

December 10, 2020 | Hazard Mitigation Plan





Q&A | ELEMENT A: PLANNING PROCESS | A1c.

Q: Does the plan identify who represented each jurisdiction? (At a minimum, it must identify the jurisdiction represented and the person's position or title and agency within the jurisdiction.)

(Requirement §201.6(c)(1))

A: See **Credits** below.

Credits

Special Thanks

Hazard Mitigation Planning Team:

Agency	Name	Department	Position
City of Sierra Madre	Henry Amos	Police Department	Captain
	Brent Bartlett, Planning Team Chair	Fire Department	Fire Chief
	James Carlson	Public Works	Management Analyst
	Chris Cimino	Public Works	Director of Public Works
	Colby Konisek	Finance	Finance Director
	Gabe Engeland	Administration	City Manager
	Vincent Gonzalez	Planning	Planning and Community Preservation Director
	Miguel Hernandez	Human Resources	Human Resources Manager
	Kurt Norwood	Fire Department	Interim Fire Chief
	Jose Reynoso	Public Works	Utility Services Director
	Charles Kamchamnan	Police Department	Sergeant

Acknowledgements

City of Sierra Madre

- ✓ John Harabedian, Mayor
- ✓ John Capoccia, Mayor Pro Tem
- ✓ Rachelle Arizmendi, Council Member
- ✓ Denise Delmar, Council Member
- ✓ Gene Goss, Council Member



Point of Contact

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Mapping

The maps in this plan were provided by the City of Sierra Madre, County of Los Angeles, Federal Emergency Management Agency (FEMA), or were acquired from public Internet sources. Care was taken in the creation of the maps contained in this Plan, however they are provided "as is". The City of Sierra Madre cannot accept any responsibility for any errors, omissions or positional accuracy, and therefore, there are no warranties that accompany these products (the maps). Although information from land surveys may have been used in the creation of these products, in no way does this product represent or constitute a land survey. Users are cautioned to field verify information on this product before making any decisions.

Mandated Content

In an effort to assist the readers and reviewers of this document, the jurisdiction has inserted "markers" emphasizing mandated content as identified in the Disaster Mitigation Act of 2000 (Public Law – 390). Following is a sample marker:

EXAMPLE

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))

A:



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Part I: PLANNING PROCESS

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | A1b.

Q: Does the plan list the jurisdiction(s) participating in the plan that are seeking approval?
(Requirement §201.6(c)(1))

A: See **Introduction** below.

Introduction

The Hazard Mitigation Plan (Mitigation Plan) was prepared in response to Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 (also known as Public Law 106-390) requires state and local governments to prepare mitigation plans to document their mitigation planning process, and identify hazards, potential losses, mitigation needs, goals, and strategies. This type of planning supplements the City's comprehensive land use planning and emergency management planning programs. This document is a federally mandated update to the 2008 Hazard Mitigation Plan and ensures continuing eligibility for Hazard Mitigation Grant Program (HMGP) funding.

DMA 2000 was designed to establish a national program for pre-disaster mitigation, streamline disaster relief at the federal and state levels, and control federal disaster assistance costs. Congress believed these requirements would produce the following benefits:

- ✓ Reduce loss of life and property, human suffering, economic disruption, and disaster costs.
- ✓ Prioritize hazard mitigation at the local level with increased emphasis on planning and public involvement, assessing risks, implementing loss reduction measures, and ensuring critical facilities/services survive a disaster.
- ✓ Promote education and economic incentives to form community-based partnerships and leverage non-federal resources to commit to and implement long-term hazard mitigation activities.

The following FEMA definitions are used throughout this plan (Source: FEMA, 2002, *Getting Started, Building Support for Mitigation Planning*, FEMA 386-1):

Hazard Mitigation – “Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards”.

Planning – “The act or process of making or carrying out plans; specifically, the establishment of goals, policies, and procedures for a social or economic unit.”

Planning Approach

The four-step planning approach outlined in the FEMA publication, *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies* (FEMA 386-3) was used to develop this plan:



- ✓ **Develop mitigation goals and objectives** - The risk assessment (hazard characteristics, inventory, and findings), along with municipal policy documents, were utilized to develop mitigation goals and objectives.
- ✓ **Identify and prioritize mitigation actions** - Based on the risk assessment, goals and objectives, existing literature/resources, and input from participating entities, mitigation activities were identified for each hazard. Activities were 1) qualitatively evaluated against the goals and objectives, and other criteria; 2) identified as high, medium, or low priority; and 3) presented in a series of hazard-specific tables.
- ✓ **Prepare implementation strategy** - Generally, high priority activities are recommended for implementation first. However, based on community needs and goals, project costs, and available funding, some medium or low priority activities may be implemented before some high priority items.
- ✓ **Document mitigation planning process** - The mitigation planning process is documented throughout this plan.

Hazard Land Use Policy in California

Planning for hazards should be an integral element of any City's land use planning program. All California cities and counties have General Plans (also known as Comprehensive Plans) and the implementing ordinances that are required to comply with the statewide land use planning regulations.

The continuing challenge faced by local officials and state government is to keep the network of local plans effective in responding to the changing conditions and needs of California's diverse communities, particularly in light of the very active seismic region in which we live.

Planning for hazards requires a thorough understanding of the various hazards facing the City and region as a whole. Additionally, it's important to take an inventory of the structures and contents of various City holdings. These inventories should include the compendium of hazards facing the City, the built environment at risk, the personal property that may be damaged by hazard events and most of all, the people who live in the shadow of these hazards. Such an analysis is found in this hazard mitigation plan.

State and Federal Partners in Hazard Mitigation

All mitigation is local and the primary responsibility for development and implementation of risk reduction strategies and policies lies with each local jurisdiction. Local jurisdictions, however, are not alone. Partners and resources exist at the regional, state and federal levels. Numerous California state agencies have a role in hazards and hazard mitigation.

Some of the key agencies include:

- ✓ California Office of Emergency Services (Cal OES) is responsible for disaster mitigation, preparedness, response, recovery, and the administration of federal funds after a major disaster declaration;
- ✓ Southern California Earthquake Center (SCEC) gathers information about earthquakes, integrates information on earthquake phenomena, and communicates this to end-users and the general public to increase earthquake awareness, reduce economic losses, and save lives.



- ✓ California Department of Forestry and Fire Protection (CAL FIRE) is responsible for all aspects of wildland fire protection on private and state properties, and administers forest practices regulations, including landslide mitigation, on non-federal lands.
- ✓ California Division of Mines and Geology (DMG) is responsible for geologic hazard characterization, public education, and the development of partnerships aimed at reducing risk.
- ✓ California Division of Water Resources (DWR) plans, designs, constructs, operates, and maintains the State Water Project; regulates dams; provides flood protection and assists in emergency management. It also educates the public, serves local water needs by providing technical assistance
- ✓ FEMA provides hazard mitigation guidance, resource materials, and educational materials to support implementation of the capitalized DMA 2000.
- ✓ United States Census Bureau (USCB) provides demographic data on the populations affected by natural disasters.
- ✓ United States Department of Agriculture (USDA) provides data on matters pertaining to land management.

Q&A | ELEMENT A: PLANNING PROCESS | A3

Q: Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))

A: See **Stakeholders** below.

Stakeholders

A Hazard Mitigation Planning Team (Planning Team consisting of department representatives from City of Sierra Madre staff worked with Emergency Planning Consultants to create the updated Plan. ***The Planning Team served as the primary stakeholders throughout the planning process. The general public and external agencies served as secondary stakeholders with an opportunity to contribute to the plan during the Plan Writing Phase of the planning process.***

As required by DMA 2000, the Planning Team involved the “general public” by making the Second Draft Plan available online during the plan writing phase. Additionally, external agencies (including utility providers, special districts and adjoining jurisdictions) were directed to the Second Draft Plan via an email invitation. The Second Draft Plan was announced and posted on the City’s website from February 7-21, 2020 along with a request to forward any comments to the Planning Team Chair Brent Bartlett. A hard copy of the Second Draft Plan was available to the public at the City Hall reception counter. Additionally, the announcement was posted in the City’s Newsletter via eblast as well as social media mediums. See attachments for copies of various announcements.

Hazard Mitigation Legislation

Hazard Mitigation Grant Program

In 1974, Congress enacted the Robert T. Stafford Disaster Relief and Emergency Act, commonly referred to as the Stafford Act. In 1988, Congress established the Hazard Mitigation Grant Program (HMGP) via Section 404 of the Stafford Act. Regulations regarding HMGP implementation based on the DMA 2000 were initially changed by an Interim Final Rule (44 CFR



Part 206, Subpart N) published in the Federal Register on February 26, 2002. A second Interim Final Rule was issued on October 1, 2002.

The HMGP helps states and local governments implement long-term hazard mitigation measures for natural hazards by providing federal funding following a federal disaster declaration. Eligible applicants include state and local agencies, Indian tribes or other tribal organizations, and certain nonprofit organizations.

In California, the HMGP is administered by Cal OES. Examples of typical HMGP projects include:

- ✓ Property acquisition and relocation projects
- ✓ Structural retrofitting to minimize damages from earthquake, flood, high wind, wildfire, or other natural hazards
- ✓ Elevation of flood-prone structures
- ✓ Vegetative management programs, such as:
 - Brush control and maintenance
 - Fuel break lines in shrubbery
 - Fire-resistant vegetation in potential wildland fire areas

Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation Program (PDM) was authorized by §203 of the Stafford Act, 42 United States Code, as amended by §102 of the DMA 2000. Funding is provided through the National Pre-Disaster Mitigation Fund to help state and local governments (including tribal governments) implement cost-effective hazard mitigation activities that complement a comprehensive mitigation program.

In Fiscal Year 2009, two types of grants (planning and competitive) were offered under the PDM Program. Planning grants allocate funds to each state for Mitigation Plan development. Competitive grants distribute funds to states, local governments, and federally recognized Indian tribal governments via a competitive application process. FEMA reviews and ranks the submittals based on pre-determined criteria. The minimum eligibility requirements for competitive grants include participation in good standing in the National Flood Insurance Program (NFIP) and a FEMA-approved Mitigation Plan.

(Source: <http://www.fema.gov/fima/pdm.shtm>)

Flood Mitigation Assistance Program

The Flood Mitigation Assistance (FMA) Program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101). Financial support is provided through the National Flood Insurance Fund to help states and communities implement measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP.

Three types of grants are available under FMA: planning, project, and technical assistance. Planning grants are available to states and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for project grants to implement measures to reduce flood losses. Technical assistance grants in the amount of 10 percent of the project grant are available to the state for program administration. Communities



that receive planning and/or project grants must participate in the NFIP. Examples of eligible projects include elevation, acquisition, and relocation of NFIP-insured structures. (Source: <http://www.fema.gov/fima/fma.shtm>)

Q&A | ELEMENT C. MITIGATION STRATEGY | C2

Q: Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))

A: See **NFIP Participation** below.

National Flood Insurance Program

Flood Insurance Rate Maps (FIRM) and Flood Insurance Studies (FIS) are often used to identify flood-prone areas. The National Flood Insurance Program (NFIP) was established in 1968 as a means of providing low cost flood insurance to the nation's flood-prone communities. The NFIP also reduces flood losses through regulations that focus on building codes and sound floodplain management. NFIP regulations (44 Code of Federal Regulations (CFR) Chapter 1, Section 60, 3) require that all new construction in floodplains must be elevated at or above base flood level.

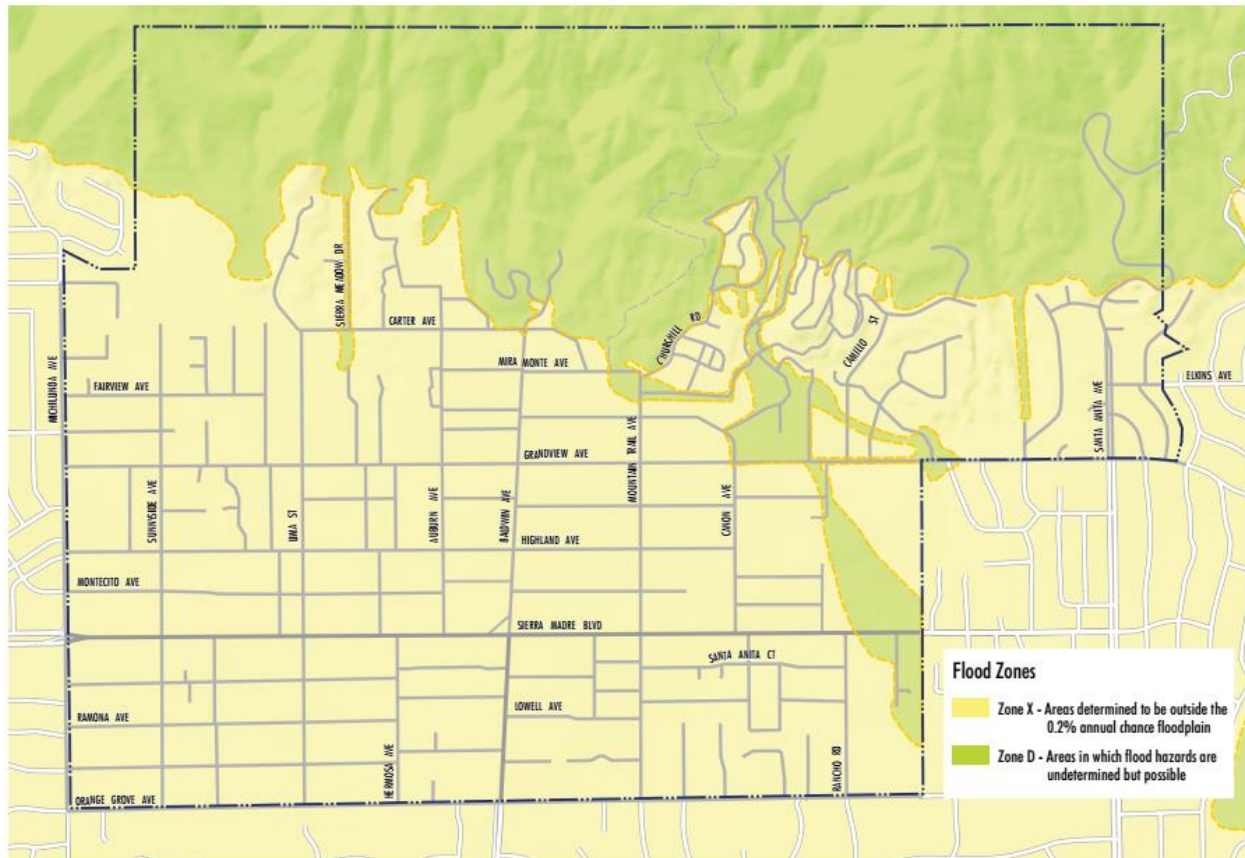
NFIP Participation

According to the City's Sierra Madre General Plan (2015), the City is not located within a 100-year flood zone. This information is in agreement with NFIP Flood Insurance Rate Map # 06037C1400F, effective September 26, 2008). The 2008 map designates the majority of Sierra Madre as Flood Zone "X", indicating that it is out of 100- and 500-year flood zone. However, two areas of the City, a small segment centered along the Little Santa Anita Creek channel and the northern portion of the City that comprises the foothills, are classified as Flood Zone "D", indicating an area in which flood hazards are undetermined, but possible. The foothill areas are at significant risk of both flooding and landslides, particularly after a brush fire. As fires remove the vegetation, which helps to retain soil structure in hillside areas, post-fire soils are often not able to absorb water effectively. Instead of infiltrating into the soil, rainfall collects and runs off the surface of hillsides, creating flood conditions. The canyon areas above the northern portion of the City are also particularly vulnerable. In the years immediately following a brush fire in the foothills, these areas can be hazardous to persons and property during a strong rainfall event.



Flood Zones

(Source: City of Sierra Madre General Plan – 2015)



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B4

Q: Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))

A: See **Repetitive Loss Properties** below.

Repetitive Loss Properties

Repetitive Loss Properties (RLPs) are most susceptible to flood damages; therefore, they have been the focus of flood hazard mitigation programs. Unlike a Countywide program, the Floodplain Management Plan (FMP) for repetitive loss properties involves highly diversified property profiles, drainage issues, and property owner's interest. It also requires public involvement processes unique to each RLP area. The objective of an FMP is to provide specific potential mitigation measures and activities to best address the problems and needs of communities with repetitive loss properties. A repetitive loss property is one for which two or more claims of \$1,000 or more have been paid by the National Flood Insurance Program (NFIP) within any given ten-year period. According to FEMA resources, there are no Repetitive Loss Properties (RLPs) within the City of Sierra Madre.



State and Federal Guidance in Hazard Mitigation

While local jurisdictions have primary responsibility for developing and implementing hazard mitigation strategies, they are not alone. Various state and federal partners and resources can help local agencies with mitigation planning.

The Mitigation Plan was prepared in accordance with the following regulations and guidance documents:

- ✓ DMA 2000 (Public Law 106-390, October 10, 2000)
- ✓ 44 CFR Parts 201 and 206, Mitigation Planning and Hazard Mitigation Grant Program, Interim Final Rule, October 1, 2002
- ✓ 44 CFR Parts 201 and 206, Mitigation Planning and Hazard Mitigation Grant Program, Interim Final Rule, February 26, 2002
- ✓ How-To Guide for Using HAZUS-MH for Risk Assessment, (FEMA 433), February 2004
- ✓ Mitigation Planning “How-to” Series (FEMA 386-1 through 9 available at: <http://www.fema.gov/fima/planhowto.shtm>)
- ✓ 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 Implementing Strategies (FEMA 386-3)
- ✓ Bringing the Plan to Life: Implementing the Mitigation Plan (FEMA 386-4)
- ✓ Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5)
- ✓ Integrating Historic Property and Cultural Resource Considerations into Mitigation Planning (FEMA 386-6)
- ✓ Integrating Manmade Hazards into Mitigation Planning (FEMA 386-7)
- ✓ Multi-Jurisdictional Mitigation Planning (FEMA 386-8)
- ✓ Using the Mitigation Plan to Prepare Successful Mitigation Projects (FEMA 386-9)
- ✓ State and Local Plan Interim Criteria Under the DMA 2000, July 11, 2002, FEMA
- ✓ Mitigation Planning Workshop for Local Governments-Instructor Guide, July 2002, FEMA
- ✓ Report on Costs and Benefits of Natural Hazard Mitigation, Document #294, FEMA
- ✓ LHMP Development Guide – Appendix A - Resource, Document, and Tool List for Local Mitigation Planning, December 2, 2003, Cal OES
- ✓ Local Mitigation Plan Review Guide (FEMA 2011)
- ✓ Local Mitigation Planning Handbook (FEMA 2013)





How is the Plan Organized?

The structure of the plan enables the reader to use a section of interest to them and allows the City to review and update sections when new data is available. The ease of incorporating new data into the plan will result in a Mitigation Plan that remains current and relevant.

Following is a description of each section of the plan:

Part I: Planning Process

Introduction

Describes the background and purpose of developing a mitigation plan.

Planning Process

Describes the mitigation planning process including stakeholders and integration of existing data and plans.

Part II: Risk Assessment

Community Profile

Summarizes the history, geography, demographics, and socioeconomics of the City.

Risk Assessment

This section provides information on hazard identification, vulnerability and risk associated with hazards in the City.

City-Specific Hazard Analysis

Describes the hazards posing a significant threat to the City including:

Earthquake | Wildfire | Landslide | Flood | Windstorm | Utility

Each City-Specific Hazard Analysis includes information on previous occurrences, local conditions, hazard assessment, and local impacts.

Part III: Mitigation Strategies

Mitigation Strategies

Documents the goals, community capabilities, and priority setting methods supporting the Plan. Also highlights the Mitigation Actions Matrix: 1) goals met; 2) identification, assignment, timing, and funding of mitigation activities; 3) benefit/cost/priorities; 4) plan implementation method; and 5) activity status.

Plan Maintenance

Establishes tools and guidelines for maintaining and implementing the Mitigation Plan.

Part IV: Appendix

The plan appendices are designed to provide users of the Mitigation Plan with additional information to assist them in understanding the contents of the mitigation plan, and potential resources to assist them with implementation.



General Hazard Overviews

Generalized subject matter information discussing the science and background associated with the identified hazards.

Attachments

- FEMA Letter of Approval
- City Council Resolution
- Planning Team sign-in sheets
- Planning Team Agendas
- Web postings and notices

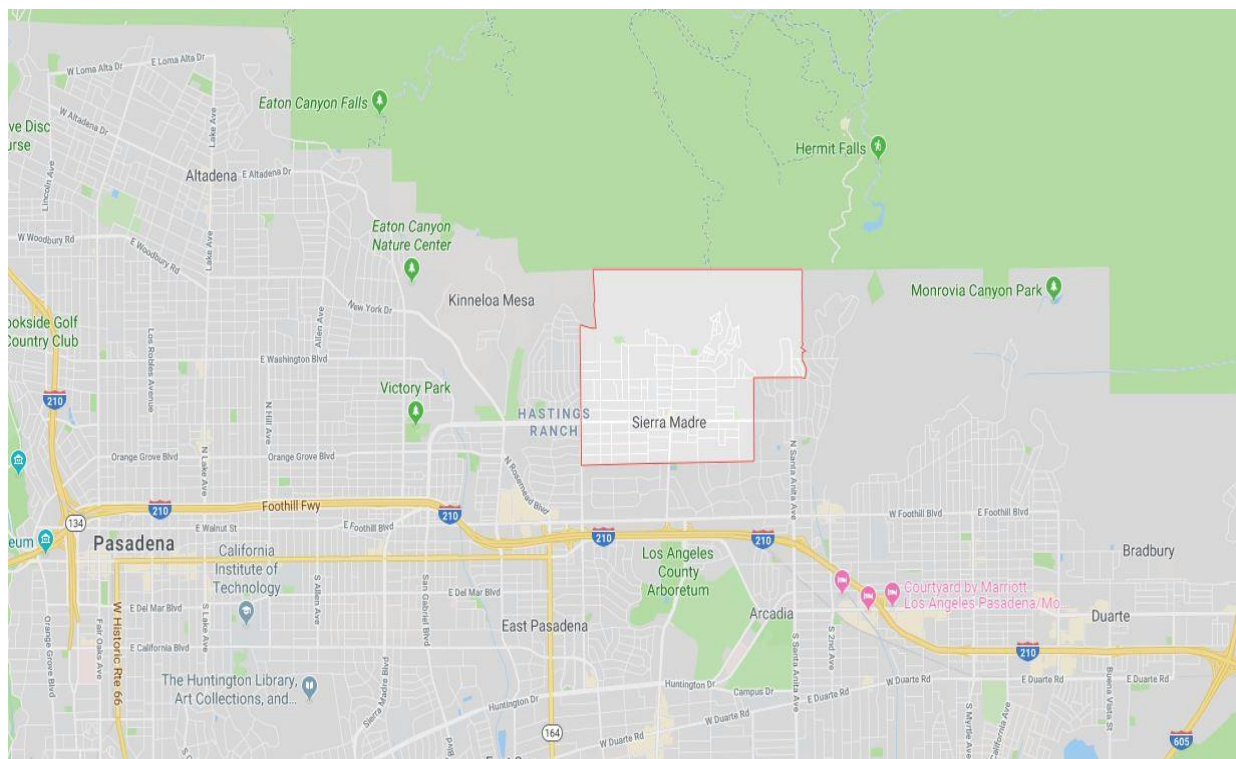
Plan Adoption and Approval

As per DMA 2000 and supporting Federal regulations, the Mitigation Plan is required to be adopted by the City Council and approved by FEMA. See the **Planning Process Section** for details.

Who Does the Mitigation Plan Affect?

This plan provides a framework for planning for natural hazards. The resources and background information in the plan are applicable City-wide and to City-owned facilities outside of the City boundaries, and the goals and recommendations provide groundwork for local mitigation plans and partnerships. **Map: City of Sierra Madre** shows the regional proximity of the City to its adjoining communities.

Map: City of Sierra Madre
(Source: Google Maps)





Planning Process

Throughout the project, the City followed its traditional approach to developing policy documents which included preparation of a First Draft Plan for internal review by the City's authors (Hazard Mitigation Planning Team) who served as the primary stakeholders. Next, following any necessary revisions, a Second Draft Plan was shared with the secondary stakeholders - general public, local community groups, and external agencies (utilities, special districts, adjoining jurisdictions) during the plan writing phase. The comments gathered from the secondary stakeholders were incorporated into a Third Draft Plan which was submitted to Cal OES and FEMA. Next, the Planning Team completed any mandated amendments to satisfy input from Cal OES and FEMA.

Following receipt of FEMA's "Approval Pending Adoption", the Final Draft Plan was posted as per jurisdictional practices in advance of the City Council meeting. Any questions or comments gathered in advance of the City Council meeting were incorporated into the City Council Staff Report. Following consideration and adoption by the City Council, proof of the Plan's adoption was forwarded to FEMA along with a request for final approval. The planning process described above is portrayed below in a timeline:

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)?

A: See **Planning Phases Timeline** and **Plan Methodology** below.

Q&A | ELEMENT A: PLANNING PROCESS | A3

Q: Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))

A: See **Planning Phases Timeline** below.



Table: Planning Phases Timeline

PLANNING PHASES TIMELINE				
Plan Writing Phase (First & Second Draft Plan)	Plan Review Phase (Third & Final Draft Plan)	Plan Adoption Phase (Final Draft Plan)	Plan Approval Phase (Final Plan)	Plan Implementation Phase
<ul style="list-style-type: none"> Planning Team input – research, meetings, writing, review of First Draft Plan Incorporate input from the Planning Team into Second Draft Plan Invite public and external agencies to comment and contribute to the Second Draft Plan Incorporate and document gathered input into the Third Draft Plan 	<ul style="list-style-type: none"> Third Draft Plan sent to Cal OES and FEMA for “Approval Pending Adoption” Address any mandated revisions identified by Cal OES and FEMA into Final Draft Plan 	<ul style="list-style-type: none"> Post public notice of City Council meeting along with posting of Final Draft Plan Present Final Draft Plan to the City Council City Council Adopted Plan Submit Proof of Adoption to FEMA with request for final approval 	<ul style="list-style-type: none"> Receive FEMA final approval Incorporate FEMA approval into the Final Plan 	<ul style="list-style-type: none"> Conduct quarterly Planning Team meetings Integrate mitigation action items into budget, CIP and other funding and strategic documents





Plan Methodology

The Planning Team discussed knowledge of natural hazards and past historical events, as well as planning and zoning codes, ordinances, and recent planning decisions.

The rest of this section describes the mitigation planning process including 1) Planning Team involvement, 2) public and external agency involvement; and 3) integration of existing data and plans.

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))

A: See **Table: Planning Team Involvement and Level of Participation** below.

Planning Team Involvement

The Planning Team consisted of representatives from City of Sierra Madre departments related to hazard mitigation processes. The Chair of the Planning Team (Brent Bartlett, Fire Captain) sent an email to the department heads requesting names of representatives to serve on the Planning Team. The Planning Team members served as primary stakeholders throughout the planning process. Next the Planning Team Chair sent an email to the identified representatives describing the content and importance of the Mitigation Plan and the need for their participation and attendance at four Planning Team Meetings.

Citizens and businesses (“the public”) along with external agencies served as secondary stakeholders in the planning process. The Planning Team was responsible for the following tasks:

- ✓ Confirming planning goals
- ✓ Prepare timeline for plan update
- ✓ Ensure plan meets DMA 2000 requirements
- ✓ Organize and solicit involvement of public and external agencies
- ✓ Analyze existing data and reports
- ✓ Update hazard information
- ✓ Review HAZUS loss projection estimates
- ✓ Update status of Mitigation Action Items
- ✓ Develop new Mitigation Action Items
- ✓ Participate in Planning Team meetings and City Council public meeting
- ✓ Provide existing resources including maps and data

The Planning Team, with assistance from Emergency Planning Consultants, identified and profiled hazards; determined hazard rankings; estimated potential exposure or losses; evaluated development trends and specific risks; and developed mitigation goals and action items (see Mitigation Strategies section).



