's plan.

Sample Exhibit 1: Measuring Vulnerability Before and After Mitigation

(Exhibit 1 shows Review Tool 1 filled out for one action)

Action: Floodproof 10 businesses in the downtown area

Vulnerability	Before the Action is implemented	After the Action is implemented	Difference
Number of people affected by the hazard	<u>Almost entire community</u> <u>(because downtown is affected)</u>	<u>Same as before but they will be less affected if businesses are able to remain open</u>	<u>Less impact</u>
Area affected (acreage) by the hazard	<u>1 acre</u>	<u>1 acre</u>	<u>Area still affected but less impact</u>
Number of properties affected by the hazard	<u>15</u>	<u>5</u>	<u>10</u>
Property damage (amount in \$)	<u>\$100,000 every year</u>	<u>\$10,000 every year</u>	<u>\$90,000 every year</u>
Loss of use (number of properties/physical assets [e.g., bridges] in number of days)	<u>10 properties for 5 days every year</u>	<u>0</u>	<u>Completely eliminated</u>
Loss of life (number of people)	<u>2 every 20 years</u>	<u>1 every 20 years</u>	<u>Reduced by half</u>
Injury (number of people)	<u>0</u>	<u>0</u>	<u>0</u>

PART 1: REVIEW BENEFITS AND COSTS

A simple listing of other costs and benefits (that do not fit into the quantitative format of Review Tool 1) can supplement Review Tool 1, as shown in Review Tools 2 and 3. Fill out as many items as possible.

Review Tool 2: Benefits

Action: _____

<u>Benefits</u>
Risk reduction (short- or long-term)
If other community goals are achieved, explain
If easy to implement, explain
If funding is available, explain
If politically/socially acceptable, explain

Sample Exhibit 2: Benefits

Action: Floodproof 10 businesses in the downtown area

<u>Benefits</u>
City's cost to repair flooded properties reduced by 80%; approximate saving of \$5,000 per year
Flooding problem in downtown area solved for the long-term; community's problem of business interruption solved
Federal grants like Flood Mitigation Assistance (FMA) and PDM can be applied for to implement the proposed floodproofing
Will help improve CRS rating in the long term (so entire community's flood insurance premium will be reduced)
More than half the members of the City Council are opposed to buy-outs; it might be easier to get their support for an alternative to buy-outs

Review Tool 3: Costs

Action: _____

<u>Costs*</u>
Construction cost (amount in \$)
Programming cost (amount in \$, # of people needed to administer)
Time needed to implement
If unfair to a certain social group, explain
If there is public/political opposition, explain
If there are any adverse effects on the environment, explain

*If precise costs are not available, use costs based on experience, professional estimate, or judgment.

Sample Exhibit 3: Costs

Action: Floodproof 10 businesses in the downtown area

<u>Costs</u>
Floodproofing cost = \$10,000 x 10 = \$100,000
Need at least 3 people to administer (after technical assistance from the State)
Need a year to implement

PART 1: REVIEW BENEFITS AND COSTS

After reviewing benefits and costs for all the actions using the Review Tools, go on to prioritize the actions. Note that there are many ways of prioritizing actions; however, DMA 2000 mandates an emphasis on Benefit-Cost Review as part of the prioritization process. Directly linking the prioritization process to the Benefit-Cost Review clearly shows that costs and benefits were emphasized. Therefore, when the review of benefits and costs of actions in Part 1 is used to prioritize the actions using one of the methods from Part 2, the process meets DMA 2000 requirements.

PART 2A: PRIORITIZE ACTIONS - QUALITATIVE METHODS

Based on the review completed in Part 1, use Part 2 to prioritize or rank the actions.

The two qualitative methods described in this section rely on a holistic response or common sense ranking. The two quantitative approaches in Part 2B rely more on comparative analysis that can be translated into mathematical scores. When the number of actions is relatively small, a subjective or qualitative process may be used. The greater the number of actions, the more likely it is that a more quantitative approach will be useful in assigning priority.