Table: Planning Team Meeting Dates and Content

	Meeting #1 June 27, 2019	Meeting #2 July 25, 2019	Meeting #3 August 22, 2019	Meeting #4 October 3, 2019
Hazard Identification and Ranking	X			
Update Mitigation Items		X		
Develop New Mitigation Items			X	
Review First Draft Plan				X



Table: Planning Team Level of Participation

Name	Research and Writing of Plan	Planning Team Meeting 6/27/19	Planning Team Meeting 7/25/19	Planning Team Meeting 8/22/19	Planning Team Meeting 10/3/19	Planning Team Comment on First Draft Plan	Review and Input from General Public and External Agencies to the Second Draft Plan	Submit Third Draft Plan to Cal OES/FEMA for Approval Pending Adoption	Post Final Draft Plan in advance of City Council Public Meeting	Present Final Draft Plan to City Council at Public Meeting for Plan Adoption	Submit Proof of Adoption and Request for FEMA for Final Approval	Receive FEMA Final Approval. Issue Final Plan
City of Sierra Madre												
Henry Amos		X	X			X						
Brent Bartlett, Chair		X	X	X	X	X	X		X	X		X
James Carlson		X		X	X	X						
Chris Cimino		X	X	X	X	X						
Colby Knoisek			X		X	X						
Gabe Engeland		X	X	X		X						
Vincent Gonzalez		X	X	X	X	X						
Miguel Hernandez		X	X		X	X						
Charles Kamchamnan					X	X						
Kurt Norwood		X		X		X						
Jose Reynoso		X	X	X		X						
Emergency Planning Consultants												
Carolyn J. Harshman	X	X	X	X	X		X	X			X	
Megan Fritzler	X											
Zoe Schumacher	X											



Table: Planning Team Timeline

	June 2019	July	August	September	October	November	December	January 2020	February	March	April	May	June-September	October	November	December
Research and Plan Writing																
Research for Risk Assessment and HAZUS	X															
Prepare First, Second, and Third Draft Plans	X	X	X	X	X	X	X	X	X	X	X	X				
Prepare Final Draft Plan																
Prepare Final Plan																
Planning Team Meetings																
Planning Team Meeting #1 - HMP Overview, Initial Hazard Briefing, Community Outreach	X															
Planning Team Meeting #2 HAZUS and Update Existing Mitigation Action Items			X													
Planning Team Meeting #3 Develop New Mitigation Action Items				X												
Planning Team Meeting #4 Input to First Draft Plan					X											
Community Outreach																
Provide Opportunities for External Agencies and General Public to Provide Input to the Second Draft Plan									X							
Formal Review, Adoption, and Approval of Plan																
Submit Third Draft Plan to Cal OES												X				
Work with Cal OES and FEMA on DMA 2000-Mandated Revisions to the Plan												X				
Receive FEMA Approval Pending Adoption												X				
City Council Adopts the Final Draft Plan												X				
Submit Proof of Adoption to FEMA												X				
Incorporate FEMA Letter of Approval and Adoption into Final Plan																X



Q&A | ELEMENT A: PLANNING PROCESS | A2a.

Q: Does the plan document an opportunity for neighboring communities, local, and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, as well as other interested parties to be involved in the planning process? (Requirement §201.6(b)(2))

A: See **Secondary Stakeholder Involvement** below.

Q&A | ELEMENT A: PLANNING PROCESS | A2b.

Q: Does the plan document an opportunity for neighboring communities, local, and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, as well as other interested parties to be involved in the planning process? (Requirement §201.6(b)(2))

A: See **Secondary Stakeholder Involvement** below.

Q&A | ELEMENT A: PLANNING PROCESS | A3

Q: Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))

A: See **General Public and External Agency Input and Table** below.

General Public and External Agency Input

In addition to the Planning Team, the secondary stakeholders also provided information, expertise, and other resources during plan writing phase. The secondary stakeholders included: general public and external agencies (e.g. utilities, special districts, adjoining jurisdictions, etc.).

Following review and input by the Planning Team of the First Draft Plan, a Second Draft Plan incorporating any revisions was made available to the secondary stakeholders as identified above.

The Second Draft Plan was posted on the City's website from February 7-21, 2020. The notice informing the general public of the Plan's availability was distributed through City of Sierra Madre Website Landing Page, Facebook, Instagram, Twitter, and Village View (City of Sierra Madre E-News Letter). See Attachments for screenshots of the various postings. External agencies were informed via email of the availability of the Plan on the City's website. The email included contact information for the Planning Team Chair as well as active encouragement for contributing questions and suggestions during the plan writing phase of the planning process. The distribution list and sample email follow:

Table: General Public and External Agency Distribution

Date Informed	Agency, Name, Title	Date & Information Gathered	How Information was Addressed
2.7.2020	LA County Fire Department – Forestry Division ATTN: Hazard Mitigation Planning J. Lopez, Assistant Chief 12605 Osborne St. Pacoima, CA 91331-2129	N/A	
2.7.2020	LA County Agricultural Commissioner, Weights & Measures ATTN: Hazard Mitigation Planning	N/A	

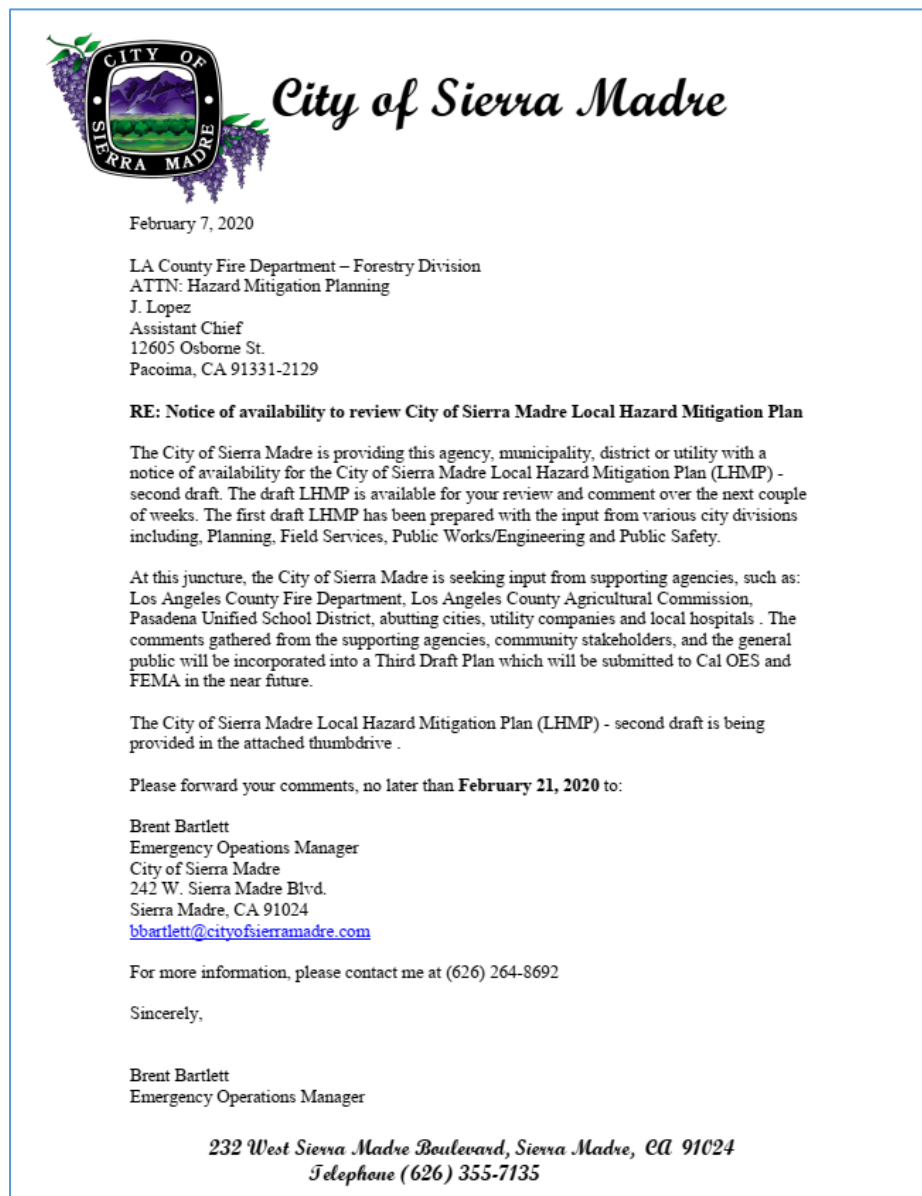


	Richard Lizuka, Chief Contact 12300 Lower Azusa Rd. Arcadia, CA 91006-5872		
2.7.2020	City of Pasadena ATTN: Hazard Mitigation Planning David Reyes, Administration Director 100 N. Garfield Ave. Pasadena, CA 91101	N/A	
2.7.2020	City of Monrovia ATTN: Hazard Mitigation Planning Craig Jimenez, Community Development Director 415 S. Ivy Ave. Monrovia, CA 91016	N/A	
2.7.2020	City of Arcadia ATTN: Hazard Mitigation Planning Jason Kruckeberg, Development Services Director 240 W. Huntington Dr. Arcadia, CA 91066	N/A	
2.7.2020	Area D Office of Disaster Management ATTN: Hazard Mitigation Planning Diana Manzano-Garcia, Area D Coordinator 500 W. Bonita Ave., Suite #5 San Dimas, CA 91773	N/A	
2.7.2020	Southern California Gas Company ATTN: Hazard Mitigation Planning William Vanettes, Field Planning Associate 950 N. Todd Ave. Azusa, CA 91702	N/A	
2.7.2020	Southern California Edison ATTN: Hazard Mitigation Planning Maggie Bass, Electrical Planner 1440 S. California Blvd. Monrovia, CA 91016	N/A	
2.7.2020	Pasadena Unified School District ATTN: Hazard Mitigation Planning Dr. Brian McDonald, Superintendent 351 S. Hudson Ave. Pasadena, CA 91109	N/A	

Local community group members and external agencies listed below were invited via email and provided with an electronic link to the City's website. Following is a sample of the emails distributed along with the invitation for comments, questions, and input:



Figure: Email Invitation to External Agencies



No input was gathered from the secondary stakeholders.

Following receipt of FEMA’s “Approval Pending Adoption” and in advance of the City Council public meeting, the general public (via public noticing) and external agencies (via email) were informed of the web posting of the Final Draft Plan and encouraged to attend the public meeting. Gathered comments on the Plan during the posting period were noted in the City Council Staff Report and added to the Final Plan.



Q&A | ELEMENT C. MITIGATION STRATEGY | C1a.

Q: Does the plan document each jurisdiction's existing authorities, policies, programs and resources? (Requirement §201.6(c)(3))

A: See **Capability Assessment – Existing Processes and Programs** below.

Capability Assessment – Existing Processes and Programs

The City will incorporate mitigation planning as an integral component of daily operations. This will be accomplished by the Planning Team working with their respective departments to integrate mitigation strategies into the planning documents and operational guidelines within the City. In addition to the Capability Assessment below, the Planning Team will strive to identify additional policies, programs, practices, and procedures that could be created or modified to address mitigation activities.

Table: Capability Assessment - Existing Processes and Program

Resource Type	Resource Name	Ability to Support Mitigation
Personnel	City Manager's Office	<i>The City Manager is appointed by the City Council to enforce municipal laws, direct daily operations of the City, make recommendations to the Council, prepare and observe the municipal budget, appoint and supervise all City department heads and employees, and supervise the operation of all City departments. The City Manager is responsible for implementing policies adopted by the City Council, preparing and submitting the annual budget, and administering the day-to-day operations of the City.</i>
Personnel	Community Services	<i>The Community Services Department consists of four full-time employees. The Department is responsible for a variety of facilities, parks, events, services and programs ranging from traditional recreation programs to arts and seniors. The Department oversees the Community Recreation Center and Youth Activity Center, Sierra Madre Aquatic Center, Hart Park House Senior Center, and six parks as well as supports and coordinates the activities of the City's Community Services Commission, Senior Community Commission, and various committees.</i>
Personnel	Finance Department	<i>The Finance Department is responsible for administering the city-wide operating budget and plays a key role in every financial transaction. The Department provides city-wide fiscal oversight, accounting, analysis, debt management, investments, purchasing, result-based budgeting, cash handling, payroll, billing, collections and administrative services.</i>
Personnel	Fire Department	<i>The mission of the Sierra Madre Fire Department is to provide superior community service through the delivery of fire suppression, fire prevention, and emergency medical and public education services. The Sierra Madre Fire Department proudly protects those residing, working and visiting the City of Sierra Madre from its central location in downtown. The Department services a primarily residential area of 3.2 square miles with a wildland/urban interface to more than 11,000 residents.</i>
Personnel	Human Resources Department	<i>Human Resources is responsible for administering the City's human resources management system, including labor relations, benefits administration, and staff development, as well as providing personnel support services to all City departments. Responsibilities of the Division include recruitment, application review, and testing of all candidates for City employment. In addition, the Department oversees the administration of compensation and benefits for all</i>



Resource Type	Resource Name	Ability to Support Mitigation
		<i>current employees, labor relations, contract negotiations and the maintenance of personnel records. Finally, Human Resources also coordinates all the risk management functions for the City including claims administration.</i>
Personnel	Library Services	<i>The Sierra Madre Public Library is a community library dedicated to providing equal access to information services and programs reflecting diverse points of view, always endeavoring to be responsive to changing needs of the community, to preserving its history, and to meeting the challenges of the future. The library provides a welcoming environment, quality materials and technologies, and professional, dedicated staff.</i>
Personnel	Planning and Community Preservation	<i>The Planning & Community Preservation Department is comprised of the Planning, Zoning, Building & Safety, and Code Enforcement Divisions. Planning and Zoning divisions are responsible for regulating the type, scale, and land use that may be established at a given location. Building and Safety division is responsible for structural and life safety concerns in the construction, demolition or alteration of buildings. Code Enforcement Division conducts investigations to abate code violations and public nuisance abatement.</i>
Personnel	Police	<i>For nearly 100 years, the men and women of the Sierra Madre Police Department have been committed to ensuring a safe environment for those who live, visit and work in Sierra Madre. The Sierra Madre Police Department has 20 full-time members including the Chief of Police, a Lieutenant, four sergeants, two corporals, nine officers (including detective & traffic), and four dispatchers. The Department also has several part-time employees and volunteers who contribute to maintaining a safe community.</i>
Personnel	Public Works	<i>The Public Works Department and Utilities Department operate and maintain infrastructure for critical services to the City's residents and visitors. Services include providing potable water to its customers; maintaining the City's sewer system; safe streets and sidewalks; the City's urban forest; and City facilities. The Public Works Department also serves as liaison to the power and gas providers.</i>
Personnel	Water	<i>The City's water quality and supply is maintained by the Water Division, a department within the Sierra Madre Public Works. By providing consistently high-quality service to the residents of Sierra Madre, the City ensures a safe and reliable method of water delivery for all users. The Water Division has two sources by which they pump, treat, and distribute water. One source of the water supply is derived from four wells drawing from the East Raymond Basin aquifer. The second source is derived from two natural spring tunnels located in the foothills.</i>
Plans	General Plan	<i>The City of Sierra Madre General Plan is a long-range policy document which lays out the framework for all future growth and development within the City. The General Plan is the blueprint that sets the basis for future policy decisions, in that it organizes the desires of the Sierra Madre community with respect to the physical, cultural, economic, and environmental character of the City. Most importantly, the Sierra Madre General Plan is a community-based document that reflects the community values and character as expressed in its goals and policies, while also serving as a technical document which provides information about the City. The General Plan shall be used as a guide by the City's decision makers to achieve the community's vision and preserve the history, character and shared values of the community for future generations.</i>



Resource Type	Resource Name	Ability to Support Mitigation
		<p><i>The General Plan is intended to be both a long-term and a dynamic document that must be periodically updated to respond to changing community needs. Unlike the housing element, which is required by State law to be updated every five years, a General Plan does not expire and is not required to have a specific time frame. The City recently updated its 1996 General Plan; updating the General Plan is done to ensure that the plan is a reflection of the community's values and goals. The update process also allows the City to reflect on challenges of the past years and use these experiences to shape new policy.</i></p> <p><i>On July 14, 2015, the City Council adopted the Sierra Madre General Plan (2015) and certified the General Plan Environmental Impact Report pursuant to Resolutions 15-43 and 15-44.</i></p>

Q&A | ELEMENT A: PLANNING PROCESS | A4

Q: Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))

A: See **Use of Existing Data** below.

Use of Existing Data

The Planning Team gathered and reviewed existing data and plans during plan writing and specifically noted as “sources”. Numerous electronic and hard copy documents were used to support the planning process:

City of Sierra Madre General Plan and Elements

www.cityofsierramadre.com

Applicable Incorporation: Community Profile, City-Specific Hazard Analysis

County of Los Angeles All-Hazards Mitigation Plan (2014)

www.lacoa.org

Applicable Incorporation: Information about hazards in the County contributed to the hazard-specific sections in the City's Mitigation Plan.

California State Hazard Mitigation Plan (2018)

www.caloes.ca.gov

Applicable Incorporation: Used to identify hazards posing greatest hazard to State.

HAZUS Maps and Reports

Created by Emergency Planning Consultants

Applicable Incorporation: Numerous HAZUS results have been included for earthquake scenarios to determine specific risk to City of Sierra Madre.

California Department of Finance

www.dof.ca.gov/

Applicable Incorporation: Community Profile section – demographic and population data



FEMA “How To” Mitigation Series (386-1 to 386-9)

www.fema.gov/media

Applicable Incorporation: Mitigation Measures Categories and 4-Step Planning Process are quoted in the Executive Summary.

National Flood Insurance Program

www.fema.gov/national-flood-insurance-program

Applicable Incorporation: Used to confirm there are no repetitive loss properties within the City

Local Flood Insurance Rate Maps

www.msc.fema.gov

Applicable Incorporation: Provided by FEMA and included in Flood Hazard section.

California Department of Forestry and Fire Protection (CAL FIRE)

www.fire.ca.gov

Applicable Incorporation: Wildland fire hazard mapping

California Department of Conservation

www.conservation.ca.gov/cgs

Applicable Incorporation: Seismic hazards mapping

U.S. Geological Survey (USGS)

www.usgs.gov

Applicable Incorporation: Earthquake records and statistics

Q&A | ELEMENT E: PLAN ADOPTION | E1

Q: Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))

A: See **Plan Adoption Process** below.

Plan Adoption Process

Adoption of the plan by the local governing body demonstrates the City’s commitment to meeting mitigation goals and objectives. Governing body approval legitimizes the plan and authorizes responsible agencies to execute their responsibilities.

The City Council must adopt the Mitigation Plan before the Plan can be approved by FEMA.

In preparation for the public meeting with the City Council, the Planning Team prepared a Staff Report including an overview of the Planning Process, Risk Assessment, Mitigation Goals, and Mitigation Actions. The staff presentation concluded with a summary of the input received during the public review of the document in advance of the City Council meeting. The meeting participants were encouraged to present their views and make suggestions on possible mitigation actions.

The City Council heard the item on September 8, 2020. The City Council voted unanimously to adopt the updated Mitigation Plan. The Resolution of adoption by the City Council is in the **Appendix**.



Plan Approval

FEMA approved the Plan on September 10, 2020. A copy of the FEMA Letter of Approval is in the **Appendix**.



Part II: RISK ASSESSMENT

Community Profile

Geography and the Environment

According to the City of Sierra Madre General Plan (2015), the City is one of 29 cities in the San Gabriel Valley region of Los Angeles County. The City encompasses approximately 3.2 square miles with a population of 10,917 people. It is located approximately 17 miles northeast of downtown Los Angeles at the base of the San Gabriel Mountains, as shown in Figure 1-1, Regional Location. The City is bounded by the cities of Arcadia to the east and south, Pasadena to the west, and the Angeles National Forest to the north.



Climate

According to the U.S. Census Bureau, Sierra Madre has warm, dry summers, and cool, wet winters (Mediterranean climate type). Annual precipitation is just under 18 inches, mostly falling between November and March. In fall months, a Southern California phenomenon called the Santa Ana winds can bring daytime temperatures into the 80's year-round, and keep overnight lows above 60, even in winter. Winter, however, mostly consist of cool, rainy days followed by warm sunny ones. Frosts are not very common, with snow only being recorded 3 times. By May, Pacific storms no longer visit the region. In May and June, hot desert temperatures combined with cool ocean waters bring in low hanging clouds each morning called the Marine Layer. They dissipate by noon. These clouds make June the cloudiest month for Sierra Madre, even though it only receives an average .21" of rain in June. From July through October, hot temperatures grip the region, with September being the hottest month, unlike the rest of the nation. During this period, it rarely rains.

Population and Demographics

The 2010 United States Census reported that Sierra Madre had a population of 10,917. The population density was 3,692.0 people per square mile (1,425.5/km²). The racial makeup of Sierra Madre was 8,967 (82.1%) White (72.3% Non-Hispanic White), 201 (1.8%) African American, 44 (0.4%) Native American, 835 (7.6%) Asian, 9 (0.1%) Pacific Islander, 390 (3.6%) from other races, and 471 (4.3%) from two or more races. Hispanic or Latino of any race were 1,628 persons (14.9%).

The Census reported that 10,916 people (100% of the population) lived in households, 1 (0%) lived in non-institutionalized group quarters, and 0 (0%) were institutionalized.

There were 4,837 households, out of which 1,205 (24.9%) had children under the age of 18 living in them, 2,291 (47.4%) were opposite sex married couples living together, 442 (9.1%) had a



female householder with no husband present, 139 (2.9%) had a male householder with no wife present. There were 217 (4.5%) unmarried opposite-sex partnerships, and 54 (1.1%) same-sex married couples or partnerships. 1,596 households (33.0%) were made up of individuals and 588 (12.2%) had someone living alone who was 65 years of age or older. The average household size was 2.26. There were 2,872 families (59.4% of all households); the average family size was 2.89.

The population was spread out with 2,095 people (19.2%) under the age of 18, 539 people (4.9%) aged 18 to 24, 2,524 people (23.1%) aged 25 to 44, 3,864 people (35.4%) aged 45 to 64, and 1,895 people (17.4%) who were 65 years of age or older. The median age was 46.6 years. For every 100 females, there were 89.8 males. For every 100 females age 18 and over, there were 86.3 males.

There were 5,113 housing units at an average density of 1,729.1 per square mile (667.6/km²), of which 2,988 (61.8%) were owner-occupied, and 1,849 (38.2%) were occupied by renters. The homeowner vacancy rate was 1.0%; the rental vacancy rate was 5.0%. 7,390 people (67.7% of the population) lived in owner-occupied housing units and 3,526 people (32.3%) lived in rental housing units.

During 2009–2013, Sierra Madre had a median household income of \$88,837, with 8.3% of the population living below the federal poverty line.

According to the American Community Survey (2017), the demographic makeup of the City is as follows:

Table: City of Sierra Madre Demographics
(Source: American Community Survey 2017)

Racial/Ethnic Group	2010	2016	Change	Change %
White	8,967	8,843	(124)	-1%
Black	201	152	(49)	-24%
American Indian or Alaska Native	44	33	(11)	-25%
Asian or Pacific Islander	844	1,230	386	46%
Other	390	253	(137)	-35%
Total	10,917	11,061	144	1%
Hispanic	1,628	1,797	169	10%



Housing and Community Development

Table: City of Sierra Madre - Housing
(Source: American Community Survey 2017)

2017	Number	Percent %
Housing Type:		
1-unit, detached	3,220	66.5%
1-unit, attached	281	5.8%
2-4 Units	434	9.0%
5+ Units	906	18.7%
Mobile homes/Other	0	0.0%
Housing Statistics:		
Total Occupied Housing Units	4,441	100%
Owner-Occupied Housing	2,683	60.4%
Renter-Occupied	1,758	39.6 %
Average Household Size:	2.42 persons	
Median Home Price:	\$889,300	

Employment and Industry

According to the City of Sierra Madre General Plan 2015, the most recent data states that approximately 1,973 persons were employed in the City of Sierra Madre in 2013, compared to 3,520 in 2007. Services employment was the largest employment sector in the City, comprising 77 percent of all employment in Sierra Madre. Retail/wholesale (7 percent), manufacturing (3 percent), and government jobs (4 percent) comprised a total of 14 percent of City employment. Construction and other jobs contributed the remaining 9 percent of City employment. (Southern California Association of Governments, 2015 Local Profile of the City of Sierra Madre Report May 2015).



Table: City of Sierra Madre - Industry
(Source: American Community Survey, 2017)

Industry	2017	
	Number	Percent %
Total	5,544	100%
Agriculture, forestry, fishing and hunting, and mining	5	0.1%
Construction	228	4.1%
Manufacturing	307	5.5%
Wholesale Trade	147	2.7%
Retail Trade	410	7.4%
Transportation and Warehousing, and Utilities	259	4.7%
Information	274	4.9%
Finance and insurance, and real estate and rental and leasing	633	11.4%
Professional, scientific, and management, and administrative and waste management services	895	16.1%
Educational services, and health care and social assistance	1,524	27.5%
Arts, entertainment, and recreation, and accommodation and food services	431	7.8%
Other services, except public administration	238	4.3%
Public administration	193	3.5%



Table: City of Sierra Madre - Occupation
(Source: American Community Survey, 2017)

Occupation	2017	
	Number	Percent
Civilian employed population (16 years and over)	5,544	65.6%
Management, business, science, and arts occupations	3,277	59.1%
Service occupations	447	8.1%
Sales and office occupations	1,376	24.8%
Natural resources, construction, and maintenance occupations	251	4.5%
Production, transportation, and material moving	193	3.5%

Transportation and Commuting Patterns

According to the Circulation Element of Sierra Madre General Plan (2015), the San Gabriel Valley features a grid-patterned freeway system connecting all of the cities to the rest of southern California, as shown in the Regional Circulation System. The east-west freeways, listed from north to south, are Interstate 210 (I-210), I-10, and State Route 60 (SR-60). The north-south freeways, listed from west to east, are SR-110, I-605, and SR-57. Given this evenly distributed pattern of coverage, freeway accessibility is high for most communities in the valley. For the City of Sierra Madre, the main connecting link to this system is I-210.



I-210 is an east-west travelling freeway servicing the San Gabriel Valley. The western terminus lies at the interchange with I-5 in the San Fernando Valley, and the eastern terminus lies in San Bernardino County at the interchange with I-10. This freeway is a major regional route connecting the foothill communities to the coast and Inland Empire. The roadway features 6-8 lanes including High Occupancy Vehicle (HOV) lanes and has a posted speed limit of 65 miles per hour (mph) throughout the valley. I-210 runs through the City of Arcadia, one half-mile to the south of the Sierra Madre border, providing access primarily via interchanges at Santa Anita Avenue, Baldwin Avenue, and Michillinda Avenue, all of which enter the City at some point in their alignment. I-210 is the gateway connector to the regional freeway network for the residents of Sierra Madre and is therefore of key importance to the City.

Several rail systems operate within the San Gabriel Valley, ranging from light rail to freight rail. Los Angeles Metropolitan Transit Authority (Metro) operates the Gold Line light rail train connecting the northern valley to Downtown Los Angeles. The Metrolink commuter rail system is jointly operated by several regional transit agencies across four counties, and services both the northern and southern valley regions through two lines that connect to Downtown Los Angeles to the west, and the Inland Empire to the east. Amtrak operates interregional trains throughout



southern California, with a single station in the southern valley at the City of Pomona. For the City of Sierra Madre, the connecting link to this system would be the Metro Gold Line.

There are no regional transportation facilities located within the City boundaries of Sierra Madre. The City is served by Interstate 210 Foothill Freeway located approximately one-half mile south of the City. This is controlled by the State of California Department of Transportation. The Los Angeles County Metropolitan Transportation Authority (Metro) maintains two bus lines in town as well as nearby light rail service (the Sierra Madre Villa Gold Line Station is approximately two miles from the center of town and the Arcadia Gold Line Station, completed in 2015, is approximately 2.6 miles from downtown Sierra Madre.)). Major streets which are operated by the City include Michillinda Avenue, Santa Anita Avenue, Grandview Avenue, Sierra Madre Boulevard, and Orange Grove Avenue. The circulation system in the City of Sierra Madre includes a network of surface streets which serve two distinct and equally important functions: access to adjacent properties, and movement of persons and goods into and out of the City. The design and operation of each street depends upon the importance placed on each of these functions. A classification system is used to identify the function of each street in the City. This system is important because it provides a logical framework for the design and operation of the street system. The functional classification system allows the residents and elected officials to identify preferred characteristics of each street.

According to Sierra Madre General Plan (2015), there are currently two forms of transit in operation within the City: fixed-route transit and paratransit. Within the City, there are two entities



operating transit routes: Los Angeles County Metropolitan Transit Authority (Metro) and the City of Sierra Madre. This includes Metro Line 487, Metro Line 268, and City of Sierra Madre Gateway Coach. The paratransit operation the City provides full demand-responsive transportation service through the Dial-A-Ride program. Dial-A-Ride provide same day, curb-to-curb transit to anyone who is a city resident, and is either 62 years of age or older, or disabled in a manner that makes use of regular transit unduly difficult. Any qualifying users must submit an application to the City before using the service. The service will typically not travel to

destinations more than two miles outside of City limits. The relatively small size of the City makes this type of paratransit possible. The Dial-A-Ride service operates Monday through Friday during the day.



Map: Roadway Classifications

(Source: City of Sierra Madre General Plan, Technical Background Report, Circulation Element, 2015)





Risk Assessment

What is a Risk Assessment?

Conducting a risk assessment can provide information regarding: the location of hazards; the value of existing land and property in hazard locations; and an analysis of risk to life, property, and the environment that may result from natural hazard events. Specifically, the five levels of a risk assessment are as follows:

1. *Hazard Identification*
2. *Profiling Hazard Events*
3. *Vulnerability Assessment/Inventory of Existing Assets*
4. *Risk Analysis*
5. *Assessing Vulnerability/Analyzing Development Trends*

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

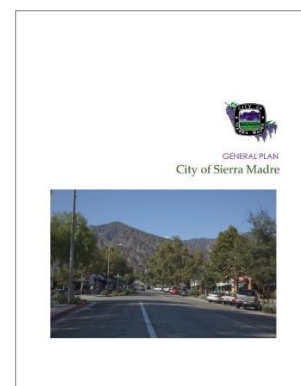
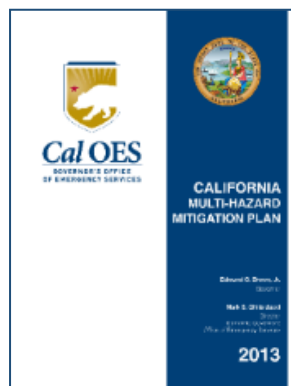
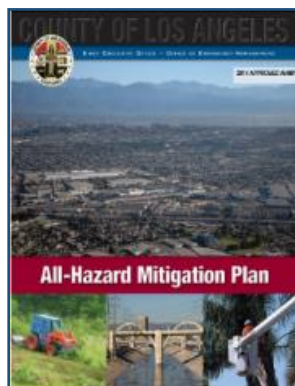
Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Hazard Identification** below.

1) Hazard Identification

This section is the description of the geographic extent, potential intensity, and the probability of occurrence of a given hazard. Maps are used in this plan to display hazard identification data. ***The City of Sierra Madre utilized the categorization of hazards as identified in California's State Hazard Mitigation Plan, including: Earthquakes, Floods, Levee Failures, Wildfires, Landslides and Earth Movements, Tsunami, Climate-related hazards, Volcanoes, and Other Hazards (including Drought).***

Next, the Planning Team reviewed existing documents to determine which of these hazards posed the most significant threat to the City. In other words, which hazard would likely result in a local declaration of emergency.





The geographic extent of each of the identified hazards was identified by the Planning Team utilizing maps and data contained in the City's General. In addition, numerous internet resources and the County of Los Angeles All-Hazards Mitigation Plan served as valuable resources. Utilizing the Calculated Priority Risk Index (CPRI) ranking technique, the Planning Team concluded the following hazards posed a significant threat against the City:

Earthquake | Wildfire | Landslide | Flood | Windstorm | Utility

The hazard ranking system is described in **Table: Calculated Priority Risk Index**, while the actual ranking is shown in **Table: Calculated Priority Risk Index Ranking for City of Sierra Madre**.



Table: Calculated Priority Risk Index
(Source: Federal Emergency Management Agency)

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 1 in 1,000 years.	1	45%
	Possibly	Rare occurrences. Annual probability of between 1 in 100 years and 1 in 1,000 years.	2	
	Likely	Occasional occurrences with at least 2 or more documented historic events. Annual probability of between 1 in 10 years and 1 in 100 years.	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability of greater than 1 every year.	4	
Magnitude / Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths. Negligible loss of quality of life. Shut down of critical public facilities for less than 24 hours.	1	30%
	Limited	Slight property damage (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). Injuries or illnesses do not result in permanent disability, and there are no deaths. Moderate loss of quality of life. Shut down of critical public facilities for more than 1 day and less than 1 week.	2	
	Critical	Moderate property damage (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and at least 1 death. Shut down of critical public facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	Severe property damage (greater than 50% of critical and non-critical facilities and infrastructure). Injuries and illnesses result in permanent disability and multiple deaths. Shut down of critical public facilities for more than 1 month.	4	
Warning Time	> 24 hours	Population will receive greater than 24 hours of warning.	1	15%
	12–24 hours	Population will receive between 12-24 hours of warning.	2	
	6-12 hours	Population will receive between 6-12 hours of warning.	3	
	< 6 hours	Population will receive less than 6 hours of warning.	4	
Duration	< 6 hours	Disaster event will last less than 6 hours	1	10%
	< 24 hours	Disaster event will last less than 6-24 hours	2	
	< 1 week	Disaster event will last between 24 hours and 1 week.	3	
	> 1 week	Disaster event will last more than 1 week	4	



Table: Calculated Priority Risk Index Ranking for City of Sierra Madre

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Total
Earthquake – San Andreas M7.8	3	1.35	3	0.9	4	0.6	1	0.1	2.95
Windstorm	4	1.8	2	0.6	2	0.3	1	0.1	2.80
Wildfire	3	1.35	2	0.6	3	0.45	2	0.2	2.60
Earthquake – Sierra Madre M7.2	2	0.9	3	0.9	4	0.6	1	0.1	2.50
Earthquake – Raymond M6.8	2	0.9	3	0.9	4	0.6	1	0.1	2.50
Earthquake – Clamshell-Sawpit M6.7	2	0.9	2	0.6	4	0.6	1	0.1	2.20
Landslide	2	0.9	2	0.6	4	0.6	1	0.1	2.20
Flood	2	0.9	2	0.6	2	0.3	2	0.2	2.00
Utility	2	0.9	2	0.6	2	0.3	2	0.2	2.00

2) Profiling Hazard Events

This process describes the causes and characteristics of each hazard and what part of the City's facilities, infrastructure, and environment may be vulnerable to each specific hazard. A profile of each hazard discussed in this plan is provided in the City-Specific Hazard Analysis. **Table: Vulnerability: Location, Extent, and Probability for City of Sierra Madre** indicates a generalized perspective of the community's vulnerability of the various hazards according to extent (or degree), location, and probability.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1b.

Q: Does the plan provide rationale for the omission of any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Sierra Madre** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1c.

Q: Does the plan include a description of the **location** for all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Sierra Madre** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1d.

Q: Does the plan include a description of the **extent** for all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Sierra Madre** below.



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Sierra Madre** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2b.

Q: Does the plan include information on the **probability** of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Sierra Madre** below.

Table: Vulnerability: Location, Extent, and Probability for City of Sierra Madre

Hazard	Location (Where)	Extent (How Big an Event)	Probability (Frequency of an Event of Disaster Proportions) *	Most Recent Occurrence
Earthquake	Entire Project Area	The Southern California Earthquake Center (SCEC) in 2007 concluded that there is a 99.7 % probability that an earthquake of M6.7 or greater will hit California within 30 years. ¹	Likely	1991 - Sierra Madre M5.8
Wildfire	From Highland Avenue North	Moderate, High and Very High Fire Hazard Zones	Likely	April and May 2008, over 500 acres burned
Landslide	Northwest, North, and Northeastern areas	Earthquake-induced and rain-induced landslide events could impact dozens of structures.	Possible	2008-2009 Burn area above Sierra Madre and Arcadia
Flood	Eastern, Northwest, North, and Northeastern portions of the project area	Urban flooding from severe weather.	Possible	2008-2009 Burn area above Sierra Madre and Arcadia; 1994 – Baily Canyon Flash Flood and Mudslide
Windstorm	Entire Project Area	50 miles per hour or greater.	Likely	December 2011 – Structure damage and power outages
Utility	Entire Project Area	Broad range of extent based on the scope and scale of the utility event.	Possible	December 2011 – Structure damage and power outages

* Probability is defined as: Unlikely = 1:1,000 years, Possibly = 1:100-1:1,000 years, Likely = 1:10-1:100 years, Highly Likely = 1:1 year

¹ Uniform California Earthquake Rupture Forecast



3) Vulnerability Assessment/Inventory of Existing Assets

A Vulnerability Assessment in its simplest form is a simultaneous look at the geographical location of hazards and an inventory of the underlying land uses (populations, structures, etc.). Facilities that provide critical and essential services following a major emergency are of particular concern because these locations house staff and equipment necessary to provide important public safety, emergency response, and/or disaster recovery functions.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Critical Facilities** below.

Critical Facilities

FEMA separates critical buildings and facilities into the five categories shown below based on their loss potential. All of the following elements are considered critical facilities:

Essential Facilities are essential to the health and welfare of the whole population and are especially important following hazard events. Essential facilities include hospitals and other medical facilities, police and fire stations, emergency operations centers and evacuation shelters, and schools.

Transportation Systems include airways – airports, heliports; highways – bridges, tunnels, roadbeds, overpasses, transfer centers; railways – trackage, tunnels, bridges, rail yards, depots; and waterways – canals, locks, seaports, ferries, harbors, drydocks, piers.

Lifeline Utility Systems such as potable water, wastewater, oil, natural gas, electric power and communication systems.

High Potential Loss Facilities are facilities that would have a high loss associated with them, such as nuclear power plants, dams, and military installations.

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



Table: Impacts to Critical Facilities illustrates the hazards with potential to impact critical facilities owned by or providing services to the City of Sierra Madre.

Table: Impacts to Critical Facilities

Name of Facility	Earthquake	Wildfire	Landslide	Flood	Windstorm	Utility
Alverno Heights Academy School 200 N. Michillinda Avenue	X	X		X	X	X
Bethany Christian School 93 N. Baldwin Avenue	X	X		X	X	X
Grove Reservoirs (address protected)	X	X				
Mira Monte Reservoirs (address protected)	X	X				
MWD Water Connection (address protected)	X	X				X
Sierra Madre City Hall (includes EOC) 232 W. Sierra Madre Blvd.	X	X	X	X	X	X
Sierra Madre Community Nursery School 701 E. Sierra Madre Boulevard	X	X		X	X	X
Sierra Madre Community Recreation Center 611 E. Sierra Madre Blvd.	X	X	X	X	X	X
Sierra Madre Dam (address protected)	X		X	X		X
Sierra Madre Elementary School 141 W. Highland Avenue	X	X		X	X	X
Sierra Madre Middle School 160 N. Canon Avenue	X	X		X	X	X
Sierra Madre Fire Department 242 W. Sierra Madre Blvd.	X	X	X	X	X	X
Sierra Madre Maintenance Yards (Utility Department) 621 E. Sierra Madre Blvd.	X	X	X	X	X	X
Sierra Madre Police Department 242 W. Sierra Madre Blvd.	X	X	X	X	X	X
Sierra Madre Public Library 440 W. Sierra Madre Blvd.	X	X	X	X	X	X
Sierra Madre Hart Park House Senior Center and Memorial Park 222 W. Sierra Madre Blvd.	X				X	X
Sierra Madre Search & Rescue Facility (address protected)	X		X	X		



Name of Facility	Earthquake	Wildfire	Landslide	Flood	Windstorm	Utility
Sierra Vista Apartments 70 Esperanza Avenue	X	X		X	X	X
Sierra Vista Park 611 E. Sierra Madre Blvd.	X	X	X	X	X	X
Southern California Edison Sierra Madre Substation (address protected)	X				X	X
St. Ritas School 322 N. Baldwin Avenue	X	X		X	X	X
Telecom Sierra Madre Substation (address protected)	X				X	X
The British Home in California 647 Manzanita Avenue	X	X		X	X	X
The Gooden School 192 N. Baldwin Avenue	X	X		X	X	X
The Kensington Sierra Madre 245 W. Sierra Madre Boulevard	X	X		X	X	X

4) Risk Analysis

Estimating potential losses involves assessing the damage, injuries, and financial costs likely to be sustained in a geographic area over a given period of time. This level of analysis involves using mathematical models. The two measurable components of risk analysis are magnitude of the harm that may result and the likelihood of the harm occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework in which to measure the effects of hazards on assets. For each hazard where data was available, quantitative estimates for potential losses have been included in the hazard assessment. Data was not available to make vulnerability determinations in terms of dollar losses for all of the identified hazards. The **Mitigation Actions Matrix** includes an action item to conduct such an assessment in the future.

5) Assessing Vulnerability/ Analyzing Development Trends

This step provides a general description of City facilities and contents in relation to the identified hazards so that mitigation options can be considered in land use planning and future land use decisions. This Mitigation Plan provides comprehensive description of the character of the City of Sierra Madre in the **Community Profile Section**. This description includes the geography and environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns. Analyzing these components of the City of Sierra Madre can help in identifying potential problem areas and can serve as a guide for incorporating the goals and ideas contained in this mitigation plan into other community development plans.



Hazard assessments are subject to the availability of hazard-specific data. Gathering data for a hazard assessment requires a commitment of resources on the part of participating organizations and agencies. Each hazard-specific section of the plan includes a section on hazard identification using data and information from City, County, state, or federal sources.

Regardless of the data available for hazard assessments, there are numerous strategies the City can take to reduce risk. These strategies are described in the action items detailed in the Mitigation Actions Matrix in the **Mitigation Strategies Section**. Mitigation strategies can further reduce disruption to critical services, reduce the risk to human life, and alleviate damage to personal and public property and infrastructure.

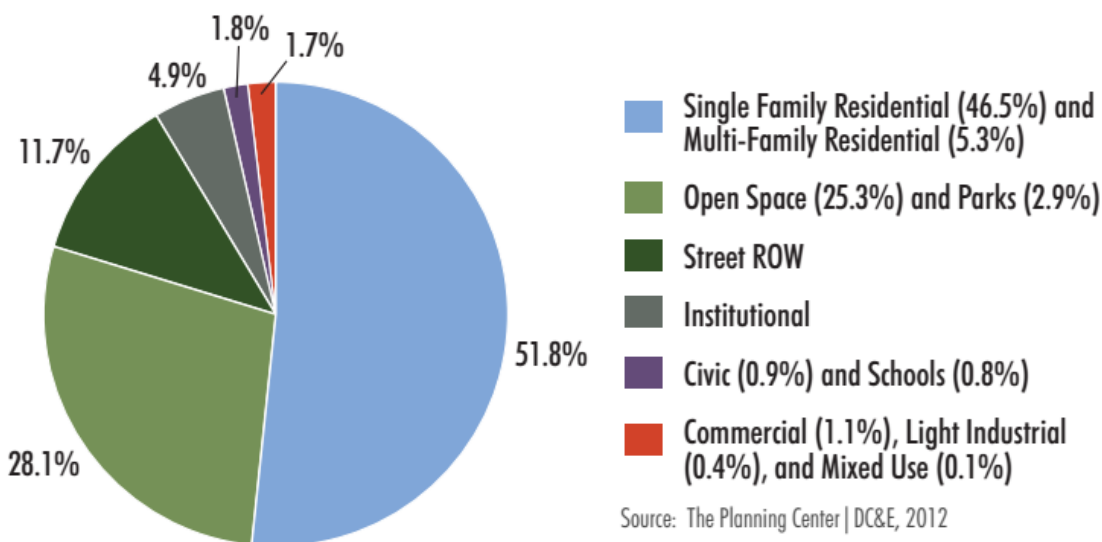
Land and Development

The City of Sierra Madre General Plan provides the framework for the growth and development of the City. This Plan is one of the City's most important tools in addressing environmental challenges including transportation and air quality; growth management; conservation of natural resources; clean water and open spaces.

According to the City's General Plan (2015), the City is designated into four major land use categories: (1) residential, (2) institutions, (3) commercial, and (4) manufacturing. Many residential neighborhoods in Sierra Madre are fully developed and not expected to experience any significant new development or "recycling" (e.g. where an existing structure is removed and a new structure is built in its place).

Table: Existing Land Use in the City of Sierra Madre

(Source: City of Sierra Madre General Plan, Land Use and the Built Environment Element, 2015)





Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impacts to Types of Land Uses** below.

Impacts to Types of Land Uses

According to the City of Sierra Madre General Plan (2015), the chart below identifies existing land uses in the City. Residential uses occupy nearly 52 percent of the total land area in the City boundaries, as illustrated in the existing land use distribution chart below. Other land uses include commercial, light industrial, mixed use, institutional, civic uses, public schools, and parks. Open space is the most prominent nonresidential land use and occupies 28 percent of the City's land.

Table: Impacts to Existing and Future Land Uses in the City of Sierra Madre
(Source: EPC Analysis Based on City of Sierra Madre General Plan, 2015)

Category of Land Use Designation	Earthquake	Wildfire	Landslide	Flood	Windstorm	Utility
Single Family Residential	X	X	X	X	X	X
Multi-Family Residential	X	X	X	X	X	X
Mixed Use Residential and Commercial	X	X	X	X	X	X
Commercial	X	X			X	X
Light Industrial	X	X			X	X
Institutional	X	X		X	X	X
Public Facilities and Civic Facilities	X	X	X	X	X	X
Public School	X	X			X	X
Public Park	X	X	X	X	X	X
Open Space	X	X	X	X	X	X



Q&A | ELEMENT D: MITIGATION STRATEGY | D1

Q: Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))

A: See **Changes in Development** below

Changes in Development

Physical Development

Since the adoption of the 2008 Hazard Mitigation Plan, the infrastructure for a 29 lot subdivision (Stonegate) has been developed with applications for custom homes in various phases of planning entitlements. This subdivision is located within the identified hazard prone areas that include potential earthquake, wildfire, landslide, windstorm and utility hazards.

Policy Improvements

Since the adoption of the 2008 Hazard Mitigation Plan, the City as adopted and codified new development standards and zoning requirements that impose regulations for development within the High Fire Hazard Severity Zones. Regulations restrict use of combustible building materials, requiring heavy timber construction techniques, fire resistant exterior cladding, i.e. fiber cement board exterior siding, and restrictions on highly flammable plant materials.

Also, the following residential zoning standards have been updated and are inclusive of the above restrictions:

R-C Residential Canyon Zone – Codified March 22, 2011

HMZ – Hillside Management Zone – June 23, 2009

R-1 Single Family Residential Zone – July 11, 2017



Earthquake Hazards

Previous Occurrences of Earthquakes in the City of Sierra Madre

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Earthquakes in the City of Sierra Madre** below.

According to the City of Sierra Madre General Plan (2015), the most significant earthquake in the City of Sierra Madre was the Sierra Madre Earthquake. At 7:43 a.m. on June 28, 1991 this 5.8 earthquake struck. The epicenter (Sierra Madre fault) was 7.5 miles northeast of Sierra Madre and damage totaled \$12.5 million. There were 18 personal injuries, but no injuries to hikers; 403 structures damaged; 2 businesses uninhabitable; 22 homes condemned (many in west Sierra Madre Sunnyside and Lima Streets), and 3 religious institutions remained unoccupied; other problems included 36 toppled chimneys; 2 damaged church bell towers, 17 natural gas leaks, 6 water leaks, 4 hazardous materials leaks. The fire department received 150 calls. Sierra Madre School served as an emergency shelter. Other nearby communities that were affected were the cities of Arcadia, Azusa, Irwindale, Monrovia, Pasadena and Rosemead. This was the most recent major rupture of the Sierra Madre fault.

Previous Occurrences of Earthquakes in Los Angeles County

Southern California has a history of powerful and relatively frequent earthquakes, dating back to the powerful magnitude 8.0+ 1857 San Andreas Earthquake which did substantial damage to the relatively few buildings that existed at the time.

Paleoseismological research indicates that large magnitude (M8.0+) earthquakes occur on the San Andreas Fault at intervals between 45 and 332 years with an average interval of 140 years. Other lesser faults have also caused very damaging earthquakes since 1857. Notable earthquakes include the 1933 Long Beach Earthquake, the 1971 San Fernando Earthquake, the 1987 Whittier Earthquake and the 1994 Northridge Earthquake.

Scientists have stated that such devastating shaking should be considered the norm near any large thrust earthquake. Recent reports from scientists of the U.S. Geological Survey and the Southern California Earthquake Center say that the Los Angeles Area could expect one earthquake every year of magnitude 5.0 or more for the foreseeable future.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

According to the City's General Plan 2015, Southern California has many earthquakes because it straddles the boundary between the North American and Pacific plates, and fault rupture often results from their motion. Along most of California, the Pacific plate is moving northwesterly (relative to the North American plate) at approximately 50 millimeters/year. Therefore, the faults associated with the plate movement have a northwest trend and are characterized as strike-slip faults. On average, strike-slip faults are near vertical breaks in the rock. When a strike-slip fault ruptures, the rocks on either side of the fault slide horizontally past each other. The State of California, under the guidelines of the Alquist-Priolo Earthquake Fault Zoning Act, classifies faults according to the following criteria:

- Active. Faults showing proven displacement of the ground surface within about the last 11,000 years (Holocene age) that are thought capable of producing earthquakes.
- Potentially Active. Faults showing evidence of movement within the last 1.6 million years, but that have not been shown conclusively whether or not they have moved in the last 11,000 years.
- Not Active. Faults that have conclusively not moved in the last 11,000 years.

No areas of the City are within an Alquist-Priolo Earthquake Fault Zone. However, there are many active and potentially active faults within or in the vicinity of the City, including the Sierra Madre Fault, Clamshell-Sawpit Fault, and Raymond Fault.

Earthquakes that could affect the City would most likely originate from the San Andreas (M7.8), Sierra Madre (M7.2), Raymond (M6.8), and Clamshell-Sawpit (M6.7) Faults. These faults are close enough in proximity or expected to generate strong enough shaking that could significantly affect the City.

Another active fault in proximity to the City is the Raymond Fault located approximately 1.5 miles to the south. The Raymond Fault is designated by the California Geologic Survey as an Alquist-Priolo Special Study Fault Zone.

Although the Sierra Madre, Clamshell-Sawpit and Raymond Faults are the primary faults that pose a hazard to the City, earthquakes occurring on other regional faults could also cause considerable damage. Other notable faults in the region include the San Andreas, Newport-Inglewood, Palos Verdes, Whittier and Malibu Coast Faults, all of which are considered to be active. An earthquake along any of these faults would represent a hazard in the region, potentially causing many deaths and injuries, along with extensive property damage.

Earthquakes are caused by the violent and abrupt release of strain built up along faults. When a fault ruptures, energy spreads in the form of seismic waves. Hazards associated with seismic waves include ground rupture, ground shaking, land sliding, flooding, liquefaction, tsunamis, and



seiches. The potential seismically induced hazards that Sierra Madre may face include ground rupture and shaking, landslides, and liquefaction.

San Andreas Fault Zone

This fault zone extends from the Gulf of California northward to the Cape Mendocino area where it continues northward along the ocean floor. The total length of the San Andreas Fault Zone is approximately 750 miles. The activity of the fault has been recorded during historic events, including the 1906 (M8.0) event in San Francisco and the 1857 (M7.9) event between Cholame and San Bernardino, where at least 250 miles of surface rupture occurred. These seismic events are among the most significant earthquakes in California history. Geologic evidence suggests that the San Andreas Fault has a 50 percent chance of producing a magnitude 7.5 to 8.5 quake (comparable to the great San Francisco earthquake of 1906) within the next 30 years.

Sierra Madre Fault Zone

The Sierra Madre Fault Zone passes through the northern part of the City at the base of the San Gabriel Mountains in a west-northwesterly direction. This fault zone is a series of moderate angle, north-dipping, reverse faults (thrust faults). Movement along these frontal faults has resulted in the uplift of the San Gabriel Mountains. According to the Southern California Earthquake Data Center, rupture on the Sierra Madre fault zone (theoretically) could be limited to one segment at a time, it has recently been suggested that a large event on the San Andreas fault to the north (like that of 1857) could cause simultaneous rupture on reverse faults south of the San Gabriel Mountains – the Sierra Madre fault zone being a prime example of such. Whether this could rupture multiple Sierra Madre fault zone segments simultaneously is unknown. Seismic activity on the Sierra Madre Fault is expected to have a maximum magnitude of 7.2.

According to the City's General Plan (2015), the Sierra Madre Fault Zone is the principal seismic hazard due not only to its potential for ground rupture, but also potential for seismic shaking. The consequences of strong seismic shaking are of greater significance over a far wider area than is ground rupture by active faulting. The Sierra Madre Fault Zone is the principal seismic hazard due not only to its potential for ground rupture, but also potential for seismic shaking. The consequences of strong seismic shaking are of greater significance over a far wider area than is ground rupture by active faulting.

Raymond Fault Zone

The Raymond Fault Zone is located approximately 1.5 miles south of Sierra Madre. It is designated as an Alquist-Priolo Special Study Fault Zone by the California Geologic Survey. This fault dips at about 75 degrees to the north. There is evidence that at least eight surface-rupturing events have occurred along this fault in the last 36,000 years.

According to the Southern California Earthquake Data Center, the exact nature of the slip along the Raymond fault has been a subject of debate for quite some time. The fault produces a very obvious south-facing scarp along much of its length, and this has made many favor reverse-slip as the predominant sense of fault motion. However, there are also places along this scarp where left-lateral stream offsets of several hundred meters can be seen. If the Raymond fault is indeed primarily a left-lateral fault, it could be responsible for transferring slip southward from the Sierra Madre fault zone to other fault systems.



Clamshell-Sawpit Fault Zone

The Clamshell-Sawpit Fault, located approximately 1.5 miles east of Sierra Madre is an off-shoot branch of the Sierra Madre Fault and is considered a potentially active fault.

Map: Local Faults

(Source: City of Sierra Madre General Plan, 2015)





Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Earthquakes in the City of Sierra Madre** below.

Impact of Earthquakes in the City of Sierra Madre

Based on the risk assessment, it is evident that earthquakes will continue to have potentially devastating economic impacts to certain areas of the City. Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life;
- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Secondary health hazards e.g. mold and mildew;
- ✓ Damage to roads/bridges resulting in loss of mobility;
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community;
- ✓ Negative impact on commercial and residential property values; and
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.

Earthquake-Induced Landslides

Earthquake-induced landslides are secondary earthquake hazards that occur from ground shaking. They can destroy the roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake. Many communities in Southern California have a high likelihood of encountering such risks, especially in areas with steep slopes. Seismically induced landslides have the potential to occur in the foothill region north of Sierra Madre.