Method A: Simple Listing

The qualitative method described below helps the Planning Team judge the priorities of actions based on perceived pros and cons (i.e., benefits and costs).

The method is best used when it is not possible, or appropriate, to identify a quantitative measure of benefits and costs. Each action can have a unique advantage or disadvantage that can subsequently be used for prioritization.

Using this method ensures that special emphasis is given to Benefit-Cost Review by categorizing prioritization criteria (e.g., ease of implementation, technical effectiveness) as either benefits or costs.

Step 1: List identified actions

For each hazard, list the actions identified earlier in the plan.

Step 2: Identify benefits and costs

Identify all expected benefits (i.e., positive effects) and costs (i.e., perceived obstacles) of the actions and write these down in the benefits and costs columns, respectively. Use Review Tools 1, 2, and 3 (see Exhibits 1, 2, and 3) from Part 1.

Step 3: Assign priority

As a result of the Benefit-Cost Review, the Planning Team assigns a priority to each action. Priority can be expressed in many ways, such as:

- High, medium, low, accompanied by an explanation of what each term means.
- Priority 1, Priority 2, etc.
- Immediate, short-term, and long-term, accompanied by an explanation of what each category means (e.g., immediate = within a month, short-term = within 6 months, long-term = within 2 years).

PART 2A: PRIORITIZE ACTIONS - QUALITATIVE METHODS

Sample Exhibit 4: Prioritization by Listing Benefits and Costs

Actions	Benefits (Pros)	Costs (Cons)	Priority
Floodproof 10 businesses in the downtown area	<ul style="list-style-type: none"> - Avoidance of 1 loss of life every 20 years (casualties reduced by half) - Saving of \$90,000 in private damages and \$5,000 in public cost - Loss of use of 10 downtown businesses completely eliminated - Community's problem of business interruption solved - Federal grants like FMA and PDM can be applied for to implement the proposed floodproofing - Will help improve CRS rating in the long term (so entire community's flood insurance premium will be reduced) - More than half the members of the City Council are opposed to buy-outs; it might be easier to get their support for an alternative to buy-outs 	<ul style="list-style-type: none"> - Floodproofing cost = \$10,000 x 10 = \$100,000 - Need at least 3 people to administer (after obtaining technical assistance from the State) - Need a year to implement 	High (Priority no. 1)
Build safe rooms for a neighborhood of 50 homes without basements	<ul style="list-style-type: none"> - Avoidance of 5 lives lost every 20 years (casualties reduced by half) - Public and political support for mitigating this hazard exists (due to regular recurrence of tornadoes) 	<ul style="list-style-type: none"> - City will share 50% of the cost per existing home = \$2,000 X 50 = \$100,000 - Administrative cost per home = \$1,000 X 50 = \$50,000 - Need 3 years to complete - Tornadoes are unpredictable; they may never strike this exact area again 	Medium (Priority no. 2)
Broadcast educational video on local channel on hazard mitigation	<ul style="list-style-type: none"> - Local channel might be willing to broadcast free of cost - Publicity would spread awareness about mitigation methods as well as what to do in an emergency 	<ul style="list-style-type: none"> - Cost of preparing video = \$5,000 - Only 5% of population might notice the broadcast - Only 5% of that 5% might actually consider acting on individual mitigation methods 	Low (Priority no. 3)

PART 2A: PRIORITIZE ACTIONS - QUALITATIVE METHODS

Method B: Relative Rating

A second approach is to assign relative scores to the actions based on qualitative factors. By rating costs and benefits as High, Medium, and Low, this method clearly emphasizes the Benefit-Cost Review. Exhibit 5 uses a set of factors commonly called STAPLEE, which stands for **Social**, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental factors. They are typically used for evaluating planning alternatives. For details on using STAPLEE, refer to FEMA 386-3.