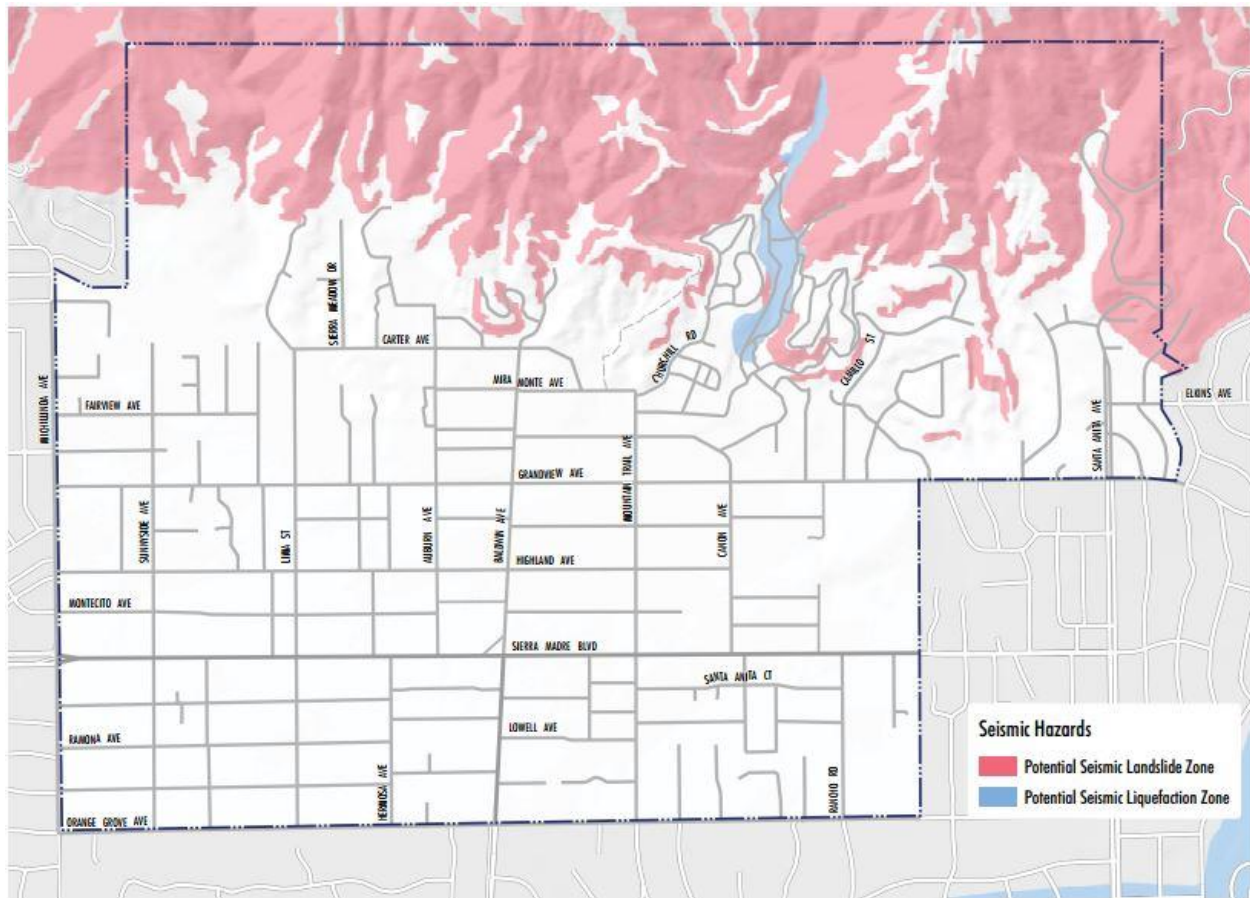
Liquefaction

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other events. Liquefaction occurs in saturated soils, which are soils in which the space between individual soil particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. Because liquefaction only occurs in saturated soil, its effects are most commonly observed in low lying areas. Typically, liquefaction is associated with shallow groundwater, which is less than 50 feet beneath the earth's surface.

According to the Sierra Madre General Plan (2015), there is one area of the City vulnerable to liquefaction (see map below). Of these hazards, ground shaking presents the most significant risk in terms of potential structural damage and loss of life. Intensity of ground shaking and the resultant damages are determined by the magnitude of the earthquake, the distance from the epicenter, and characteristics of surface geology. Since seismologists started recording and measuring earthquakes, there have been tens of thousands of recorded earthquakes in southern California, most with a magnitude below three.



Map: Liquefaction and Earthquake-Induced Landslide Areas
(Source: Sierra Madre General Plan, 2015)



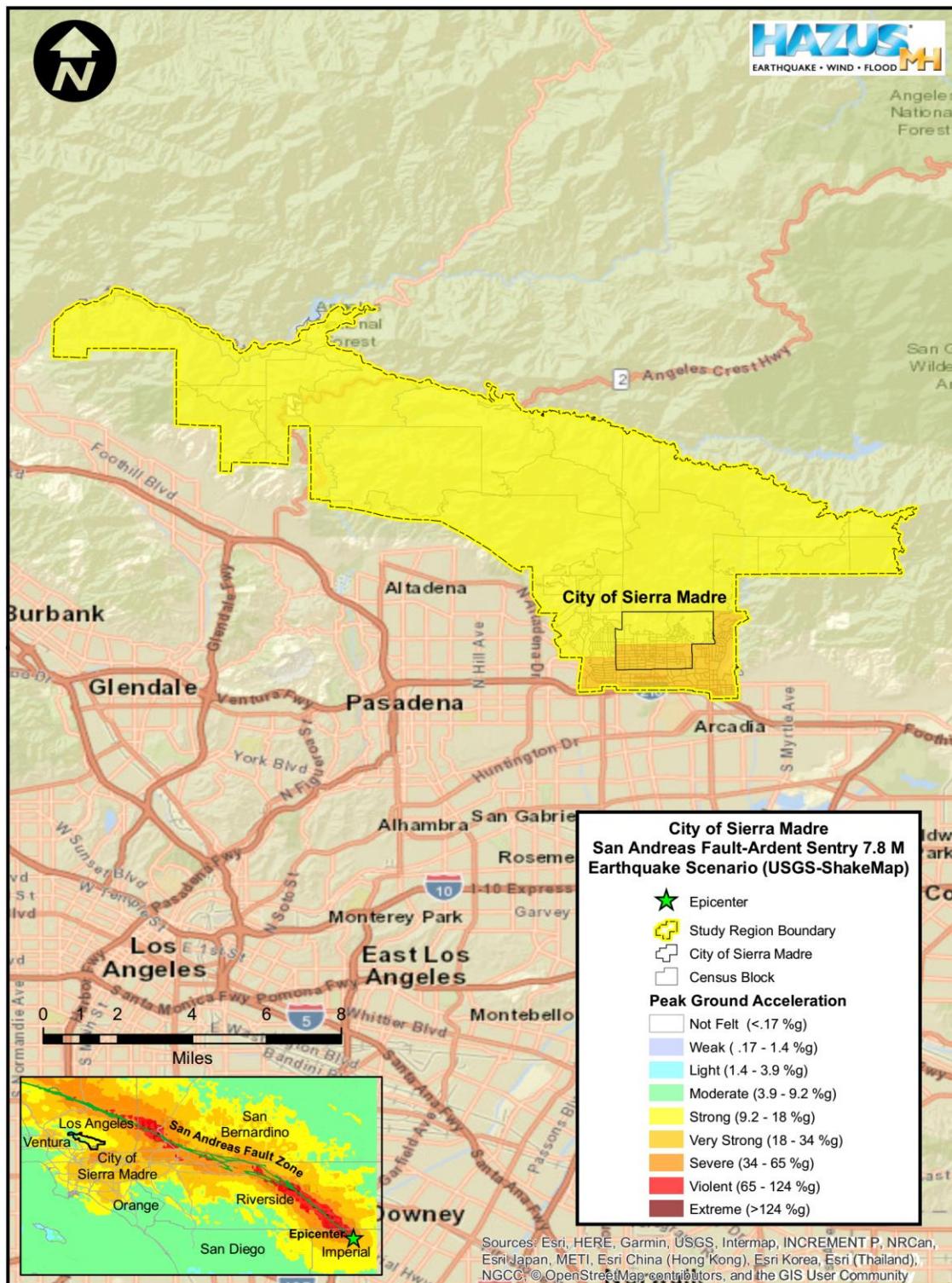


HAZUS-MH

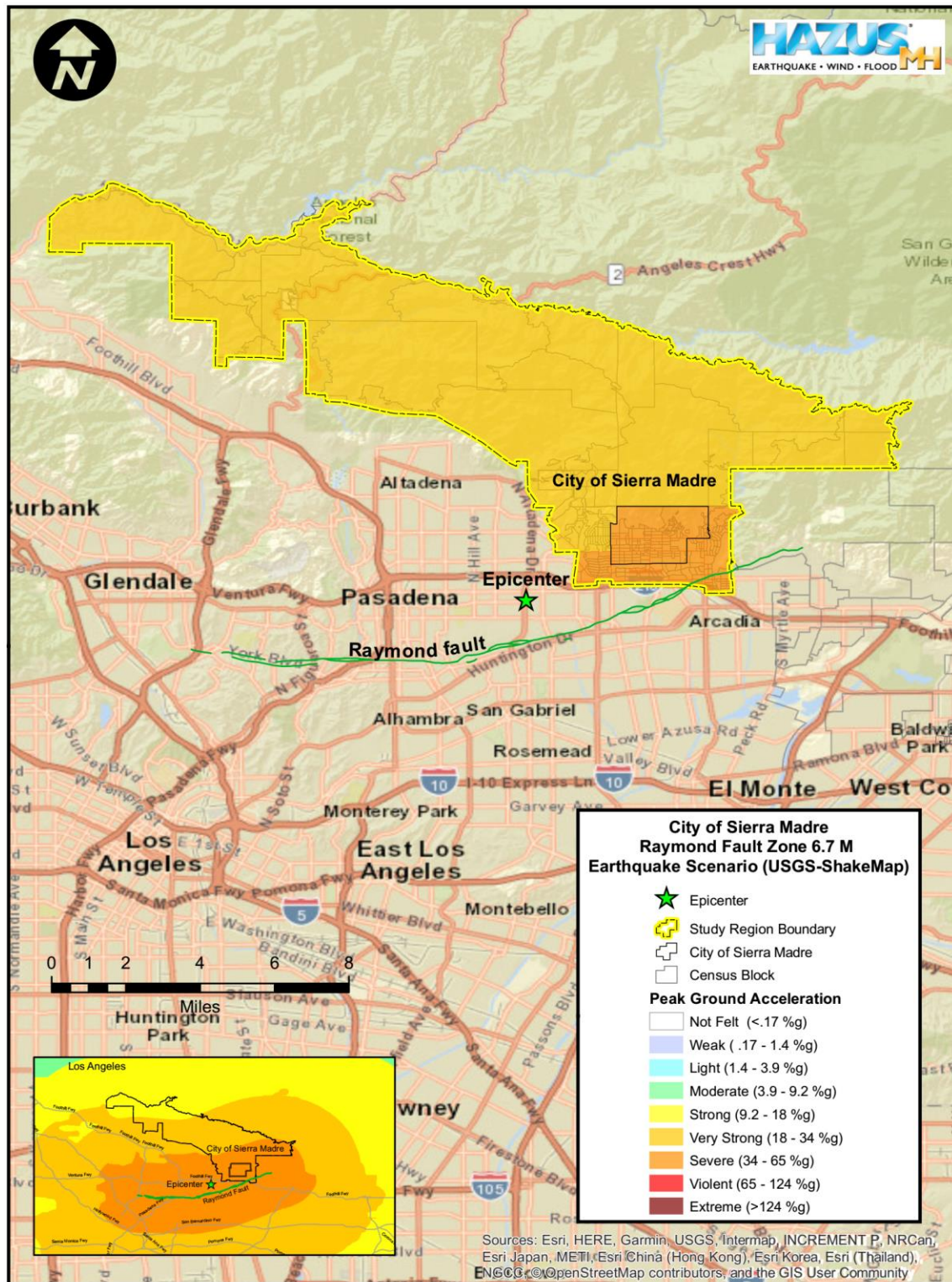
The maps in this section were generated using FEMA's loss projection software "Hazards United States – Multi Hazard" (HAZUS-MH) program for earthquakes. Once the location and size of a hypothetical earthquake are identified, HAZUS-MH estimates the intensity of the ground shaking, the number of buildings damaged, the number of casualties, the amount of damage to transportation systems and utilities, the number of people displaced from their homes, and the estimated cost of repair and clean up. The supporting HAZUS reports are located in the Attachments.



Map: HAZUS San Andreas Fault
(Source: Emergency Planning Consultants)

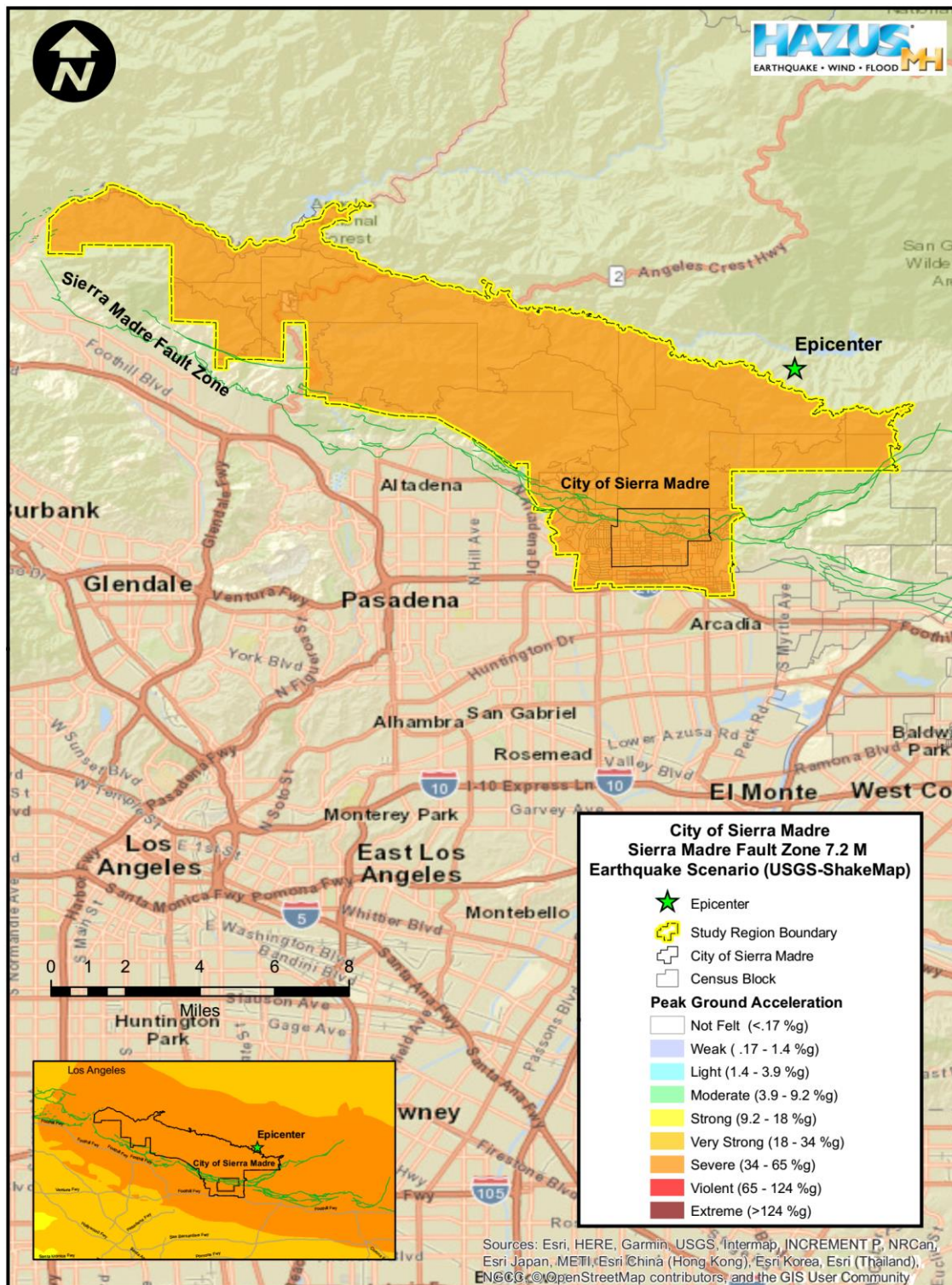


Map: HAZUS Raymond Fault
(Source: Emergency Planning Consultants)





Map: HAZUS Sierra Madre Fault
(Source: Emergency Planning Consultants)





Structures and Building Code

The built environment is susceptible to damage from earthquakes. Buildings that collapse can trap and bury people. Lives are at risk, and the cost to clean up the damages is great. According to the Hazard Mitigation Plan (2008), each earthquake is followed by revisions and improvements in the Building Codes. The 1933 Long Beach resulted in the Field Act, affecting school construction. The 1971 Sylmar earthquake brought another set of increased structural standards. Similar re-evaluations occurred after the 1989 Loma Prieta and 1994 Northridge earthquakes. These code changes have resulted in stronger and more earthquake resistant structures. The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. This state law was a direct result of the 1971 San Fernando Earthquake, which was associated with extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures. Surface rupture is the most easily avoided seismic hazard.

Implementation of earthquake mitigation policy most often takes place at the local government level. The City of Sierra Madre Building Official enforces building codes pertaining to earthquake hazards.

Additionally, the City has implemented basic building requirements that are above and beyond what the State demands for hazard mitigation. Newly constructed buildings in Sierra Madre that are built in an area subject to Earthquake-induced landslide or liquefaction are typically built with extra foundation support. Such support is found in the post-tension reinforced concrete foundation; this same technique is used by coastal cities to prevent home destruction during cases of liquefaction.

Generally, these codes seek to discourage development in areas that could be prone to flooding, landslide, wildfire and/or seismic hazards; and where development is permitted, that the applicable construction standards are met. Developers in hazard-prone areas may be required to retain a qualified professional engineer to evaluate level of risk on the site and recommend appropriate mitigation measures.



Flood Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Flood in the City of Sierra Madre** below.

Previous Occurrences of Flooding in the City of Sierra Madre

According to the Planning Team, the City of Sierra Madre was most recently affected by the flooding and mudslides from the burn area above Sierra Madre and Arcadia below Stonehouse Road. Mudflow destroyed public drainage, portions of Chantry Flats Road and damaged homes in Arcadia and Sierra Madre. There was an estimated \$600,000 in damage, which is 13% of the City's annual operating budget.

Previous Occurrences of Flooding in Los Angeles County

Los Angeles County records reveal since 1861, the Los Angeles River has flooded 30 times, on average once every 6.1 years. But averages are deceiving, for the Los Angeles basin goes through periods of drought and then periods of above average rainfall. Between 1889 and 1891 the river flooded every year, from 1941 to 1945, the river flooded 5 times. Conversely, from 1896 to 1914, and again from 1944 to 1969, a period of 25 years, the river did not have serious floods.

Average annual precipitation in Los Angeles County ranges from 13 inches on the coast to approximately 40 inches on the highest point of the Peninsular Mountain Range that transects the County. Several factors determine the severity of floods, including rainfall intensity and duration. A large amount of rainfall over a short time span can result in flash flood conditions. A sudden thunderstorm or heavy rain, dam failure, or sudden spills can cause flash flooding. The National Weather Service's definition of a flash flood is a flood occurring in a watershed where the time of travel of the peak of flow from one end of the watershed to the other is less than six hours.

The towering mountains that give the Los Angeles region its spectacular views also wring a great deal of rain out of the storm clouds that pass through. Because the mountains are so steep, the rainwater moves rapidly down the slopes and across the coastal plains on its way to the ocean.

Naturally, this rainfall moves rapidly downstream, often with severe consequences for anything in its path. In extreme cases, flood-generated debris flows will roar down a canyon at speeds near 40 miles per hour with a wall of mud, debris and water, tens of feet high. Flooding occurs when climate, geology, and hydrology combine to create conditions where water flows outside of its usual course.



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

According to the General Plan (2015), the City of Sierra Madre is not located within a 100-year flood zone. This is confirmed on the NFIP Flood Insurance Rate Map Number 06037C1400F, effective September 26, 2008). The 2008 FIRM for Sierra Madre designates the majority of Sierra Madre as Flood Zone X, indicating that it is out of 100- and 500-year flood zones. However, two areas of the City, a small segment centered along the Little Santa Anita Creek channel and the northern portion of the City that comprises the foothills, are classified as Zone D, indicating an area in which flood hazards are undetermined, but possible. The foothill areas are at significant risk of both flooding and landslides, particularly after a brush fire. As fires remove the vegetation, which helps to retain soil structure in hillside areas, post-fire soils are often not able to absorb water effectively. Instead of infiltrating into the soil, rainfall collects and runs off the surface of hillsides, creating flood conditions. The canyon areas above the northern portion of the City are also particularly vulnerable. In the years immediately following a brush fire in the foothills, these areas can be hazardous to persons and property during a strong rainfall event.

According to the General Plan, the City of Sierra Madre's topography is comprised of a naturally downgraded slope. It is bisected by the Los Angeles River, which is susceptible to flooding events; however, a flooding event from this source has never been documented in the history of Sierra Madre. Although Sierra Madre's topography is comprised of a naturally downgraded slope the areas of Little Santa Anita Canyon and Bailey Canyon have tended to produce minor flooding events.

Dam Inundation Flood Hazards

According to the General Plan (2015), while dams have proven to be effective flood control tools, these structures also pose additional flood risks. Flooding that results from a structural failure, known as dam inundation, is the main risk associated with dams. An additional hazard posed is known as overtopping. Overtopping describes situations where water escapes over the top of a dam without structural failure. Both overtopping and inundation can occur as the result of seismic activity.

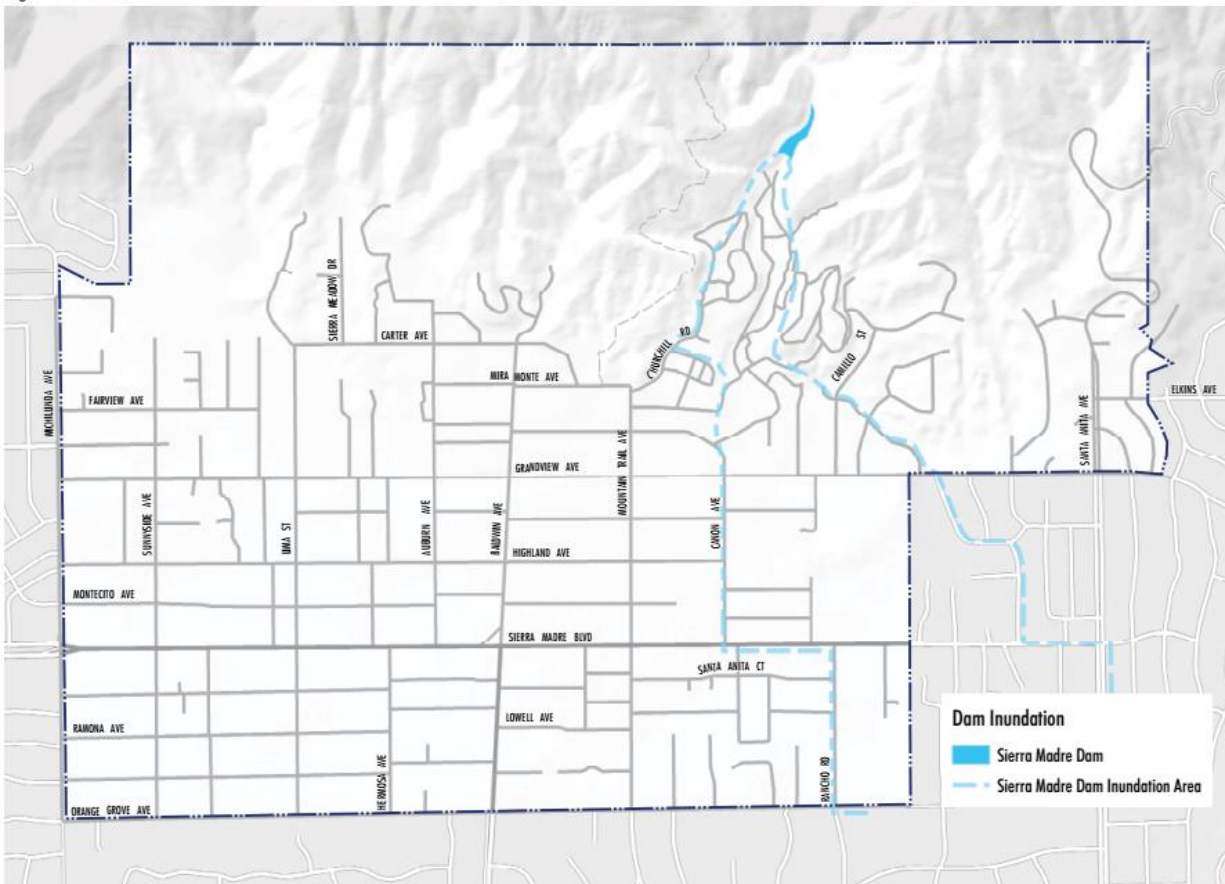
The major dam that could have a significant impact on the City in the event of overtopping or dam failure is the Little Santa Anita Dam, also known as Sierra Madre Debris Basin. A good portion of the City is within the inundation area of the Sierra Madre Debris Basin, as mapped by the California Office of Emergency Services in 2007. Failure of this dam during a catastrophic event,



such as a severe earthquake is considered a very unlikely event. The dam has performed well in previous earthquakes and dam failure is not expected. Additionally, the Sierra Madre Dam is considered a “dry” dam and functions solely as a flood control device, only containing water during rainy seasons.



Map: Dam Inundation
(Source: City of Sierra Madre General Plan, 2015)

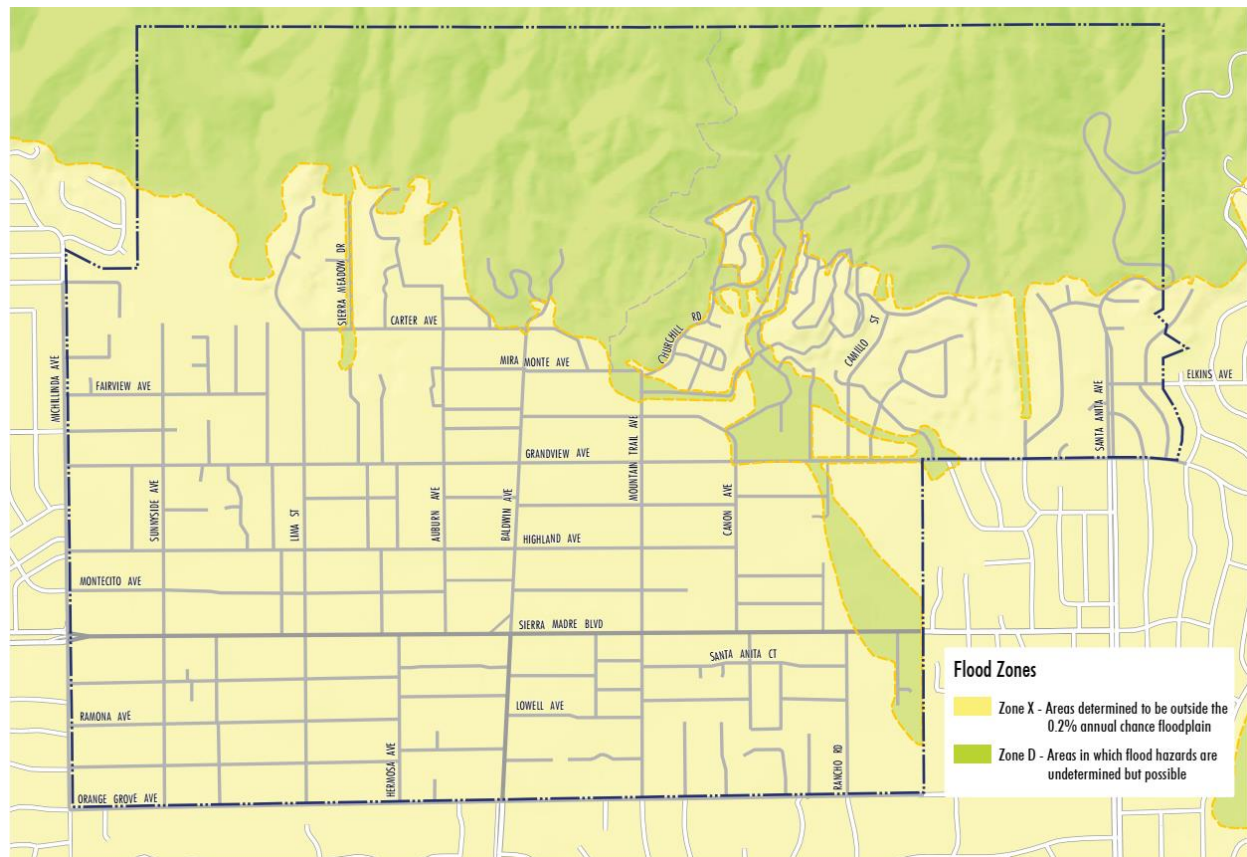


National Flood Insurance Program

The City participates in the National Flood Insurance Program (NFIP). Created by Congress in 1968, the NFIP makes flood insurance available in communities that enact minimum floodplain management rules consistent with the Code of Federal Regulations §60.3.

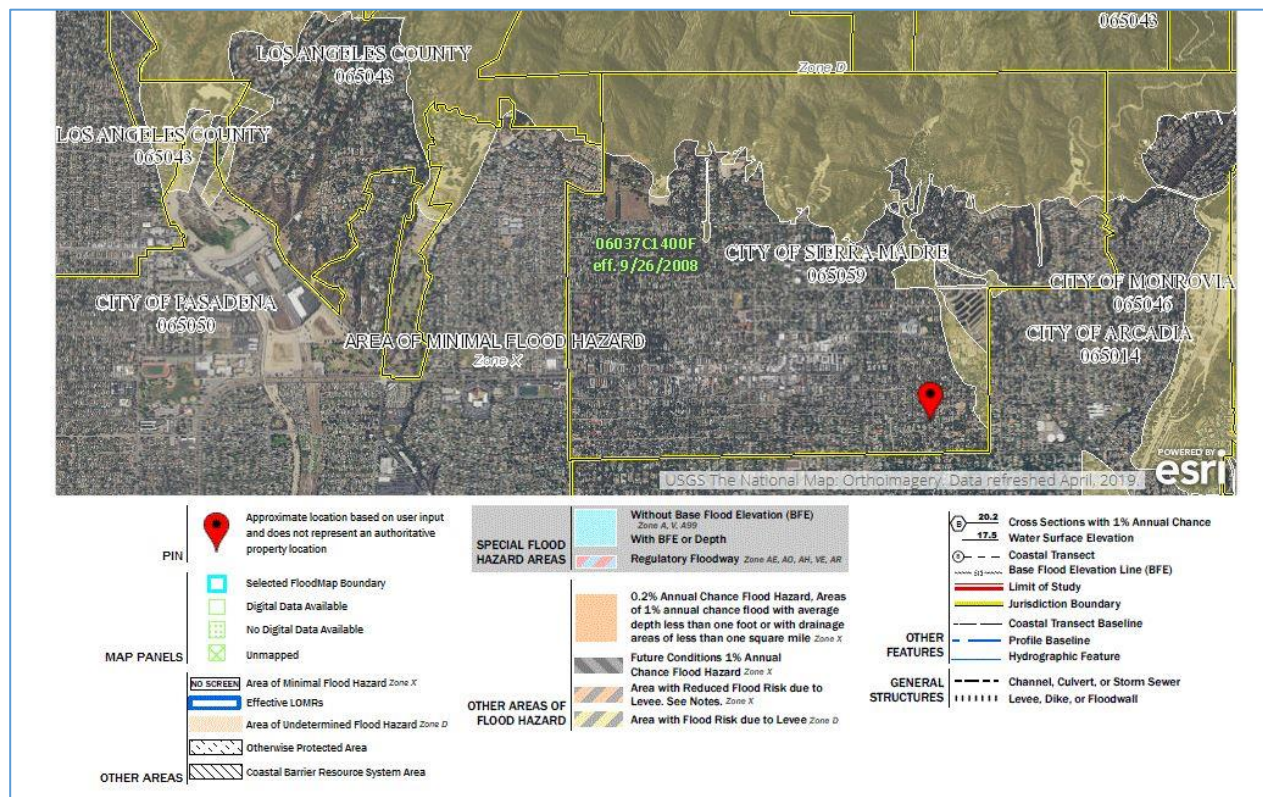


Map: Flood Zones
(Source: City of Sierra Madre General Plan, 2015)





Map: FEMA Flood Insurance Rate Map (Source: FEMA)



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Flooding in the City of Sierra Madre** below.

Impact of Flooding in the City of Sierra Madre

Floods and their impacts vary by location and severity of any given flood event, and likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that floods will continue to have devastating economic impact to certain areas of the City.

Impact that is not quantified, but anticipated in future events includes:

- ✓ Injury and loss of life;
- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;



- ✓ Secondary health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values and
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.



Wildfire Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Wildfire in the City of Sierra Madre** below.

Previous Occurrences of Wildfire in the City of Sierra Madre

According to the City of Sierra Madre General Plan (2015), large fires have been part of southern California for many years. In April and May 2008, a fire raged through the foothills above Sierra Madre, forcing the evacuation of all the residents who lived on Grand View Avenue north to the foothills. This fire resulted in over 500 acres being burned, but no houses were destroyed.



Previous Occurrences of Wildfire in Los Angeles County

Due to its weather, topography, and native vegetation, the majority of Los Angeles County is at risk from wildland fires. The extended droughts characteristic of California's Mediterranean climate result in large areas of dry vegetation that provide fuel for wildland fires. Furthermore, the native vegetation typically has a high oil content that makes it highly flammable. The area is also intermittently impacted by Santa Ana winds, the hot, dry winds that blow across southern California in the spring and late fall.

The most recent significant wildfire event to impact the County of Los Angeles was the Station Fire in 2009. The Station Fire destroyed 209 structures and burned a total of 160,577 acres within Los Angeles County. According to the United States Forest Service, the Station Fire was the 10th largest in modern California history, and the largest wildfire in Los Angeles County to date.



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

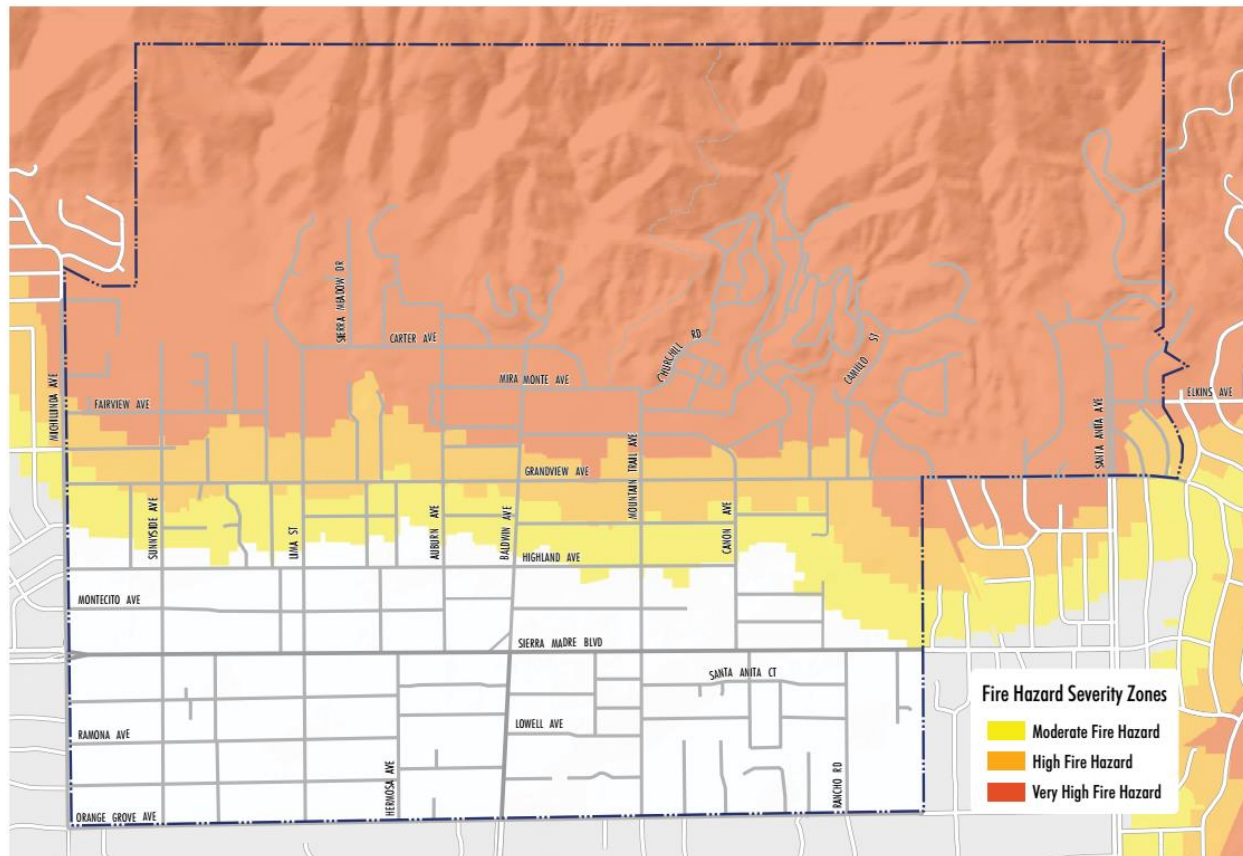
A: See **Local Conditions** below.

Local Conditions

According to Sierra Madre General Plan (2015), Sierra Madre's location at the base (southern foothills) of the San Gabriel Mountains presents a significant wildfire hazard to people and structures. The natural, undeveloped slopes of the hillside areas within the City support open coastal sage scrub and chaparral habitats that are susceptible to wildfires common to the San Gabriel Mountains. Additionally, development in the canyon areas is characterized by narrow roads with tree canopy coverage. These tree canopies provide opportunities for hillside wildfires to spread, creating a potential fire hazard for residents of Sierra Madre. According to the Fire Hazard Severity Zone Map published by the County of Los Angeles Fire Department, the foothills within Sierra Madre are within three fire hazard severity zones: Moderate, High and Very High Fire Hazard Zones, with the very high being the highest designation possible (LACoFD).



Map: Fire Hazard Severity Zones
(Source: City of Sierra Madre General Plan, 2015)





Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Wildfire in the City of Sierra Madre** below.

Impact of Wildfire in the City of Sierra Madre

Wildfires and their impacts vary by location and severity of any given wildfire event and will likely only affect certain areas of the county during specific times. Based on the risk assessment, it is evident that wildfires will have a potentially devastating economic impact to certain areas of the City.

Impacts that are not quantified, but which may be anticipated in future events include:

- ✓ Injury and loss of life
- ✓ Commercial and residential structural damage
- ✓ Disruption of and damage to public infrastructure
- ✓ Secondary health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed



Landslide Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Landslides in the City of Sierra Madre** below.

Previous Occurrences of Landslides in the City of Sierra Madre

According to the General Plan, in January 1954, 2000 residents were urged to evacuate north of Grand View between Grove and Mountain Trail Avenues and evacuation centers were established at the Monastery and the Woman's Club; areas hardest hit were North Lima, Bailey Canyon, Carter Avenue, North Auburn Avenue, Woodland Avenue, Brookside Lane; silt, boulders, mud and debris strewn down as far as Sierra Madre Blvd.; silt was 8-10 feet in some places; catch basin was filled with mud (30,000 cubic feet); boulders broke City water lines in the north section of town; runoff led to water contamination and many residents became sick with abdominal pain. On March 6, 1994, a cloudburst below Mount Wilson caused a flash flood and mudslide in Bailey Canyon. An inch of rain fell between 4 and 6 that afternoon causing 15 feet of mud to collect in the Bailey Canyon catch basin. The mudslide claimed the lives of two hikers, both Sierra Madre residents. Underbrush and grass in the area had been burned by the October 1993 fire.

Previous Occurrences of Landslides in Los Angeles County

1928 St. Francis Dam

Cost, \$672.1 million (2000 Dollars). The dam, located in Los Angeles County, gave way on March 12, and its waters swept through the Santa Clara Valley toward the Pacific Ocean, about 54 miles away. Sixty-five miles of valley was devastated, and over 500 people were killed.

1956 Portuguese Bend

Cost, \$14.6 million (2000 Dollars). California Highway 14, Palos Verdes Hills. Land use on the Palos Verdes Peninsula consists mostly of single-family homes built on large lots, many of which have panoramic ocean views. All of the houses were constructed with individual septic systems, generally consisting of septic tanks and seepage pits. Landslides have been active here for thousands of years, but recent landslide activity has been attributed in part to human activity. The Portuguese Bend Landslide began its modern movement in August 1956, when displacement was noticed at its northeast margin. Movement gradually extended down slope so that the entire eastern edge of the slide mass was moving within 6 weeks. By the summer of 1957, the entire slide mass was sliding towards the sea.

1958-1971 Pacific Palisades

Cost, \$29.1 million (2000 Dollars). California Highway 1 and house damaged.



1961 Mulholland Cut

Cost, \$41.5 million (2000 Dollars). On Interstate 405, 11 miles north of Santa Monica, Los Angeles County.

1963 Baldwin Hills Dam

Cost, \$50 million (1963 Dollars). On December 14, the 650-foot-long by 155-foot-high earth fill dam gave way and sent 360 million gallons of water in a fifty-foot-high wall cascading onto the community below, killing five persons.

1969 Glendora

Cost, \$26.9 million (2000 Dollars). Los Angeles County, 175 houses damaged, mainly by debris flows.

1969 Seventh Ave., Los Angeles County

Cost, \$14.6 million (2000 Dollars). California Highway 60.

1970 Princess Park

Cost, \$29.1 million (2000 Dollars). California Highway 14, ten miles north of Newhall, near Saugus, northern Los Angeles County.

1971 Upper and Lower Van Norman Dams, San Fernando

Cost, \$302.4 million (2000 Dollars). Earthquake-induced landslides. Damage due to the February 9, 1971, M7.5 San Fernando, Earthquake. The earthquake of February 9 severely damaged the Upper and Lower Van Norman Dams.

1971 Juvenile Hall, San Fernando

Cost, \$266.6 million (2000 Dollars). Landslides caused by the February 9, 1971, San Fernando earthquake. In addition to damaging the San Fernando Juvenile Hall, this 1.2 km-long slide damaged trunk lines of the Southern Pacific Railroad, San Fernando Boulevard, Interstate Highway 5, the Sylmar electrical converter station, and several pipelines and canals.

1977-1980 Monterey Park, Repetto Hills, Los Angeles County

Cost, \$14.6 million (2000 Dollars). 100 houses damaged in 1980 due to debris flows.

1979 Big Rock, California, Los Angeles County

Cost, \$1.08 billion (2000 Dollars). California Highway 1 rockslide.

1980 Southern California Slides

Cost, \$1.1 billion in damage (2000 Dollars). Heavy winter rainfall in 1979-90 caused damage in six Southern California counties. In 1980, the rainstorm started on February 8. A sequence of 5 days of continuous rain and 7 inches of precipitation had occurred by February 14. Slope failures were beginning to develop by February 15 and then very high-intensity rainfall occurred on February 16. As much as eight inches of rain fell in a six-hour period in many locations.



Records and personal observations in the field on February 16 and 17 showed that the mountains and slopes literally fell apart on those two days.

1983 Big Rock Mesa

Cost, \$706 million (2000 Dollars) in legal claims, condemnation of 13 houses, and 300 more threatened rockslide caused by rainfall.

1994 Northridge Earthquake Landslides

As a result of the M6.7 Northridge Earthquake, more than 11,000 landslides occurred over an area of 10,000 km². Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. Destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. Caused deaths from Coccidioidomycosis (valley fever) the spore of which was released from the soil and blown toward the coastal populated areas. The spore was released from the soil by the landslide activity.



March 1995 Los Angeles and Ventura Counties

Above normal rainfall triggered damaging debris flows, deep-seated landslides, and flooding. Several deep-seated landslides were triggered by the storms, the most notable was the La Conchita landslide, which in combination with a local debris flow, destroyed or badly damaged 11 to 12 homes in the small town of La Conchita, about 20 km west of Ventura. There also was widespread debris-flow and flood damage to homes, commercial buildings, and roads and highways in areas along the Malibu coast that had been devastated by wildfire two years before.



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

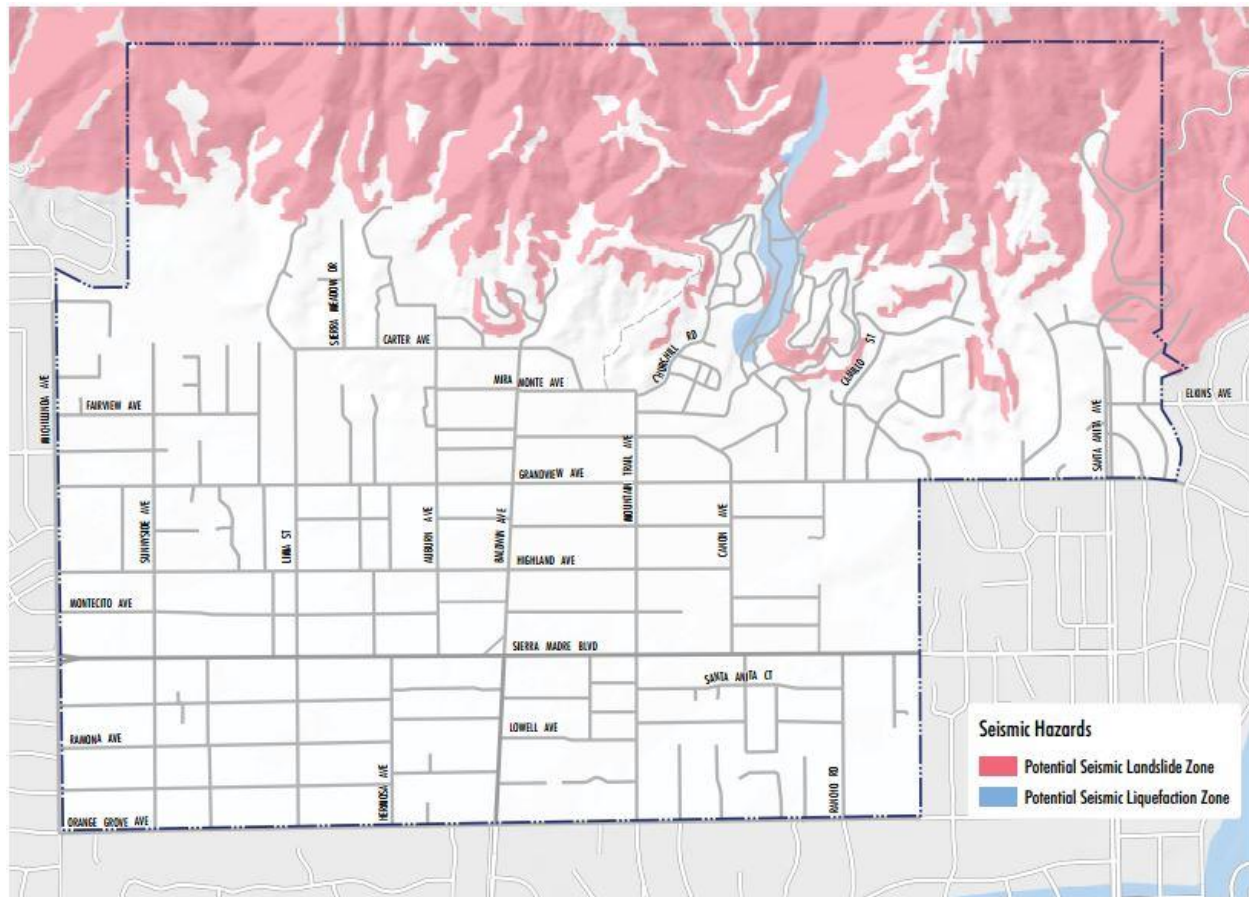
Local Conditions

According to the Sierra Madre General Plan (2015), landslides can occur for various reasons. For example, severe flooding can undermine the integrity of the soils in the hillsides, therefore causing instability. Landslides may also occur as the result of brush fires, which weaken the soil by removing vegetation integral to its support structure. Ground shaking from an earthquake presents an additional risk; seismic activity of this type can easily initiate a downslope movement of already unstable earth mass. Grading activities can also trigger landslides.

Landslides in the City typically occur at elevations of between 1,400 and 2,000 feet, well above the urban area of the City. A common type of landslide experienced in Sierra Madre is known as a mudflow. This type of landslide involves very rapid downslope movement of saturated soil, sub soil and weathered bedrock. Large mudflows may have enough force to uproot trees and to carry along boulders several feet in diameter. Due to their fast speeds, mudflows can be very destructive, especially along the bottom and the mouths of canyons. Mudslides have generally occurred in several locations within the northern foothill areas of the City.



Map: Landslide Zones
(Source: City of Sierra Madre General Plan, 2015)





Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impacts of Landslides in the City of Sierra Madre** below.

Impacts of Landslides in the City of Sierra Madre

Based on the risk assessment, it is evident that landslides continue to have potentially devastating economic impact to certain areas of the City.

Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life
- ✓ Commercial and residential structural damage
- ✓ Disruption of and damage to public infrastructure
- ✓ Secondary health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed



Windstorm Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Windstorms in the City of Sierra Madre** below.

Previous Occurrences of Windstorms in the City of Sierra Madre

According to the General Plan 2015, in December 2011, severe winds caused building damage to 34 residences in Sierra Madre, including eight homes which reported major structural damage and were forced to evacuate and seven homes and one business which had restricted access. The severe winds wiped out many trees as trees were uprooted or limbs snapped off, which attributed to the structure damage as described above. Downed electrical power lines significantly impacted the City, which caused complete power outages for up to 7 days for portions of the City. Preliminary cost estimates to repair damaged residential structures is 4.8 million and to repair City-owned facilities 1.6 million, which includes the costs for the extensive clean-up of vegetation debris which obstructed street access following the windstorm.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

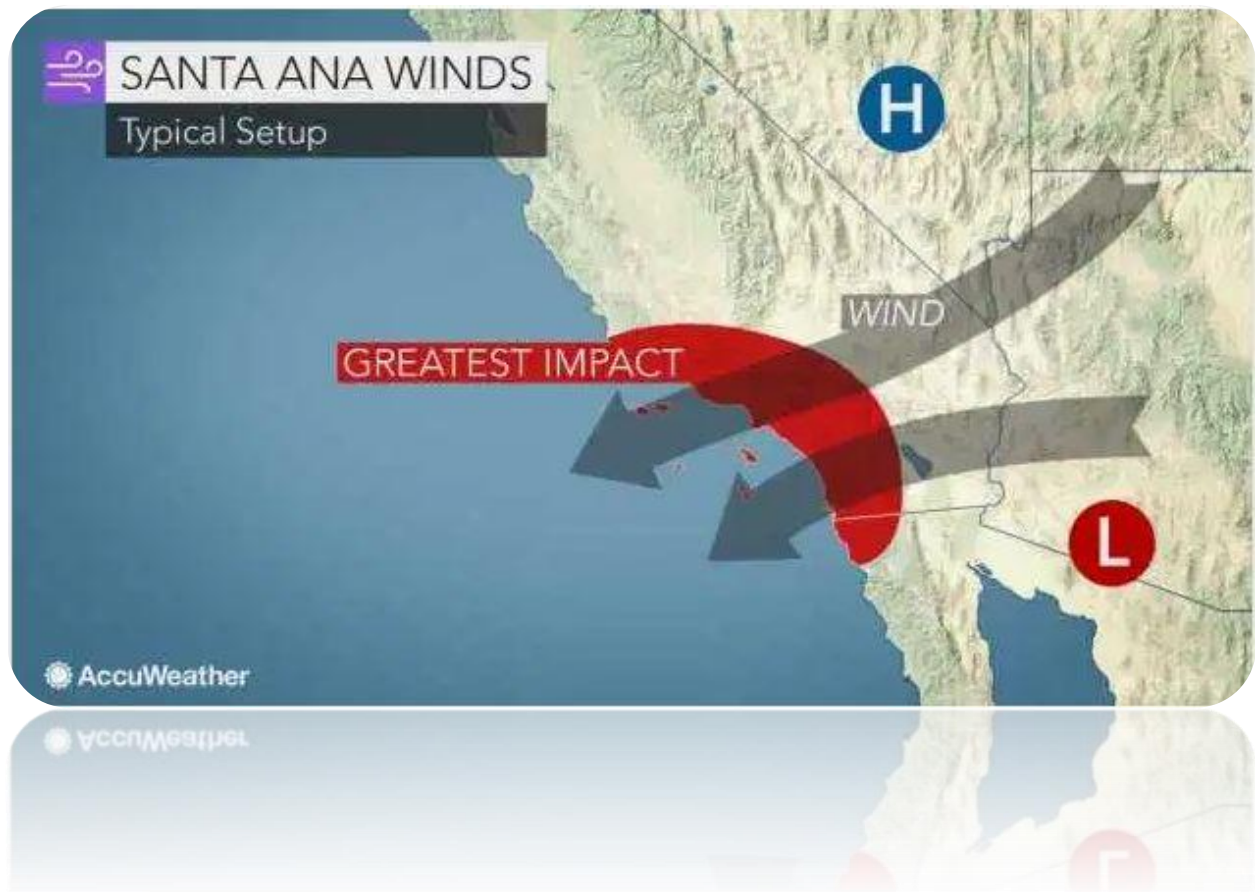
Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

According to the Sierra Madre General Plan (2015), the southern California and Sierra Madre climate is generally mild and does not produce enough airflow to generate a windstorm. However, during the Fall, season shifts in weather patterns begin to arise and produce very high and unpredictable winds. These windstorm conditions are known as the Santa Ana winds and often produce events such as trees and power lines falling down. Severe windstorms pose a significant risk to life and property in the region, including Sierra Madre, by creating conditions that disrupt essential systems such as public utilities, telecommunications and transportation routes. High winds can and do occasionally cause tornado-like damage to local homes and businesses. Severe windstorms can present a very destabilizing effect on the dry brush that covers Sierra Madre's hillsides and urban wildland interface areas. High winds can have destructive impacts, especially to trees, power lines, and utility services. Perhaps the greatest danger from windstorm activity in the region comes from the combination of the Santa Ana winds and the major fires that occur every few years in the urban/wildland interface.

Graphic: Santa Ana Winds
(Source: AccuWeather, 2019)





Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Windstorms in the City of Sierra Madre** below.

Impacts of Windstorms in the City of Sierra Madre

Based on the risk assessment, it is evident that Windstorms continue to have potentially devastating economic impact to certain areas of the City.

Impacts that is not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life
- ✓ Commercial and residential structural damage
- ✓ Disruption of and damage to public infrastructure
- ✓ Secondary Health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.



Utility-Related Events

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2.

Q: Does the plan include information on **previous occurrences** of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Utility-Related Events in Sierra Madre** below.

Previous Occurrences of Utility-Related Events in Sierra Madre

Power Failure and Shutoff

There have been brief power failures in the project area but none to the extent posing a significant threat. The Southern California Edison “Public Safety Power Stoppage” program began in 2019 and to date no deliberate stoppages have been ordered in the project area.

Drought/Water Shortages

Fortunately, there is no severe history of drought within the project area. However, the State of California has declared state-wide drought declarations over most of the last ten years.

Natural Gas Pipelines

There have been no pipeline incidents posing a significant threat to the project area.

Previous Occurrences of Utility-Related Events in Los Angeles County

Power Failure and Shutoff

According to the City of Los Angeles Hazard Mitigation Plan (2018), on November 5, 2001, a power outage caused by a car accident led to the release of 1.4 million gallons of raw sewage into the Pacific Ocean, Marina del Rey, and Ballona Creek. The car crash knocked powerlines into a sewage pumping station. While the subsequent power outage lasted only 20 minutes, the sewage pumps shut down completely. Enough raw sewage was released to affect beaches from Santa Monica to Manhattan Beach. The backup power and alarm system malfunctioned because the wastewater pumping plant was undergoing construction, and the systems were turned off. The sewage spill went unnoticed for 15 hours; 12 more hours passed before sanitation officials notified the Los Angeles County Public Health office; and at least 10 more hours passed before lifeguards were notified of the sewage release. Civilians in the area first reported raw sewage pouring out of manholes and flowing directly into storm drains. It took 24 hours before the beaches were closed.

Drought/Water Shortages

California’s drought from 2012-2016 set several records:

- The period from 2012 to 2014 ranked as the driest three consecutive years for statewide precipitation.
- 2014 set new climate records for statewide average temperatures and for record-low water allocations in the State Water Project and federal Central Valley Project.
- 2013 set minimum annual precipitation records for many communities.