Sample Exhibit 5: Prioritization Using STAPLEE and Qualitative Scores

Criteria	Actions →		Build safe rooms in a neighborhood of 50 homes without basements		Broadcast educational video about hazard mitigation on local channel	
	Cost	Benefit	Cost	Benefit	Cost	Benefit
Social	-	-	L	-	-	-
Technical	M	H	M	M	L	L
Administrative	M	-	M	-	L	-
Political	-	L	-	H	-	-
Legal	-	-	-	-	-	-
Economic	M	H	H	-	-	-
Environmental	-	-	-	-	-	-
Priority	High (priority 1)		Medium (priority 2)		Low (priority 3)	

Definition of rating scale: H=High, M=Medium, L=Low, - None/Not applicable

Use the Review Tools completed in Part 1 to help rate the costs and benefits. For help on how to rank High, Medium, Low, None, or NA, see the explanation about STAPLEE in FEMA 386-3.

PART 2B: PRIORITIZE ACTIONS - QUANTITATIVE METHODS

Quantitative methods typically assign numerical values to concepts like high, medium, and low. The Planning Team needs to review the scores and make sure they make sense.

Method C: Simple Score

A simple way of using scores based on the STAPLEE criteria is shown in Exhibit 6. After the table is completed, the scores can be added to determine priority.

Sample Exhibit 6: Prioritization Using STAPLEE and Simple Scores

Actions Criteria	Floodproof 10 properties in the downtown area		Build safe rooms in a neighborhood of 50 homes without basements		Broadcast educational video about hazard mitigation on local channel	
	Cost	Benefit	Cost	Benefit	Cost	Benefit
Social	0	1	-1	1	0	0
Technical	-1	2	-1	2	-1	1
Administrative	-1	0	-1	0	-1	0
Political	0	1	0	1	0	0
Legal	0	0	0	0	0	0
Economic	-1	2	-1	0	0	0
Environmental	0	0	0	0	0	0
Sub-total of cost/benefit	-3	6	-4	4	-2	1
Total Score	$-3+6 = 3$		$-4+4 = 0$		$-2+1 = -1$	
Priority	No. 1		No. 2		No. 3	

Definition of rating scale: 2=Very beneficial, 1=Favorable, 0=None/Not applicable, -1=Not Favorable

The Planning Team should be careful when assigning criteria, scores, and weights to avoid the problem inherent in comparing different types of actions. In the example above, the scores allowed the participants to objectively compare the various actions. The weakness of such a simple method is that very different kinds of actions may score similarly, and if not given qualitative consideration (a common-sense check), may yield a questionable ranking. In this example, the safe-room action's total score is very low compared to the floodproofing action, but the Relative Rating method (Method B in Part 2A) showed that for floodproofing and safe rooms, the actions were similar in how their benefits measured up against the costs, and for both actions the benefits exceeded the costs. The Simple Score method shown above, however, results in a greater difference in the final priority scores (3 vs. 0), indicating a large difference

PART 2B: PRIORITIZE ACTIONS - QUANTITATIVE METHODS

in these actions' cost-effectiveness. A formal Benefit-Cost Analysis for each project would verify whether this large difference is accurate, although it is not required for the plan.

Method D: Weighted Score

As noted in the Simple Score method (Method C), a common-sense adjustment may be necessary to adapt the prioritization to the plan. The weighted score method attempts to compensate for the limitations of the Simple Score method by adding emphasis to those factors judged to be more important.

An example of weighted scores using STAPLEE follows.

Sample Exhibit 7: Prioritization Using STAPLEE and Weighted Scores

Actions → Criteria ↓	Floodproof 10 properties in the downtown		Build safe rooms in a neighborhood of 50 homes without basements		Broadcast educational video about hazard mitigation on local channel	
	Cost	Benefit	Cost	Benefit	Cost	Benefit
Social (weight = 1)	0	1	-1	1	0	0
Technical (weight = 2)	-1x2=-2	2x2=4	-1x2=-2	2x2=4	-1x2=-2	1x2=2
Administrative (weight = 1)	-1	0	-1	0	-1	0
Political (weight = 1)	0	1	0	1	0	0
Legal (weight = 1)	0	0	0	0	0	0
Economic (weight = 2)	-1x2=-2	2x2=4	-1x2=-2	0	0	0
Environmental (weight = 1)	0	0	0	0	0	0
Sub-total of cost/benefit	-5	10	-6	6	-3	2
Total Score	$-5+10 = 5$		$-6+6 = 0$		$-3+2 = -1$	
Priority	No. 1		No. 2		No. 3	