On January 17, 2014 the governor declared a state of emergency for drought throughout California. This declaration followed release of a report that stated that California had had the least amount of rainfall in its 163-year history. Californians were asked to voluntarily reduce their water consumption by 20 percent. Drought conditions worsened into 2015. On April 1, 2015, following the lowest snowpack ever recorded, the governor announced actions to save water, increase enforcement to prevent wasteful water use, streamline the state's drought response, and invest in new technologies to make California more drought resilient. The governor directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce water usage by 25 percent on average. The LADWP was assigned a 16-percent water conservation target by the State Water Resources Control Board.

Natural Gas Pipelines

The City of Los Angeles Hazard Mitigation Plan (2018) notes that in 2002 an underground Kinder Morgan high-pressure gas pipeline failed causing a significant spill of diesel fuel in the Rocklin neighborhood adjacent to where the breach occurred.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1.

Q: Does the plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction (s)? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2.

Q: Does the plan include information on previous occurrences of hazard events and on the **probability** of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Local Conditions

Power Failure and Shutoff

Power failure is defined as any interruption or loss of electrical service caused by disruption of power transmission caused by accident, sabotage, natural hazards, or equipment failure (also referred to as a loss of power or power outage). A significant power failure is defined as any incident of a long duration, which would require the involvement of the local and/or State emergency management organizations to coordinate provision of food, water, heating, cooling, and shelter. Power failures in the planning area are usually localized and are usually the result of a natural hazard event involving high winds or storms. Electricity throughout the planning areas is provided by Southern California Edison.

The massive 2011 Southern California electricity outage brought to light many critical issues surrounding the state's power generation and distribution system, including its dependency on out-of-state resources. Although California has implemented effective energy conservation programs, the state continues to experience both population growth and weather cycles that contribute to a heavy demand for power.

Hydro-generation provides approximately 25% of California's electric power, with the balance coming from fossil fuels, nuclear, and green sources. As experienced in 2000 and 2001, blackouts can occur due to losses in transmission or generation and/or extremely severe temperatures that lead to heavy electric power consumption.



The effects of an energy shortage would affect all occupants of the City. Perhaps most at risk would be medically challenged individuals with health care equipment reliant on electricity (e.g. oxygen), businesses, emergency service locations, and vulnerable populations center (e.g. schools).

In 2018, the California Public Utilities Commission (CPUC) directed California's three largest energy companies to coordinate to prepare all Californians for the threat of wildfires and power outages during times of extreme weather. To help protect customers and communities during extreme weather events, electric power may now be shut off for reasons of public safety in an effort to prevent a wildfire. This new protocol is referred to as Public Safety Power Shutoff (PSPS). During the writing of this HMP update, all three of the power companies initiated PSPS due to expected Santa Ana winds during the second week of October and first week of November.

Drought/Water Shortages

It's impossible to separate drought from water supply shortages. Drought is defined as a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (e.g., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness of the rains (e.g., rainfall intensity, number of rainfall events).

Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity. Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. Human beings often exacerbate the impact of drought. Recent droughts in both developing and developed countries and the resulting economic and environmental impacts and personal hardships have underscored the vulnerability of all societies to this natural hazard.

One dry year does not normally constitute a drought in California but serves as a reminder of the need to plan for droughts. California's extensive system of water supply infrastructure — its reservoirs, groundwater basins, and inter-regional conveyance facilities — mitigates the effect of short-term dry periods for most water users. 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.

Figure: Water Supply Conditions below illustrates several indicators commonly used to evaluate California water conditions. The percent of average values are determined for measurement sites and reservoirs in each of the State's ten major hydrologic regions. Snowpack is an important indicator of runoff from Sierra Nevada watersheds, the source of much of California's developed water supply.

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods



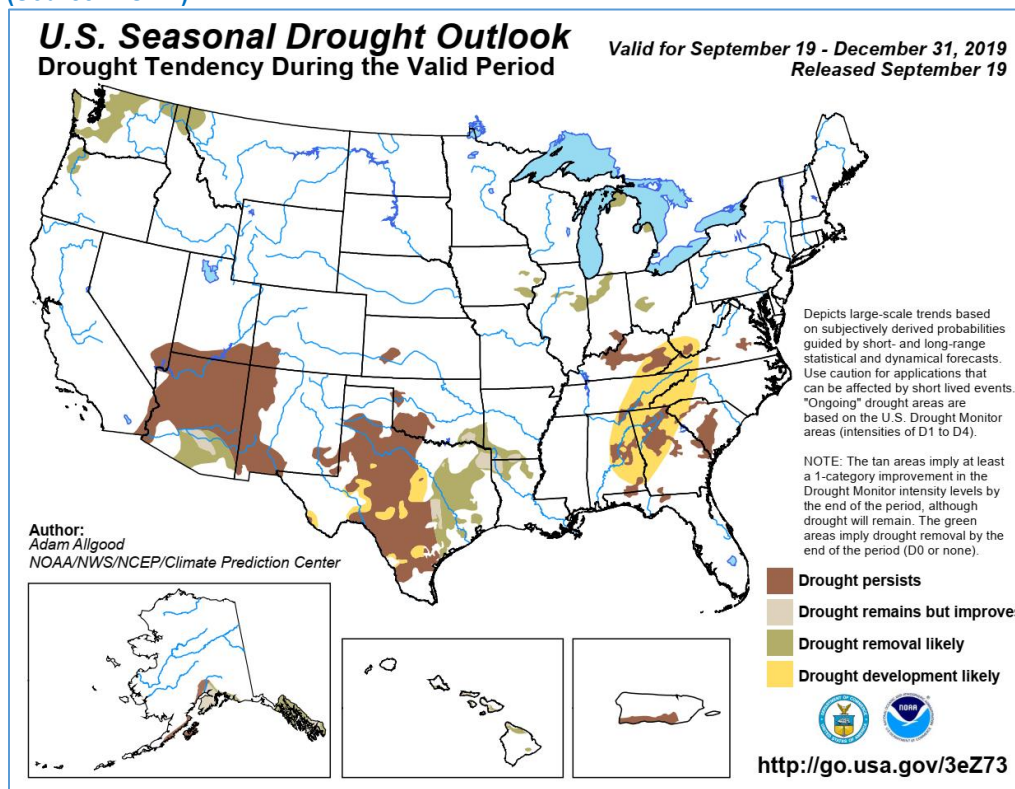
or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multiyear period. There is no universal definition of when a drought begins or ends. Impacts of drought are typically felt first by those most reliant on annual rainfall - ranchers engaged in dry land grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable source. Criteria used to identify statewide drought conditions do not address these localized impacts. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

There are four different ways that drought can be defined:

- **Meteorological** - a measure of departure of precipitation from normal. Due to climatic differences what is considered a drought in one location may not be a drought in another location.
- **Agricultural** - refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
- **Hydrological** - occurs when surface and subsurface water supplies are below normal.
- **Socioeconomic** - refers to the situation that occurs when physical water shortage begins to affect people.

The U.S. Seasonal Drought Outlook below shows the project area as well as California as a whole is no longer in danger from the impacts of drought:

Figure: U.S. Seasonal Drought Outlook - 2019
(Source: NOAA)



Natural Gas Pipelines

There are several major natural gas pipelines that traverse the planning area as shown on **Map: California Natural Gas Pipeline Systems**. While pipelines are often thought of as presenting risks to communities, natural hazards can impact the integrity of pipelines. According to the U.S. Department of Transportation, although natural hazards are cited as the cause in fewer than ten percent (10%) of pipeline incidents, the failure of a large-diameter, high-pressure natural gas or hazardous liquid transmission pipeline during an earthquake can significantly complicate a communities' ability to respond and recover from the event. Natural gas is supplied to the planning area by Southern California Gas.

On September 9, 2010, a 30-inch steel natural gas transmission pipeline owned and operated by PG&E ruptured and exploded in the City of San Bruno residential neighborhood. The blast and ensuing inferno resulted in 8 confirmed deaths, 66 reported injuries, 34 destroyed structures, and 8 damaged structures. Cal OES has identified preliminary damage estimates at \$15.4 million, including \$2.5 million for debris removal, \$10.2 million for protective measures, \$2.1 million for roads and bridges, and \$0.6 million for utilities and other facilities. Investigations into the cause of the explosion are under way by the National Safety Transportation Board (NSTB), the California Public Utilities Commission (CPUC), and PG&E. Although it will not be confirmed until official



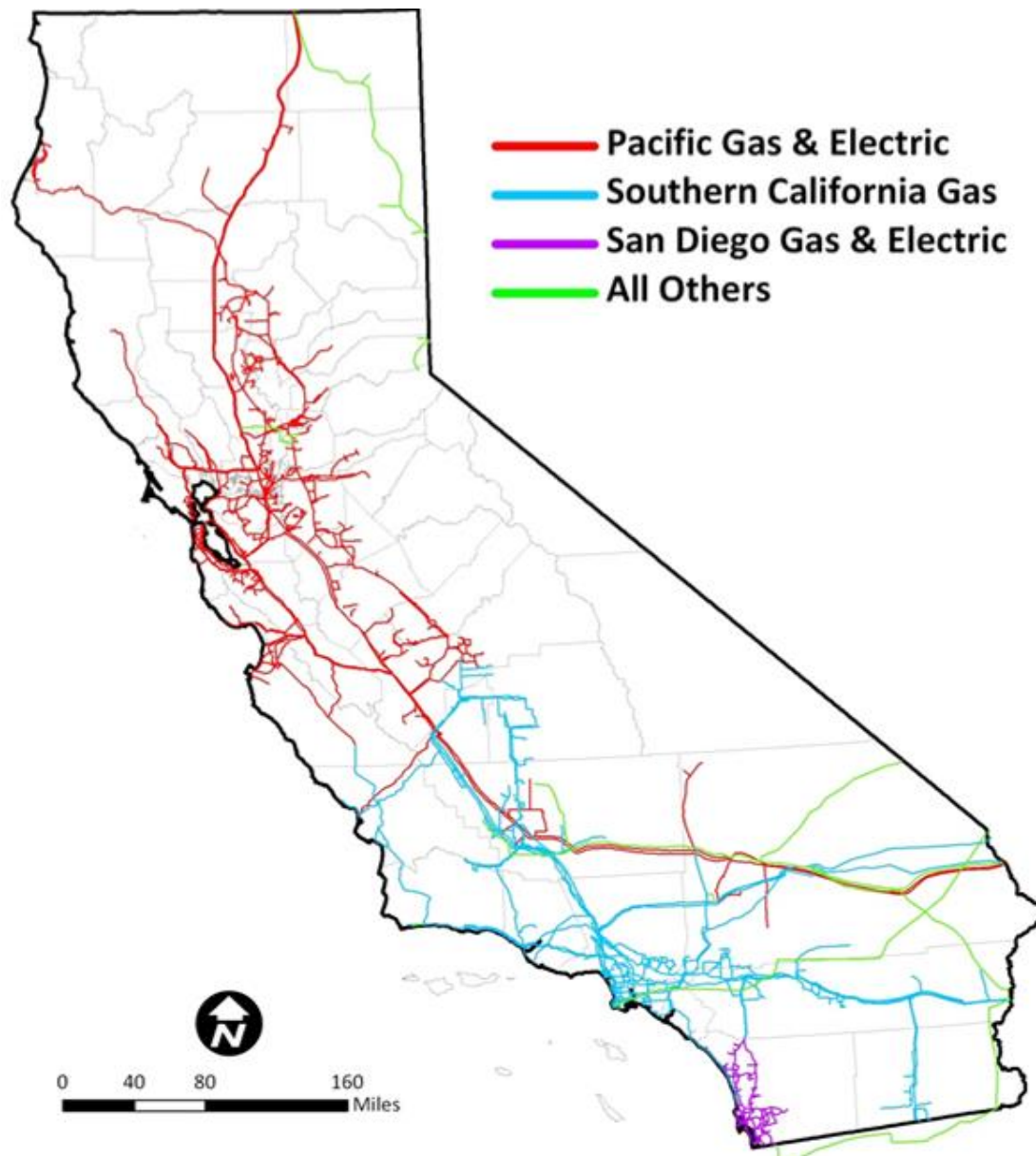
investigations are completed, initial speculation points to the weakening of the 60-year-old pipeline due to corrosion. The day after the explosion, the CPUC asked PG&E to provide a list of its top 100 high-priority projects to upgrade or replace portions of the pipeline for reasons of public safety, as well as information on the status of listed projects. The list was published on September 21, 2010. Although targeted for repair several years ago, the San Bruno pipeline was not on the list.

Virtually all natural gas, which accounts for about 28 percent of energy consumed annually, is transported by transmission pipelines. Although California is a leader in exploring and implementing alternative energy sources such as wind and solar, the expansion of traditional energy sources, such as natural gas, continues. There are natural gas transmission pipelines within the planning area, as well as adjoining communities.

Photo: San Bruno Gas Transmission Line Explosion
(Source: City of San Bruno)



Map: California Natural Gas Pipeline Systems
(Source: California Energy Commission)





Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3.

Q: Is there a description of each identified hazard's **impact** on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Utility-Related Events in Sierra Madre** below.

Impacts of Utility-Related Events in Sierra Madre

Based on the risk assessment, it is evident that Utility-Related events will continue to have potentially devastating impacts to certain portions of the planning area.

Impacts that can be anticipated in future events could include:

- ✓ Injury and loss of life;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Significant economic impact;
- ✓ Negative impact on commercial and residential property values.

Epidemic/Pandemic/Vector-Borne Disease Hazards

Hazard Definition

According to the California State Hazard Mitigation Plan (2018), the California Department of Public Health has identified epidemics, pandemics, and vector-borne diseases as specific hazards that would have a significant impact throughout the State.

According to the Centers for Disease Control (CDC), an epidemic refers to an increase, often sudden, in the number of cases of a disease above what is normally expected in that population area. A pandemic refers to an epidemic that has spread over several countries or continents, usually affecting a large number of people. Vector-borne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by vectors – living organisms that can transmit infectious pathogens between humans, or from animals to humans.



Seasonal Influenza

Seasonal influenza, also known as the flu, is a disease that attacks the respiratory system (nose, throat, and lungs) in humans. Seasonal influenza occurs every year. In the U.S., the influenza season typically occurs from October through May, peaking in January or February with yearly epidemics of varying severity. Although mild cases may be similar to a viral “cold,” influenza is typically much more severe. Influenza usually comes on suddenly; may include fever, headache, tiredness (which may be extreme), dry cough, sore throat, nasal congestion, and body aches; and can result in complications such as pneumonia. Persons aged 65 and older, those with chronic health conditions, pregnant women, and young children are at the highest risk for serious complications, including death.

Pandemic Influenza

A pandemic influenza occurs when a new influenza virus, for which there is little or no human immunity, emerges and spreads on a worldwide scale, infecting a large proportion of the human population. The 20th century saw three such pandemics. The most notable pandemic was the 1918 Spanish influenza pandemic that was responsible for 20 million to 40 million deaths throughout the world. There have been two pandemics in the 21st century; H1N1 in 2009, and the most recent COVID-19 outbreak in 2019. As demonstrated historically and currently, pandemic influenza has the potential to cause serious illness and death among people of all age groups and have a major impact on society. These societal impacts include significant economic



disruption that can occur due to death, loss of employee work time, and costs of treating or preventing the spread of influenza.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general description of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

H1N1 Influenza

In 2009 a pandemic of H1N1 influenza, popularly referred to as the swine flu, resulted in many hospitalizations and deaths. Pandemic H1N1 influenza is spread in the same way as seasonal influenza, from person to person through coughing or sneezing by infected people. In April 2009, two kids living more than 100 miles apart in Southern California came down with the flu. By mid-April, their illnesses had been diagnosed as being caused by a new strain of H1N1 influenza. Persons infected with H1N1 experienced fever and mild respiratory symptoms, such as coughing, runny nose, and congestion. In some cases, symptoms were severe and included diarrhea, chills, and vomiting, and in rare cases respiratory failure occurred. The H1N1 virus caused relatively few deaths in humans. In the United States, for example, it caused fewer deaths (between 8,870 and 18,300) than seasonal influenza, which, based on data for the years 2014–2019, causes an average of about 40,000 deaths each year. The H1N1 virus was most lethal in individuals affected by chronic disease or other underlying health conditions.

COVID-19

As of 2020, the CDC is responding to a pandemic of respiratory disease spreading from person to person caused by a novel (new) coronavirus. The disease has been named “Coronavirus Disease 2019” (abbreviated “COVID-19”). Coronaviruses are a large family of viruses that are common in people and many different species of animals, including camels, cattle, cats, and bats. Rarely, animal coronaviruses can infect people and then spread between people such as with Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS).

According to the CDC, many of the patients at the epicenter of the outbreak in Wuhan, Hubei Province, China had some link to a large seafood and live animal market, suggesting animal-to-person spread. Later, a growing number of patients reportedly did not have exposure to animal markets, indicating person-to-person spread. Person-to-person spread was subsequently reported outside Hubei and in countries outside China, including in the United States. Most international destinations now have ongoing community spread with the virus that causes COVID-19, as does the United States.

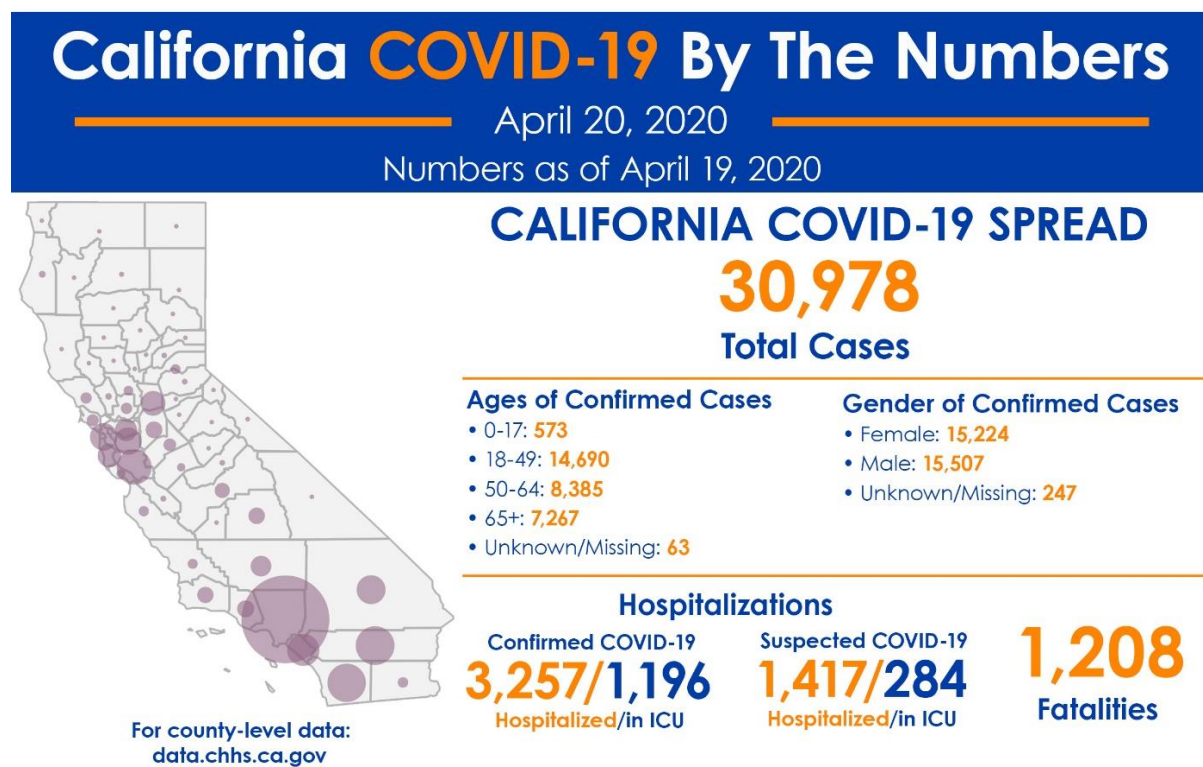
On March 4, 2020, Governor Newsom proclaimed a state of emergency in the California in response to the COVID-19 outbreak. On March 19, 2020, Governor Newsom issued an executive order directing all residents immediately to heed current State public health directives to stay



home, except as needed to maintain continuity of operations of essential critical infrastructure sectors.



As of April 20, 2020, ~31,000 Californians have tested positive for COVID-19 and ~1,200 have died. Approximately 290,500 tests have been conducted. At least 251,614 results have been received and 7,200 are pending.



Stay Home. **Save Lives.**

covid19.ca.gov



Avian Influenza



Avian Influenza, commonly referred to as “Bird Flu,” remains a looming pandemic threat. Avian Influenza primarily spreads from birds to birds and rarely to humans. Public health experts continue to be alert to the possibility that an avian virus may mutate or change so that it can be passed from birds to humans, potentially causing a pandemic in humans. Some strains of the Avian Influenza could arise from Asia or other continents where people have very close contact with infected birds. This disease could have spread from poultry farmers or visitors to live poultry markets who had been in very close contact with infected birds and contracted fatal strains of Avian Influenza. Thus far, Avian Influenza viruses have not mutated and have not demonstrated easy transmission from person to person. However, if Avian Influenza viruses were to mutate into a highly virulent form and become easily transmissible from person to person, the public health community would be very concerned about the potential for an influenza pandemic. Such a pandemic could disrupt all aspects of society and severely affect the economy.

Vector-Borne Diseases

Vector-borne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by vectors. Every year there are more than 700,000 deaths from diseases such as malaria, dengue, schistosomiasis, human African trypanosomiasis, leishmaniasis, Chagas disease, yellow fever, Japanese encephalitis and onchocerciasis. Vectors are living organisms that can transmit infectious pathogens between humans, or from animals to humans. Many of these vectors are bloodsucking insects, which ingest disease-producing microorganisms during a blood meal from an infected host (human or animal) and later transmit it into a new host, after the pathogen has replicated. Often, once a vector becomes infectious, they can transmit the pathogen for the rest of their life during each subsequent bite/blood meal.



Mosquito-Borne Viruses

Mosquito-borne viruses belong to a group of viruses commonly referred to as arboviruses (for arthropod-borne). Although 12 mosquito-borne viruses are known to occur in California, only West Nile virus (WNV), western equine encephalomyelitis virus (WEE), and St. Louis encephalitis virus (SLE) are significant causes of human disease. WNV continues to seriously affect the health of humans, horses, and wild birds throughout the state. Since 2003, there have been over 6,000 WNV human cases with 248 deaths, and over 1,200 equine cases.

WNV first appeared in the United States in 1999 in New York and rapidly spread across the country to California in subsequent years. California has historically maintained a comprehensive mosquito-borne disease surveillance and control program including the Mosquito-borne Virus Surveillance and Response Plan, which is updated annually in consultation with local vector control agencies.

Climate change will likely affect vector-borne disease transmission patterns. Changes in temperature and precipitation can influence seasonality, distribution, and prevalence of vector-borne diseases. A changing climate may also create conditions favorable for the establishment of invasive mosquito vectors in California.



Lyme Disease

Lyme disease is caused by a spirochete (a corkscrew-shaped bacteria) called *Borrelia burgdorferi* and is transmitted by the Western black-legged tick. Lyme disease was first described in North America in the 1970s in Lyme, Connecticut, the town for which it was then named. Though the tick has been reported from 56 of the 58 counties in California, the highest incidence of disease occurs in the northwest coastal counties and northern Sierra Nevada counties with western-facing slopes. Ticks prefer cool, moist areas and can be found in wild grasses and low vegetation in both urban and rural areas.

The map below shows Western black-legged tick and Lyme disease incidence in California. The Western black-legged tick is commonly found in all green areas shown on the map; dark green areas on the map show where reported Lyme disease cases most often had exposure.

Map: Tick and Lyme Disease Incidence in California
(Source: California State Hazard Mitigation Plan, 2018)





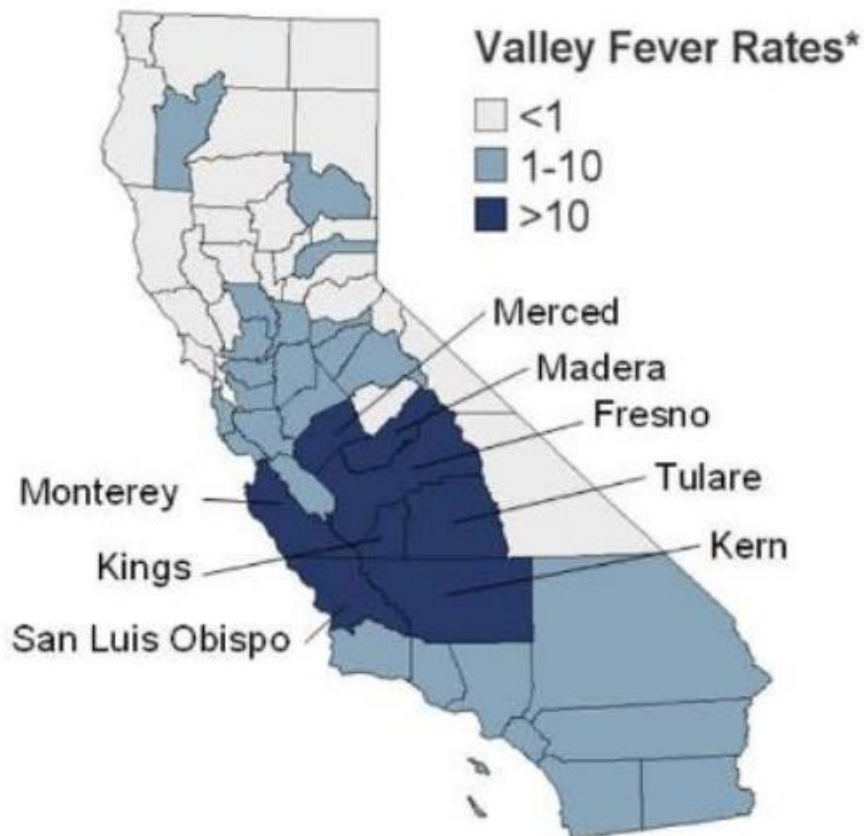
Valley Fever

Valley Fever is caused by *Coccidioides*, a fungus that lives in the soil in the southwestern United States and parts of Mexico, Central America, and South America. Inhaling the airborne fungal spores can cause an infection called coccidioidomycosis, which is also known as “cocci” or “Valley Fever.”

Most people who are exposed to the fungus do not get sick, but some people develop flu-like symptoms that may last for weeks to months. In a very small proportion of people who get Valley Fever, the infection can spread from the lungs to other parts of the body and cause more severe conditions, such as meningitis or even death. Valley Fever cannot spread from person to person.

Most cases of Valley Fever in the U.S. occur in people who live in or have traveled to the southwestern United States, especially Arizona and California. The map below shows the areas where the fungus that causes Valley Fever is thought to be endemic, or native and common in the environment. The full extent of the current endemic areas is unknown and is a subject for further study

Map: Valley Fever Average Annual Rates by California County
(Source: California State Hazard Mitigation Plan, 2018)



*Average of annual rates from 2008-2012 per 100,000 population



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Epidemic/Pandemic/Vector-Borne Diseases in the (City of ???)** below.

Previous Occurrences of Epidemic/Pandemic/Vector-Borne Diseases in the (City of ???)

(INSERT PREVIOUS OCCURENCES IN TABLE BELOW OR PARAGRAPH FORMAT)

Table: (Name)

(Source: City of ???)

Date	Description
January 20xx	
April 20xx	
October 20xx	
December 20xx	

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's impacts on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Epidemic/Pandemic/Vector-Borne Diseases in the (City of ???)** below.

Impact of Epidemic/Pandemic/Vector-Borne Diseases in the (City of ???)

Based on the risk assessment, it is evident that Epidemic/Pandemic/Vector-Borne Diseases will continue to have potentially devastating economic impacts to the (City of ???). Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life;
- ✓ Disruption of public infrastructure;
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community; and
- ✓ Negative impact on commercial and residential property values.



PART III: MITIGATION STRATEGIES

Mitigation Strategies

Overview of Mitigation Strategy

As the cost of damage from natural disasters continues to increase nationwide, the City of Sierra Madre recognizes the importance of identifying effective ways to reduce vulnerability to disasters. Mitigation Plans assist communities in reducing risk from natural hazards by identifying resources, information and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the City.

The plan provides a set of action items to reduce risk from natural hazards through education and outreach programs, and to foster the development of partnerships. Further, the plan provides for the implementation of preventative activities, including programs that restrict and control development in areas subject to damage from natural hazards.

The resources and information within the Mitigation Plan:

1. Establish a basis for coordination and collaboration among agencies and the public in the City of Sierra Madre;
2. Identify and prioritize future mitigation projects; and
3. Assist in meeting the requirements of federal assistance programs

The Mitigation Plan is integrated with other City plans including the City of Sierra Madre Emergency Operations Plan, General Plan as well as department-specific standard operating procedures.

Mitigation Measure Categories

Following is FEMA's list of mitigation categories. The activities identified by the Planning Team are consistent with the six broad categories of mitigation actions outlined in FEMA publication 386-3 *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies*.

- ✓ **Prevention:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
- ✓ **Property Protection:** Actions that involve modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- ✓ **Public Education and Awareness:** Actions to inform and educate citizens, property owners, and elected officials about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.



- ✓ **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses preserve or restore the functions of natural systems. Examples include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- ✓ **Emergency Services:** Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- ✓ **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, retaining walls, and safe rooms.

Q&A | ELEMENT C. MITIGATION STRATEGY | C3

Q: Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))

A: See **Goals** below.

Goals

In the 2008 HMP, the Planning Team identified the overall goal of avoiding or reducing long-term vulnerabilities to hazards. The Team agreed to maintain the overall goal as well as the five mitigation goals identified below.

The goals are based on the risk assessment and Planning Team input, and represents a long-term vision for hazard reduction or enhanced mitigation capabilities. They are compatible with community needs and goals expressed in other planning documents prepared by the City.

Each goal is supported by mitigation action items. The Planning Team developed these action items through its knowledge of the local area, risk assessment, review of past efforts, identification of mitigation activities, and qualitative analysis.

The five mitigation goals and descriptions are listed below.

Protect Life and Property

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 insurance coverage for catastrophic hazards.

Improve hazard assessment information to make recommendations for discouraging new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural hazards.

FEMA defines **Goals** as general guidelines that explain what you want to achieve. They are usually broad policy-type statements, long-term, and represent global visions.

FEMA defines **Mitigation Activities** as specific actions that help you achieve your goals and objectives.



Enhance Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.

Provide information on tools; partnership opportunities, and funding resources to assist in implementing mitigation activities.

Preserve Natural Systems

Balance natural resource management, and land use planning with natural hazard mitigation to protect life, property, and the environment.

Preserve, rehabilitate, and enhance natural systems to serve natural hazard mitigation functions.

Encourage 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

Strengthen Emergency Services

Establish policy to ensure 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 natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

The Planning Team also developed hazard-specific mitigation goals, which appear in the **Mitigation Strategies Section**.

How are the Mitigation Action Items Organized?

The action items are a listing of activities in which City agencies and citizens can be engaged to reduce risk. Each action item includes an estimate of the timeline for implementation.

The action items are organized within the following **Mitigation Actions Matrix**, which lists all of the multi-hazard (actions that reduce risks for more than one specific hazard) and hazard-specific action items included in the mitigation plan. Data collection and research and the public participation process resulted in the development of these action items. The Matrix includes the following information for each action item:



Funding Source

The action items can be funded through a variety of sources, possibly including operating budget/general fund, development fees, Community Development Block Grant (CDBG), Hazard Mitigation Grant Program (HMGP), other Grants, private funding, Capital Improvement Plan, and other funding opportunities.

Coordinating Organization

The Mitigation Actions Matrix assigns primary responsibility to a particular department or agency for each of the mitigation action items. The primary responsibility for implementing the action items falls to the entity shown as the “Coordinating Organization”. The coordinating organization is the department or agency with regulatory responsibility to address hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. Generally, the coordinating organization is within the City government however in some cases important responsibilities are outsourced to Los Angeles County or other regional agencies.

Plan Goals Addressed

The plan goals addressed by each action item are included as a way to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins.

The plan goals are organized into the following five areas:

- ✓ Protect Life and Property
- ✓ Enhance Public Awareness
- ✓ Preserve Natural Systems
- ✓ Encourage Partnerships and Implementation
- ✓ Strengthen Emergency Services
- ✓ Regulation and Permitting

Planning Mechanism

It's important that each action item be implemented. Perhaps the best way to ensure implementation is through integration with one or many of the City's existing “planning mechanisms” including the General Plan, Capital Improvement Program, General Fund and Grants. Opportunities for integration will be simple and easy in cases where the action item is already compatible with the content of the planning mechanism. As an example, if the action item calls for the creation of a floodplain ordinance and the same action is already identified in the General Plan's policies, then the General Plan will assist in implementation. On the contrary, if preparation of a floodplain ordinance is not already included in the General Plan policies then the item will need to be added during the next update to the General Plan. The General Plan was last updated in 2015 and was used as a resource throughout the Mitigation Plan. The next General Plan update will likely not take place for another 20 years.

The Capital Improvement Program, depending on the budgetary environment, is updated every 5 years. The CIP includes infrastructure projects built and owned by the City. As such, the CIP is an excellent medium for funding and implementing action items from the Mitigation Plan. The Mitigation Actions Matrix includes several items from the existing CIP. The authors of the CIP



served on the Planning Team and are already looking to funding addition Mitigation Plan action items in future CIPs.

The General Fund is the budget document that guides all of the City's expenditures and is updated on an annual basis. Although primarily a funding mechanism, it also includes descriptions and details associated with tasks and projects.

Grants come from a wide variety of sources – some annually and other triggered by events like disasters. Whatever the source, the Town uses the General Fund to identify successful grants as funding sources.

Building and Infrastructure

This addresses the issue of whether or not a particular action item results in the reduction of the effects of hazards on new and existing buildings and infrastructure.

Comments

The purpose of the "Comments" is to capture the notes and status of the various action items. Since Planning Team members frequently change between plan updates and annual reviews, the Comments provide a sort of history to help in tracking the progress and status of each action. Comments are expressed in terms of Completed, Revised, Deleted, New, Deferred, and Notes.

Q&A | ELEMENT C. MITIGATION STRATEGY | C5a.

Q: Does the plan explain how the mitigation actions and projects will be prioritized (including cost benefit review)? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

A: See **Benefit/Cost Ratings** and **Priority Rating** below.

Benefit/Cost Ratings

The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grant program. A less formal approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects.

Cost ratings were defined as follows:

High: Existing jurisdictional funding will not cover the cost of the action item so other sources of revenue would be required.

Medium: The action item could be funded through existing jurisdictional funding but would require budget modifications.

Low: The action item could be funded under existing jurisdictional funding.



Benefit ratings were defined as follows:

High: The action item will provide short-term and long-term impacts on the reduction of risk exposure to life and property.

Medium: The action item will have long-term impacts on the reduction of risk exposure to life and property.

Low: The action item will have only short-term impacts on the reduction of risk exposure to life and property.



Priority Rating

Going beyond rating “benefit and cost” as used in the 2008 HMP, the Planning Team adopted the following process for rating the “priority” of each mitigation action item. Designations of “High”, “Medium”, and “Low” priority have been assigned to each action item using the following criteria:

Does the Action:

- ☐ solve the problem?
- ☐ address Vulnerability Assessment?
- ☐ reduce the exposure or vulnerability to the highest priority hazard?
- ☐ address multiple hazards?
- ☐ benefits equal or exceed costs?
- ☐ implement a goal, policy, or project identified in the General Plan or Capital Improvement Plan?

Can the Action:

- ☐ be implemented with existing funds?
- ☐ be implemented by existing state or federal grant programs?
- ☐ be completed within the 5-year life cycle of the HMP?
- ☐ be implemented with currently available technologies?

Will the Action:

- ☐ be accepted by the community?
- ☐ be supported by community leaders?
- ☐ adversely impact segments of the population or neighborhoods?
- ☐ require a change in local ordinances or zoning laws?
- ☐ positive or neutral impact on the environment?
- ☐ comply with all local, state and federal environmental laws and regulations?

Is there:

- ☐ sufficient staffing to undertake the project?
- ☐ existing authority to undertake the project?

As mitigation action items were updated or written the Planning Team, representatives were provided worksheets for each of their assigned action items. Answers to the criteria above determined the priority according to the following scale.

- 1-6 = Low priority
- 7-12 = Medium priority
- 13-18 = High priority



Q&A | ELEMENT C. MITIGATION STRATEGY | C1b.

Q: Does the plan document each jurisdiction's ability to expand on and improve these existing policies and programs? (Requirement §201.6©(3)) c

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C4a.

Q: Does the plan identify and analyze a comprehensive range (different alternatives) of specific mitigation actions and projects to reduce the impacts from hazards? (Requirement §201.6©(3)(ii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C4b.

Q: Does the plan identify mitigation actions for every hazard posing a threat to each participating jurisdiction? (Requirement §201.6©(3)(ii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C4c.

Q: Do the identified mitigation actions and projects have an emphasis on new and existing buildings and infrastructure? (Requirement §201.6©(3)(ii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C5a.

Q: Does the plan explain how the mitigation actions and projects will be prioritized (including cost benefit review)? (Requirement §201.6©(3)(iv)); (Requirement §201.6©(3)(iii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C5b.

Q: Does the plan identify the position, office, department, or agency responsible for implementing and administering the action/project, potential funding sources and expected timeframes for completion? (Requirement §201.6©(3)(iv)); (Requirement §201.6©(3)(iii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D1

Q: Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D2

Q: Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D3

Q: Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))

A: See **Mitigation Actions Matrix** below.



Mitigation Actions Matrix

Following is **Table: Mitigation Actions Matrix** which identifies the existing and future mitigation activities developed by the Planning Team.

Table: Mitigation Actions Matrix

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
Multi-Hazard Mitigation Action Items														
MH-1 Integrate the goals and action items from the City of Sierra Madre Hazard Mitigation Plan into existing regulatory documents and programs, where appropriate.	Executive Team (ETeam)	Ongoing	X	X		X			FY, FY	Y	M	L	L	Revised, Note: 2015 General Plan Update
MH-2 Identify and pursue funding opportunities to develop and implement neighborhood and city mitigation activities.	Fire Department	Ongoing	X	X	X	X	X	X	FY, FY	Y	H	L	H	Revised
MH-3 Develop inventories of Unreinforced Masonry	Planning Department	1-2 Years	X	X	X	X	X	X	FY, FY	Y	H	H	H	Revised



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
Buildings and Soft-Story Structures.														
MH-4 Strengthen emergency services preparedness by enhancing public awareness.	Police Department	Ongoing	X	X	X	X	X	X	FY, FY		H	L	H	Revised
MH-5 Develop a Multi-Hazard Emergency Evacuation Plan	Police Department, Fire Department	1 year	X	X	X	X	X		FY, FY		H	L	H	New
MH-6 Buy Vector to pneumatically collect liquids, sludges, slurries, sewage or other spills from a location thereby reducing the threat of exposure to hazardous spills.	Public Works Department		X						GF, GF		H	H	M	New
MH-7 (General Plan – Safety Element Policy Hz 3.1) Continue to cooperate with Area C Fire Departments for second and third alarm calls and	Fire Department	Ongoing	X			X	X		FY		H	L	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
continue with the State-wide Mutual Aid Agreements														
MH-8 (General Plan – Safety Element Policy Hz 4.1) Update the Emergency Operations Plan annually (EOC Related)	Fire Department, Police Department, Public Works, Community Planning and Preservation Department	Ongoing	X			X	X		FY		H	L	H	New
MH-9 (General Plan – Safety Element Policy Hz 4.2) Maintain a fully operational Emergency Operations Center (EOC Related)	Fire Department, Police Department, Public Works, IT	Ongoing	X			X	X		FY		H	L	H	New
MH-10 (General Plan – Safety Element Policy Hz 4.3) Enlist participation from the community and City staff for emergency operations (EOC Related)	Public Works, Fire Department	Ongoing	X			X	X		FY		H	L	H	New
MH-11 (General Plan – Safety Element Hz 4.4) Provide emergency	Public Works, Fire Department	Ongoing	X			X	X		FY		H	L	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
operations training and conduct test runs (EOC Related)														
MH-12 (General Plan – Safety Element Hz 4.5) Review and upgrade emergency operations equipment such as 911 equipment, and the police dispatch system as needed to maintain modern levels of service (EOC Related)	Police Department, Fire Department, IT	Ongoing	X			X	X		FY		H	H	H	New
MH-13 (General Plan – Safety Element Policy Hz 4.6) Develop and utilize emergency public communication systems	Police Department, Fire Department, IT	Ongoing	X			X	X		FY		H	H	H	New
Earthquake Mitigation Action Items														
EQ-1 Utilize contemporary seismic maps during plan/permit review process.	Community Planning & Preservation Department	Ongoing	X	X	X	X	X	X	FY, FY	Y	H	L	H	Revised



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
EQ-2 Incorporate the Regional Earthquake Transportation Evacuation Route updated developed by the Area D Disaster Management Area Coordinators into the Emergency Operations Plan.	Fire Department	Ongoing	X	X	X	X	X		FY, FY		H	L	H	Revised
EQ-3 Identify funding sources for structural and non-structural retrofitting of City-owned structures that are seismically vulnerable (e.g. City Library).	Community Planning & Preservation Department	1-2 years	X	X	X	X	X		GR, GR	Y	H	H	H	Revised
EQ-4 Encourage purchase of earthquake hazard insurance for private properties and uninsured City-owned properties.	ETeam	2 years		X					FY, FY		H	L	H	Revised
EQ-5 Encourage hazard reduction with non-structural and structural	Administration	Ongoing	X	X			X		FY, FY	Y	H	L	H	Revised



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
earthquake retrofits and other strategies in homes, businesses, and City facilities.														
EQ-6 Replace water mains in fault zones with seismic pipe thereby maintaining water system integrity and reducing the threat to life and property loss by providing fire suppression.	Public Works Department	5 years	X	X	X		X	X	GF, GF	Y	H	H	H	New
EQ-7 Renovate main booster plant with new booster pumps and control panels thereby ensuring reliable water delivery to City's distribution system.	Public Works Department	3-5 years	X	X	X		X	X	GR, GR	Y	H	H	H	New
EQ-8 Seismic retrofit of Auburn reservoir thereby preserving stored water for domestic use and fire suppression.	Public Works Department	3-5 years	X	X	X		X	X	GR, GR	Y	H	H	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
EQ-9 (General Plan – Safety Element Policy Hz 10.1) Require that earthquake survival and efficient post-disaster functioning be a primary concern in the siting, design and construction standards for essential facilities in Sierra Madre	Public Works Department	Ongoing	X				X	X	CIP	Y	H	H	H	New
EQ-10 (General Plan – Safety Element Policy Hz 10.2) Conduct geological studies on fault zones within the City and identify threatened structures and limitations on land for potential construction	Public Works, Building and Safety, Planning	Ongoing	X			X		X	GP	Y	H	H	H	New
EQ-11 (General Plan – Safety Element Policy Hz 10.3) Adopt/Amend ordinance addressing structures identified as	Building and Safety, Planning	Ongoing	X					X	FY		H	L	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
having seismic hazards to require retrofits.														
EQ-12 (General Plan – Safety Element Policy Hz 10.4) Require a thorough subsurface fault investigation for any proposed habitable structure on private property in close proximity of an active fault zone and monitor any trenching for public buried water lines in the same area.	Public Works, Building and Safety	Ongoing	X		X	X		X	GP	Y	H	H	H	New
EQ-13 (General Plan – Safety Element Policy Hz 10.5) Create a central depository of all Sierra Madre geological information the City obtains through any project approvals process, including any government	Public Works, Planning, Building and Safety	Ongoing	X	X	X	X		X	GP		H	L	M	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
projects (URM, Soft-first Story)														
EQ-14 General Plan – Safety Element Policy (Hz 11.1) Promote public awareness of the need to upgrade seismically hazardous buildings for the protection of health and safety in the City (URM, Soft-first story)	Planning, Public Works, Building and Safety	5 Years	X	X		X	X	X	GP	Y	H	H	H	New
EQ-15 (General Plan – Safety Element Policy Hz 11.2) Require seismic review of buildings (URM, Soft-first story)	Building and Safety	5 Years	X	X		X	X	X	GP	Y	H	H	H	New
EQ-16 (General Plan – Safety Element Policy Hz 11.3) Promote seismic upgrading of older residential and commercial structures with special attention given to	Building and Safety	5 Years	X	X		X	X	X	GP	Y	H	H	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
historic structures (URM, Soft-first story)														
EQ-17 General Plan – Safety Element Policy (Hz 12.1) Maintain and update multi-hazard emergency preparedness plan for the City that includes seismic safety	Public Works, Planning, Police Department, Fire Department, IT	Ongoing	X			X	X		GP		H	H	H	New
EQ-18 (General Plan – Safety Element Policy Hz 12.2) Maintain and upgrade the City's disaster response plans at least annually, conduct periodic tests of their practicality and effectiveness, and involve residents and business in the preparation and testing of the plans	Public Works, Fire Department, Planning, Police Department, IT	Ongoing	X	X		X	X		GP		H	M	H	New
EQ-19 (General Plan – Safety Element Policy Hz 12.3) Prepare and	Public Works, Fire Department, Building and Safety,	Ongoing	X	X		X	X		GP		H	H	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
disseminate to residents and businesses information regarding seismic risks affecting the City, measures to protect life and property before and during an earthquake, and emergency procedures to follow after an earthquake	Community Services, Library													
EQ-20 (General Plan – Safety Element Policy Hz 12.4) Incorporate planning for potential incidents affecting critical, sensitive and high-occupancy facilities into the City's contingency plans for disaster response and recovery	Public Works, Fire Department, Building and Safety, Community Services, Library	Ongoing	X				X		GP, CIP	Y	H	H	H	New
EQ-21 (General Plan – Safety Element Policy Hz 12.5) Ensure that emergency preparedness	All City Departments	Ongoing	X	X		X	X		GP		H	H	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
is the mutual responsibility of City agencies, City residents and the business community														
EQ-22 (General Plan – Safety Element Policy Hz 12.6) Develop and implement ongoing City-wide programs for disaster preparedness and recovery planning	All City Departments	Ongoing	X				X		GP		H	H	H	New
EQ-23 (General Plan – Safety Element Policy Hz 13.1) Provide residents and business owners with a continuing awareness and expanding knowledge of the seismic hazards affecting the City.	Public Works, Community Services	Ongoing	X	X		X			GP		H	L	M	New
Wildfire Mitigation Action Items														
WF-1 Enhance emergency services to increase the efficiency of	Fire Department	4 years	X		X		X		GR, GR	Y	M	H	H	Revised



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
wildfire response and recovery activities through purchase of a Type 5 Vehicle.														
WF-2 Maintain contemporary collection of maps relating to the fire hazard to help educate and assist builders and homeowners in mitigating against wildfire.	Fire Department, Planning Department	Ongoing	X	X	X	X	X	X	FY, FY	Y	H	L	H	Revised
WF-3 Enhance outreach and education programs (e.g. CAL FIRE, Vegetation Management) aimed at mitigating wildfire hazards.	Fire Department	Ongoing	X	X	X	X	X	X	FY, FY	Y	H	L	H	Revised
WF-4 Develop a Vegetation Management Program.	Fire Department	1 year	X	X	X	X	X	X	FY, FY	Y	H	L	H	New
WF-5 (General Plan – Safety Element Policy Hz 2.4) Ensure the quantity and	Public Works	Ongoing	X				X	X	FY	Y	H	M	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
capacity of resources are available for safety purposes for new construction projects														
WF-6 (General Plan – Safety Element Policy Hz 2.5) Assess the environmental impacts of development on fire hazards and emergency response time, and ensure fire protection standards are met throughout the review process	Building & Safety, Fire Department	Ongoing	X					X	FY	Y	H	M	H	New
WF-7 (General Plan – Safety Element Policy Hz 2.9) Maintain and update the fire prevention design measures of the hillside development standards	Fire Department, Planning	Ongoing	X			X	X	X	FY		H	L	M	New
WF-8 (General Plan Safety Element Policy Hz 2.10) Develop a solution to parking issues that	Public Works, Police Department, Community	Ongoing	X			X	X	X	FY	Y	H	M	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
affect Fire Department access in the canyon areas														
WF-9 (General Plan - Safety Element Policy Hz 5.1) Mandate annual brush removal	Public Works, Fire Department	Ongoing	X		X			X	FY		M	H	M	New
WF-10 (General Plan – Safety Element Policy Hz 5.2) Work with community groups in presenting information and trainings regarding wildfire prevention and awareness	Public Works, Fire Department, Library	Ongoing	X	X	X	X			FY		M	H	M	New
Landslide Mitigation Action Items														
LND-1 Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	Planning Department	Ongoing	X	X		X	X	X	FY, FY	Y	H	L	H	Revised
LND-2 To the extent feasible, provide	Public Works Department	Ongoing	X	X	X		X		GR, GR	Y	M	H	H	Revised



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
protective measures designed to limit debris flow resulting from the fire/mudflow sequence, thereby reducing the threat to life and property relative to existing development in threatened areas including debris basins enhancements, and property purchases.														
LND-3 Amend Hillside Management Zone.	Planning Department	1 year	X	X	X			X	FY, FY	Y	H	L	H	New
Flood Mitigation Action Items														
FLD-1 Identify surface water drainage obstructions for all parts of the City of Sierra Madre.	Public Works Department	5 years	X						GR, GR					Revised
FLD-2 Capture flood waters to lessen the flow within the City streets.	Public Works	10 years	X	X				X	GR, GR	Y	L	H	M	New
FLD-3 (General Plan – Safety Element Policy Hz	Building and Safety, Public Works	Ongoing	X		X	X		X	FY	Y	H	L	H	Yes



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
6.1) Require that all new development incorporates sufficient measures to mitigate flood hazards, including the design of containment systems to capture stormwater runoff on-site, and site grading that minimizes stormwater runoff from increased impervious surfaces, thereby addressing impacts to on-site structures and adjacent properties (change language to require LID/NPDES)														
FLD-4 (General Plan – Safety Element Policy Hz 6.2) Require that the landscape of open space areas provide the maximum permeable surface area to reduce site	Building and Safety, Public Works, Planning	Ongoing	X		X	X		X	FY		H	L	H	Yes



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
runoff, and prohibit the paving of a majority of these areas														
FLD-5 (General Plan – Safety Element Policy Hz 7.1) In the event of a flood, utilize the Incident Command and the National Incident Management System	Fire Department, Police Department, Public Works, Volunteer Search and Rescue	Ongoing	X			X	X		FY	Y	H	H	H	Yes
FLD-6 (General Plan – Safety Element Policy Hz 7.2) Schedule emergency evacuation drills to prepare for the event of floods	All City Departments	Ongoing	X				X		FY	Y	H	L	H	Yes
FLD-7 (General Plan – Safety Element Policy Hz 8.1) Require that residential tract developers be responsible for construction of drainage/storm drain systems improvements	Public Works, Planning	Ongoing	X			X	X	X	GP	Y	H	H	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
that are compatible with City and County systems within or adjacent to their project site														
FLD-8 (General Plan – Safety Element Policy Hz 8.2) Install required public storm drainage improvements	Public Works	Ongoing	X			X	X	X	GP, CIP	Y	H	H	H	New
FLD-9 (General Plan – Safety Element Policy Hz 8.3) Maintain efforts to keep the debris basins clean	Public Works, LA County	Ongoing	X			X	X	X	FY	Y	H	H	H	New
FLD-10 (General Plan – Safety Element Policy Hz 9.1) Obtain and make available to the public updated flood hazard maps prepared by FEMA	Public Works, Planning & Library	Ongoing	X	X	X		X	X	GP, GP	Y	H	L	H	New
FLD-11 Work with NFIP to have the FIRM updated for the project area.	Public Works, Administration	5 years	X	X	X	X	X	X	FY, FY	Y	H	n/a	H	New



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
Windstorm Mitigation Action Items															
WND-1 Develop Public Awareness Campaign: To provide public education materials to City residents pertaining to the protection of life and property before, during, and after a windstorm.	Fire Department, Library	1-2 years	X	X	X	X	X	X	FY, FY		H	L	H	Revised	
WND-2 Create local City awareness of tree appropriateness in regard to the Fire Code Sections relevant to utility operations.	Public Works Department	Ongoing	X	X	X	X	X	X	FY, FY		H	L	H	Revised	
WND-3 Encourage property owners and Critical Facilities to purchase and/or test backup power facilities for use during a power failure. Create an equipment/testing log to	Public Works	Ongoing	X	X	X	X	X	X	GR, GR	Y	H	H	H	Revised	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
ensure backup power equipment is in working service.														
Utility-Related Mitigation Action Items														
UT-1 Install Public Safety protective shut-offs for power.	Public Works	5 years	X	X	X	X	X	X	GR, GR	Y	H	H	H	New
UT-2 Prepare public and emergency services for Public Safety Power Shutoffs (PSPS) by providing back-up generators for critical City facilities and at-risk members of the community. Pursue solar power and energy storage as alternative sources of power during PSPS events for critical City facilities.	Public Works	1 year	X	X			X		GR, GR	Y	H	H	H	New
UT-3 Secure adequate water surplus and sources	Public Works	3 years	X	X	X	X		X	GR, GR	Y	H	H	H	New



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
during drought years to meet demands of public health and safety and emergency response.														
UT-4 Identify alternative sources of water and distribution capabilities in the event of a system-wide contamination emergency	Public Works	3 years	X	X	X	X	X		GR, GR	Y	H	H	H	New
UT-5 Make necessary upgrades to sewer infrastructure and overflow response actions to prevent major sewer overflows.	Public Works	3 years	X				X		GR, GR	Y	H	H	M	New
Epidemic / Pandemic / Vector-Borne Mitigation Action Items														
EPV-1 Develop inventories of PPE, and emergency supplies for pandemic distribution.	Fire Department	Ongoing	X	X		X	X		FY		H	M	H	New
EPV-2 Encourage community preventive	Public Works	Ongoing	X	X		X	X		FY		H	L	H	New



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting						
measures, through implementation of signage in all public facilities.														
EPV-3 Implement annual community wellness campaign, providing educational information to public, formatted to stopping the spread of illness.	Fire Department	Ongoing	X	X		X	X		FY		H	L	H	New
EPV-4 Identify and pursue funding opportunities to develop and implement neighborhood and city mitigation activities.	ETeam	Ongoing	X	X		X	X		FY		H	L	H	New



Plan Maintenance

The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan update every five years. This section describes how the City will integrate public participation throughout the plan maintenance process.

Q&A | ELEMENT A: PLANNING PROCESS | A6a.

Q: Does the plan identify how, when, and by whom the plan will be **monitored** (how will implementation be tracked) over time? (Requirement §201.6(c)(4)(i))

A: See **Method and Scheduling of Plan Implementation** below.

Method and Scheduling of Plan Implementation

The Planning Team that was involved in research and writing of the Plan will also be responsible for implementation. The Planning Team will be led by the Planning Team Chair (Brent Bartlett, Fire Captain) who will be referred to as the Local Mitigation Officer.

	Year 1	Year 2	Year 3	Year 4	Year 5
Monitoring	XXXX	XXXX	XXXX	XXXX	XXXX
Evaluating					X
Internal Planning Team Evaluation	X	X	X	X	X
Cal OES and FEMA Evaluation					X
Updating					X

Monitoring and Implementing the Plan

Plan Adoption

The City Council will be responsible for adopting the Mitigation Plan. This governing body has the authority to promote sound public policy regarding hazards. Once the plan has been adopted, the Local Mitigation Officer will be responsible for submitting it to the State Hazard Mitigation Officer at California Office of Emergency Services (Cal OES). Cal OES will then submit the plan to the Federal Emergency Management Agency (FEMA) for review and approval. This review will address the requirements set forth in 44 C.F.R. Section 201.6 (Local Mitigation Plans). Upon acceptance by FEMA, City of Sierra Madre will gain eligibility for Hazard Mitigation Grant Program funds.

Local Mitigation Officer

Under the direction of the Local Mitigation Officer, the Planning Team will take responsibility for plan maintenance and implementation. The Local Mitigation Officer will facilitate the Planning Team meetings and will assign tasks such as updating and presenting the Plan to the members of the Planning Team. Plan implementation and evaluation will be a shared responsibility among all of the Planning Team members. The Local Mitigation Officer will coordinate with City leadership to ensure funding and support for 5-year updates to Plan as required by FEMA.