Definition of rating scale: 2=Very beneficial, 1=Favorable,
0=None/Not applicable, -1=Not Favorable

Assigning weights to some factors over others can become challenging for the Planning Team. Local knowledge and values should guide the process to achieve the priorities most appropriate for the local situation.

PART 3: DOCUMENT THE REVIEW AND PRIORITIZATION PROCESS

Remember to document in the plan the Benefit-Cost Review process and prioritization method used. Include the Review Tools and prioritization worksheets from this How-To Guide in the plan. Clearly explain how the scores and priorities were assigned.

Be sure to explicitly state that Benefit-Cost Review was **emphasized** in the prioritization process. Using the Review Tools and one of the methods for prioritization from this guide ensures the emphasis on the maximization of benefits over costs. This approach demonstrates that the actions are being evaluated in terms of their pros and cons, which are represented as costs and benefits.

The intention of DMA 2000 is for the hazard mitigation plan to be useful and unique for each community; therefore, an impartial review and ranking of the mitigation actions is key. It is not so important which method is used, but rather that the method chosen is logical and clearly documented.

Remember that the Benefit-Cost Review is an important element of the community's hazard mitigation plan. Keep it simple, and focus on your community's needs and values.

Appendix A

Exhibits

Exhibit 1: Measuring Vulnerability Before and After Mitigation

Action: _____

Vulnerability	Before the Action is implemented*	After the Action is implemented*	Difference
Number of people affected by the hazard			
Area affected (acreage) by the hazard			
Number of properties affected by the hazard			
Property damage (amount in \$)			
Loss of use (number of properties/physical assets [e.g., bridges] in number of days)			
Loss of life (number of people)			
Injury (number of people)			
**			

*Include measurable items, where possible, based on experience, professional estimate, or judgment.

**Add more categories of risk as appropriate for the specific community's plan.

Exhibit 2: Benefits

Action: _____

<u>Benefits</u>
Risk reduction (short- or long-term)
If other community goals are achieved, explain
If easy to implement, explain
If funding is available, explain
If politically/socially acceptable, explain

Exhibit 3: Costs

Action: _____

<u>Costs*</u>
Construction cost (amount in \$)
Programming cost (amount in \$, # of people needed to administer)
Time needed to implement
If unfair to a certain social group, explain
If there is public/political opposition, explain
If there are any adverse effects on the environment, explain

*If precise costs are not available, use costs based on experience, professional estimate, or judgment.

Exhibit 4: Prioritization by Listing Benefits and Costs

Exhibit 5: Prioritization Using STAPLEE and Qualitative Scores

Actions → Criteria ↓						
	Cost	Benefit	Cost	Benefit	Cost	Benefit
Social						
Technical						
Administrative						
Political						
Legal						
Economic						
Environmental						
Priority						

Definition of rating scale: _____

Exhibit 6: Prioritization Using STAPLEE and Simple Scores

Actions → Criteria ↓						
	Cost	Benefit	Cost	Benefit	Cost	Benefit
Social						
Technical						
Administrative						
Political						
Legal						
Economic						
Environmental						
Sub-total of cost/benefit						
Total Score						
Priority						

Definition of rating scale: _____

Exhibit 7: Prioritization Using STAPLEE and Weighted Scores

Actions → Criteria ↓						
	Cost	Benefit	Cost	Benefit	Cost	Benefit
Social (weight = __)						
Technical (weight = __)						
Administrative (weight = __)						
Political (weight = __)						
Legal (weight = __)						
Economic (weight = __)						
Environmental (weight = __)						
Sub-total of cost/benefit						
Total Score						
Priority						

Definition of rating scale: _____