The Planning Team will be responsible for coordinating implementation of plan action items and undertaking the formal review process. The Local Mitigation Officer will be authorized to make changes in assignments to the current Planning Team.

The Planning Team will meet no less than quarterly to review the status of the mitigation action items. Meeting dates will be scheduled once the final Planning Team has been established. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the mitigation plan.

Q&A | ELEMENT C. MITIGATION STRATEGY | C6a.

Q: Does the plan identify the local planning mechanisms where hazard mitigation information and/or actions may be incorporated? (Requirement §201.6(c)(4)(ii))

A: See **Implementation through Existing Program** below.

Implementation through Existing Programs

The City of Sierra Madre addresses statewide planning goals and legislative requirements through its General Plan, its Capital Improvement Plan, and the State's Building and Safety Codes. The Mitigation Plan provides a series of recommendations - many of which are closely related to the goals and objectives of existing planning programs. The City of Sierra Madre will incorporate hazard information and implement recommended mitigation action items through existing programs and procedures.

The City of Sierra Madre Community Planning and Preservation Department is responsible for adhering to the State of California's Building and Safety Codes. In addition, the Planning Team will work with other agencies at the state level to review, develop and ensure the adopted Building and Safety Codes are adequate to mitigate or present damage by hazards. This is to ensure that life-safety criteria are met for new construction.

Some of the goals and action items in the Mitigation Plan will be achieved through activities recommended in the CIP. Various City departments develop the CIP and review it on an annual basis. Upon annual review of the CIP, the Planning Team will work with the City departments to identify areas that the Mitigation Plan action items are consistent with CIP goals and integrate them where appropriate.

Upon FEMA approval, the Planning Team will begin the process of incorporating existing planning mechanisms at the City level. The meetings of the Planning Team will provide an opportunity for Planning Team members to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.

Upon FEMA approval, the Planning Team will begin the process of incorporating risk information and mitigation action items into existing planning mechanisms including the General Plan, Capital Improvement Program, and other planning mechanisms (see Mitigation Action Matrix for links between individual action items and associated planning mechanism). The meetings of the Planning Team will provide an opportunity for Planning Team members to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.



Specifically, the Planning Team will utilize the updates of the following documents to implement the Mitigation Plan:

- ✓ Risk Assessment, Community Profile, Planning Process (stakeholders) – General Plan Land Use Element, City's Emergency Operations Plan, Community Forest Management Plan, Storm Water Management Plan
- ✓ Community Profile – General Plan Housing Element (2014-2021)
- ✓ Risk Assessment, Hazard-Specific Sections, General Hazard Overviews – General Plan Safety Element
- ✓ Mitigation Actions Matrix – Annual Budget, Capital Improvement Program

It's important to note that since the approval and adoption of the Hazard Mitigation Plan (2008), the only documents that were updated were the Annual Budget and the General Plan. Although the Annual Budget did provide funding for a few of the mitigation action items, those items were not specifically identified as coming from the Hazard Mitigation Plan (2008). The 2015 General Plan did include mention of the 2008 Hazard Mitigation Plan although there were no specific references to any of the identified mitigation action items.

Economic Analysis of Mitigation Projects

FEMA's approach to identify the costs and benefits associated with hazard mitigation strategies, measures, or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis.

Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later.

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating hazards can provide decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Given federal funding, the Planning Team will use a FEMA-approved benefit/cost analysis approach to identify and prioritize mitigation action items. For other projects and funding sources, the Planning Team will use other approaches to understand the costs and benefits of each action item and develop a prioritized list.

The "benefit", "cost", and overall "priority" of each mitigation action item was included in the Mitigation Actions Matrix located in Part III: Mitigation Strategies. A more technical assessment will be required in the event grant funding is pursued through the Hazard Mitigation Grant Program. FEMA Benefit-Cost Analysis Guidelines are discussed below.

FEMA Benefit-Cost Analysis Guidelines

The Stafford Act authorizes the President to establish a program to provide technical and financial assistance to state and local governments to assist in the implementation of hazard mitigation measures that are cost effective and designed to substantially reduce injuries, loss of life, hardship, or the risk of future damage and destruction of property. To evaluate proposed hazard mitigation projects prior to funding FEMA requires a Benefit-Cost Analysis (BCA) to validate cost



effectiveness. BCA is the method by which the future benefits of a mitigation project are estimated and compared to its cost. The end result is a benefit-cost ratio (BCR), which is derived from a project's total net benefits divided by its total project cost. The BCR is a numerical expression of the cost effectiveness of a project. A project is considered to be cost effective when the BCR is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs.

Although the preparation of a BCA is a technical process, FEMA has developed software, written materials, and training to support the effort and assist with estimating the expected future benefits over the useful life of a retrofit project. It is imperative to conduct a BCA early in the project development process to ensure the likelihood of meeting the cost-effective eligibility requirement in the Stafford Act.

The BCA program consists of guidelines, methodologies and software modules for a range of major natural hazards including:

- ✓ Flood (Riverine, Coastal Zone A, Coastal Zone V)
- ✓ Hurricane Wind
- ✓ Hurricane Safe Room
- ✓ Damage-Frequency Assessment
- ✓ Tornado Safe Room
- ✓ Earthquake
- ✓ Wildfire

The BCA program provides up to date program data, up to date default and standard values, user manuals and training. Overall, the program makes it easier for users and evaluators to conduct and review BCAs and to address multiple buildings and hazards in a single BCA module run.

Q&A | ELEMENT A: PLANNING PROCESS | A6a.

Q: Does the plan identify how, when, and by whom the plan will be **monitored** (how will implementation be tracked) over time? (Requirement §201.6(c)(4)(i))

A: See **Evaluating and Updating the Plan** below.

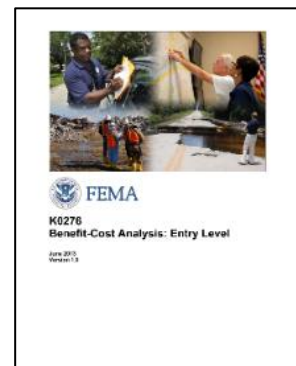
Q&A | ELEMENT A: PLANNING PROCESS | A6c.

Q: Does the plan identify how, when, and by whom the plan will be **updated** during the 5-year cycle? (Requirement §201.6(c)(4)(i))

A: See **Evaluating and Updating the Plan** below.

Evaluating and Updating the Plan

The Planning Team will be responsible for coordinating implementation of plan by monitoring the progress of the mitigation action items and documenting progress notes for each item. It will be up to the Local Mitigation Officer to hold a live meeting versus tasking the coordinating agencies with status updates on their own assigned mitigation action items. The monitoring meetings will take place no less than quarterly. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the





sustainability of the mitigation plan. See the **Quarterly Implementation Report** discussed below which will be a valuable tool for the Planning Team to measure the success of the Hazard Mitigation Plan. The focus of the quarterly meetings will be on the progress and changes to the Mitigation Action Items.

Quarterly Implementation Report

The Quarterly Implementation Report is the same as the Mitigation Action Matrix but with a column added to the far right to track the quarterly status of each Action Item. Upon approval and adoption of the Plan, the entire Quarterly Implementation Report will be added to the Appendix of the Plan. See **Appendix** for the Quarterly Implementation Report.

An equally part of the monitoring process is the need to maintain a strategic planning process which needs to include funding and organizational support. In that light, at least one year in advance of the FEMA-mandated 5-year submission of an update, the Local Mitigation Officer will convene the Planning Team to discuss funding and timing of the update planning process. On the fifth year of the planning cycles, the Planning Team will broaden its scope to include discussions and research on all of the sections within the Plan with particular attention given to goal achievement and public participation.

Q&A | ELEMENT A: PLANNING PROCESS | A6b.

Q: Does the plan identify how, when, and by whom the plan will be **evaluated** (assessing the effectiveness of the plan at achieving stated purpose and goals) over time? (Requirement §201.6(c)(4)(i))

A: See **Evaluation** below.

Evaluation

At the conclusion of the 4th Quarterly Report meeting each year, the Local Mitigation Officer will lead a discussion with the Planning Team on the success (or failure) of the Mitigation Plan to meet the Plan Goals. The results of that discussion will be added to the 4th Quarterly Report and inclusion in the 5-year update to the Plan. Efforts will be made immediately by the Local Mitigation Officer to address any failed Plan Goals.

Formal Update Process

The Mitigation Plan will be monitored on a quarterly basis to determine the effectiveness of mitigation action items and to reflect changes in land development or programs that may affect mitigation actions or their priorities. The evaluation process includes a firm schedule and timeline, and identifies the agencies and organizations participating in plan evaluation. The Local Mitigation Officer or designee will be responsible for contacting the Planning Team members and organizing the quarterly meeting. Planning Team members will also be responsible for participating in the formal update to the Plan every fifth year of the planning cycle.

The Planning Team will review the goals and mitigation action items to determine their relevance to changing situations in the City, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The Planning Team will also review the Plan's **Risk Assessment** portion of the Plan to determine if this information should be updated



or modified, given any new available data. The **coordinating organizations** responsible for the various action items will report on the status of their projects, including the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised. Amending will be made to the Mitigation Actions Matrix and other sections in the Plan as deemed necessary by the Planning Team.

Q&A | ELEMENT A: PLANNING PROCESS | A5

Q: Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))

A: See **Continued Public Involvement** below.

Continued Public Involvement

The City of Sierra Madre is dedicated to involving the public directly in the continual review and updates to the Mitigation Plan. Copies of the plan will be catalogued and made available at City Hall and at all City operated public libraries. The existence and location of these copies will be publicized in City newsletters and on the City website. This site will also contain an email address and phone number where people can direct their comments and concerns. A public meeting will also be held after each evaluation or when deemed necessary by the Planning Team. The meetings will provide the public a forum in which they can express their concerns, opinions, or ideas about the Plan.

The Local Mitigation Officer will be responsible for using City resources to publicize the annual public meetings and maintain public involvement through the public access channel, web page, and newspapers.



PART IV: ATTACHMENTS

FEMA Letter of Approval

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052



FEMA

September 11, 2020

Brent Bartlett
Acting Fire Chief
Fire Department
242 W. Sierra Madre Boulevard
Sierra Madre, CA 91024

Dear Mr. Bartlett:

We have completed our final review of the *City of Sierra Madre Hazard Mitigation Plan*, officially adopted by the City of Sierra Madre on September 8, 2020 and found the plan to be in conformance with Title 44 Code of Federal Regulations (CFR) Part 201.6 *Local Mitigation Plans*.

The approval of this plan ensures the City of Sierra Madre's continued eligibility for project grants under FEMA's Hazard Mitigation Assistance programs, including the Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities Program, and Flood Mitigation Assistance Program. All requests for funding, however, will be evaluated individually according to the specific eligibility, and other requirements of the particular program under which applications are submitted.

Also, approved hazard mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Additional information regarding the CRS can be found at <https://www.fema.gov/national-flood-insurance-program-community-rating-system> or through your local floodplain manager.

FEMA's approval of the *City of Sierra Madre Hazard Mitigation Plan* is for a period of five years, effective starting the date of this letter. Prior to September 10, 2025, the City of Sierra Madre is required to review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding. The enclosed plan review tool provides additional recommendations to incorporate into the plan when the City of Sierra Madre undertakes its identified plan maintenance process.

If you have any questions regarding the planning or review processes, please contact the FEMA Region IX Hazard Mitigation Planning Team at fema-r9-mitigation-planning@fema.dhs.gov.

Sincerely,

GREGOR P BLACKBURN

Digitally signed by GREGOR P
BLACKBURN
Date: 2020.09.11 17:10:38 -0700

for Juliette Hayes
Director
Mitigation Division
FEMA, Region IX

Enclosure

cc: Victoria LaMar-Haas, Hazard Mitigation Planning Chief, California Governor's Office of Emergency Services
Jennifer Hogan, State Hazard Mitigation Officer, California Governor's Office of Emergency Services

www.fema.gov



City Council Resolution

RESOLUTION NUMBER 20-56

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SIERRA MADRE, CALIFORNIA, ADOPTING THE 2020 LOCAL HAZARD MITIGATION PLAN

WHEREAS, the City of Sierra Madre is vulnerable to natural and human-caused hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the City of Sierra Madre acknowledges the requirements of Section 322 of DMA 2000 to update the 2005 Local Hazard Mitigation Plan in order to be eligible for pre- and post-disaster federal hazard mitigation grant funds, and

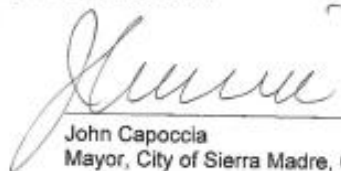
WHEREAS, the City of Sierra Madre 2020 Local Plan has been developed by a Planning Team with representatives from the City of Walnut, Mt. San Antonio Community College District, and Walnut Valley Unified School District, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Multi-Jurisdictional Hazard Mitigation Plan, and

WHEREAS, the 2020 Multi-Jurisdictional Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the District.

NOW THEREFORE BE IT RESOLVED by the City Council that the City of Sierra Madre hereby adopts the 2020 Local Hazard Mitigation Plan.

ADOPTED AND SIGNED this 8th day of September, 2020


John Capoccia
Mayor, City of Sierra Madre, California

I hereby certify that the foregoing Resolution Number 20-56 was adopted by the City Council of the City of Sierra Madre at a regular meeting held on the 8th day of September, 2020.

AYES: Mayor John Capoccia, Mayor Pro Tem Rachelle Arizmendi, Council Member Gene Goss and Council John Harabedian

NOES: None.

ABSTAIN: None.

ABSENT: None.


Laura Aguilar
Assistant City Clerk,
City of Sierra Madre, California



Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))

A: See **Sign-In Sheets** below.

Planning Team Sign-In Sheets

**City of Sierra Madre
Hazard Mitigation Planning Team Meeting #1
June 27, 2019**

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Brent Bartlett	Fire Department
Jose Reynoso	Public Works
James Carlson	PUBLIC WORKS
Miguel MIGUEL HERNANDEZ	HR
VINCENT GONZALEZ	Planning
KURT NORWOOD	Fire
GABE ENGELAND	Civil
Chris Cimino	Public Works
HENRY AMAS	POLICE DEPT

Emergency Planning Consultants



City of Sierra Madre
Hazard Mitigation Planning Team Meeting #2
July 25, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Brent Bartlett	Fire
Miguel Hernandez	HR
VINCENT GONZALEZ	PLANNING & BLDG.
Jose Reynoso	P.W.
GABRIEL ENGELAND	C.M.
COLBY KONISEK	FINANCE
Chris Cimino	P.W.
HENRY AMOS	POLICE

Emergency Planning Consultants



City of Sierra Madre
Hazard Mitigation Planning Team Meeting #3
August 22, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
KURT NORWOOD	Fire Dept.
Brent Bartlett	Fire Dept.
JAMES CARLSON	PUBLIC WORKS
VINCENT GONZALEZ	PLANNING
Jose Reynoso	P.W.
Chris Cimino	PW
GABE ENGELAND	CMO

Emergency Planning Consultants



City of Sierra Madre
Hazard Mitigation Planning Team Meeting #4
October 3, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
CHARLES KANCHAMPAN	POLICE DEPARTMENT
COLBY KONIGER	FINANCE
Brent Bartlett	Fire
MIGUEL HERNANDEZ	HUMAN RESOURCES
Chris Cimino	
VINCENT GONZALEZ	PLANNING
JAMES CARLSON	PUBLIC WORKS



Planning Team Agendas

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))

A: See **Planning Team Agendas** below.

Agenda

City of Sierra Madre

Planning Team Meeting #1

1. Examine the purpose hazard mitigation.
2. Discuss the concepts and terms related to hazard mitigation planning.
3. Review the project schedule and public involvement during the plan writing phase.
4. Discuss initial results of Hazard Analysis and Rank Hazards.
5. Gather Updated Community Profile Data
 - a. History, Geography, Land Use, Demographics, CIP

Agenda

City of Sierra Madre

Planning Team Meeting #2

1. Review examples of hazard mitigation activities.
2. Update Existing and Develop New Hazard Mitigation Action Items.
 - a. Action Item
 - b. Goals Achieved
 - c. Coordinating Agency
 - d. Timeline
 - e. Funding Source
 - f. Planning Mechanisms
 - g. Benefit, Cost, and Priority Ranking
 - h. Does action item apply to existing or future buildings or infrastructure?



Agenda

City of Sierra Madre

Planning Team Meeting #3

- 1. Continue to Develop Additional Mitigation Action Items - Review County of Los Angeles All-Hazard Mitigation Plan (Attachment: Mitigation Action Ideas).**

Agenda

City of Sierra Madre

Planning Team Meeting #4

- 1. Discuss First Draft Plan (distributed one week in advance of Planning Team Meeting #4).**
- 3. Discuss Strategy for Distributing Second Draft Plan to External Agencies and General Public. Also, discuss sending to City Council as a consent agenda (information item) in advance of submission to Cal OES/FEMA for formal review. Upon return of Approval Pending Adoption, updated Plan will be set for a public meeting with the City Council for Plan adoption.**



Web Postings and Notices

City of Sierra Madre Website



[City Hall](#)[Services](#)[Residents](#)[Business](#)[How Do I...](#)



Emergency Management

- Community Emergency Response Team
- Disaster Preparedness
- Emergency Communications
- Emergency Operations Center
- Heat Advisories
- Local Hazard Mitigation Plan

Local Hazard Mitigation Plan

[Home](#) / [Residents](#) / [Emergency Management](#) / [Local Hazard Mitigation Plan](#)



Local Hazard Mitigation Plan

The City's Local Hazard Mitigation Plan (LHMP) is available for review at the above link and as well as at City Hall. The LHMP includes a broad range of activities designed to protect homes, schools, public buildings and critical facilities. History shows that physical, financial, and emotional loss caused by disasters can be reduced significantly through hazard mitigation planning as it focuses attention and resources on solving a particular problem and thereby produces successive benefits over time. The purpose of a LHMP is to reduce or eliminate long-term risk to people and property from natural hazards and their effects on the City. An updated and adopted Plan is required not only to reduce risk to the community, but to maintain eligibility for certain types of non-emergency, disaster mitigation funding from FEMA under the Disaster Mitigation Act of 2000.

This is an opportunity for the public to comment on the draft of the LHMP. The draft Plan is available for public review starting February 7th, 2020, with comments due no later than February 21st, 2020. The LHMP has been prepared with input from various departments which includes the Fire Department, Police Department, Public Works, Finance, Planning and Community Preservation, Human Resources, and the City Manager's office.



Facebook



The City's Local Hazard Mitigation Plan (LHMP) is available for review. This is a chance for the public to make any comments or suggestions to the LHMP.

The LHMP includes a broad range of activities designed to protect homes, schools, public buildings and critical facilities.

The plan is available for review from 2/7/2020 - 2/21/2020.

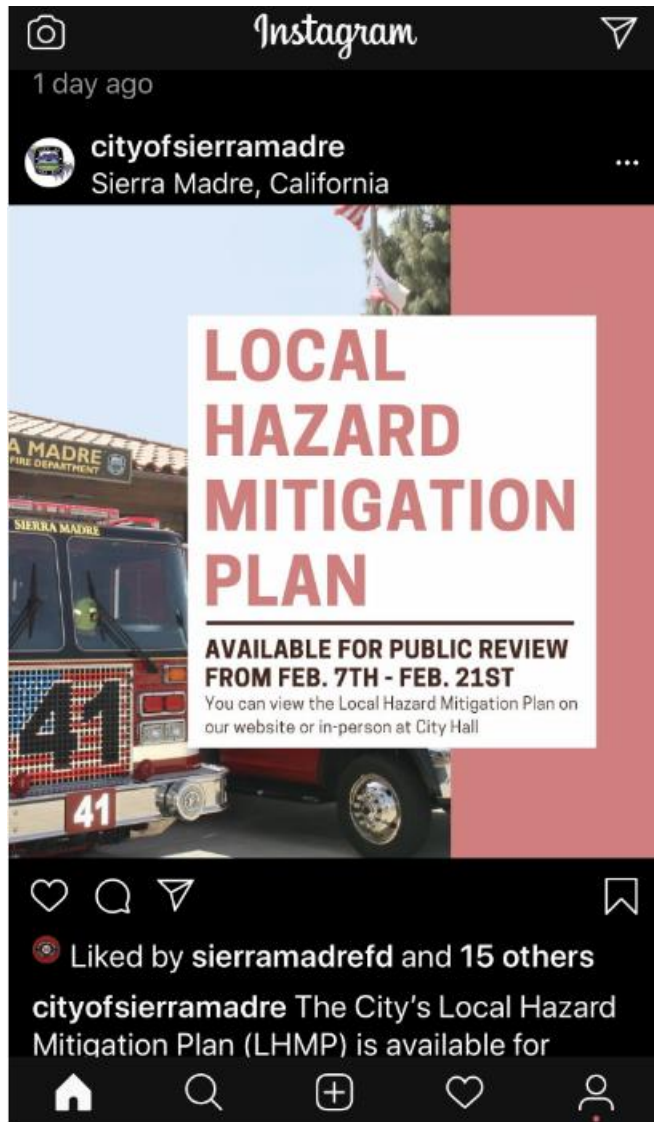
You can review the plan at the following link:
http://www.cityofsierramadre.com/residents/emergency_management/lmhp

The plan is also available for review at City Hall.

Any input you may have can be emailed to Fire Captain Brent Bartlett - bbartlett@cityofsierramadre.com



Instagram






Sierra Madre Village View E-Newsletter


X ← **www.icontact-archive.com** → ...

Like Share Tweet Share this Page: +



FIRE DEPARTMENT

Local Hazard Mitigation Plan



The Local Hazard Mitigation Plan (LHMP) is available for public review from 2/7/2020 - 2/21/2020. The plan can be found at the link below and at City Hall.

This is an opportunity for the public to comment on the draft of the LHMP. The draft Plan is available for public review starting February 7th, 2020, with comments due no later than February 21st, 2020. The LHMP has been prepared with input from various departments which includes the Fire Department, Police Department, Public Works, Finance, Planning and Community Preservation, Human Resources, and the City Manager's office.

The comments gathered from the community, supporting agencies, other stakeholders, and the general public will be incorporated into another draft that will be submitted to CAL OES and FEMA.

Please email any input that you may have to Fire Captain Brent Bartlett.

bbartlett@cityofsierramadre.com

[Click here to view LHMP](#)



Twitter



City of Sierra Madre @CitySierraMadre · 17m

The City's Local Hazard Mitigation Plan (LHMP) is available for review from 2/7 - 2/21. This is a chance for the public to provide any input to the LHMP.

Please click on the following link for more info about the LHMP and how you can send in your input: cityofsierramadre.com/residents/emergency-preparedness

LOCAL HAZARD MITIGATION PLAN

**AVAILABLE FOR PUBLIC REVIEW
FROM FEB. 7TH - FEB. 21ST**

You can view the Local Hazard Mitigation Plan
on our website or in-person at City Hall





HAZUS: San Andreas M7.8



FEMA

RiskMAP
Increasing Resilience Together

Hazus: Earthquake Global Risk Report

Region Name: CityofSierraMadre

Earthquake Scenario: M7.8-Ardent Sentry 2015 Scenario v1

Print Date: July 12, 2019

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

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.



FEMA

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FEMA

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard 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 multi-hazards 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 2.96 square miles and contains 2 census tracts. There are over 4 thousand households in the region which has a total population of 10,917 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 4 thousand buildings in the region with a total building replacement value (excluding contents) of 1,856 (millions of dollars). Approximately 93.00 % of the buildings (and 89.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 499 and 3 (millions of dollars), respectively.



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Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 4 thousand buildings in the region which have an aggregate total replacement value of 1,856 (millions of dollars). Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 92% 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 facilities (HPL). 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 0 hospitals in the region with a total bed capacity of beds. There are 6 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no 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 1 and 2.

The total value of the lifeline inventory is over 502.00 (millions of dollars). This inventory includes over 36.04 miles of highways, 8 bridges, 117.44 miles of pipes.



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Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	8	1.3807
	Segments	55	477.5368
	Tunnels	0	0.0000
	Subtotal		478.9175
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	4	17.9528
	Tunnels	0	0.0000
	Subtotal		17.9528
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	1	2.8241
	Tunnels	0	0.0000
	Subtotal		2.8241
Bus	Facilities	0	0.0000
	Subtotal		0.0000
Ferry	Facilities	0	0.0000
	Subtotal		0.0000
Port	Facilities	0	0.0000
	Subtotal		0.0000
Airport	Facilities	0	0.0000
	Runways	0	0.0000
	Subtotal		0.0000
Total			499.70



FEMA

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	1.8913
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		1.8913
Waste Water	Distribution Lines	NA	1.1348
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		1.1348
Natural Gas	Distribution Lines	NA	0.7565
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		0.7565
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		0.0000
Electrical Power	Facilities	0	0.0000
	Subtotal		0.0000
Communication	Facilities	0	0.0000
	Subtotal		0.0000
		Total	3.80



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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	M7.8-Ardent Sentry 2015 Scenario v1
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	7.80
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	



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Direct Earthquake Damage

Building Damage

Hazus estimates that about 373 buildings will be at least moderately damaged. This is over 9.00 % of the buildings in the region. There are an estimated 16 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 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

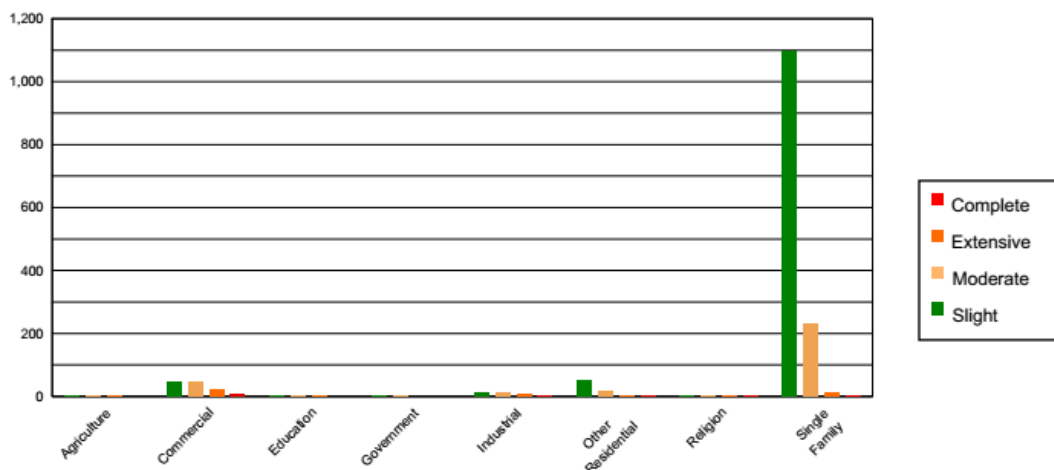


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	5.53	0.20	2.58	0.21	1.74	0.56	0.75	1.70	0.39	2.39
Commercial	98.12	3.51	48.18	3.96	44.26	14.13	20.39	45.97	8.05	49.01
Education	6.59	0.24	2.71	0.22	1.70	0.54	0.73	1.65	0.26	1.60
Government	1.25	0.04	0.63	0.05	0.61	0.20	0.34	0.77	0.16	0.98
Industrial	23.06	0.83	12.23	1.01	12.50	3.99	6.30	14.21	2.91	17.72
Other Residential	113.29	4.06	49.10	4.04	16.25	5.19	4.08	9.21	1.27	7.75
Religion	10.72	0.38	4.92	0.40	3.72	1.19	1.84	4.15	0.80	4.88
Single Family	2534.83	90.74	1096.32	90.11	232.36	74.20	9.91	22.34	2.58	15.67
Total	2,793		1,217		313		44		16	



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Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	2640.38	94.52	1149.99	94.52	247.02	78.88	12.43	28.04	4.00	24.32
Steel	22.07	0.79	14.45	1.19	19.14	6.11	9.34	21.06	3.96	24.09
Concrete	28.33	1.01	14.73	1.21	11.30	3.61	6.49	14.63	3.40	20.70
Precast	25.87	0.93	12.87	1.06	12.88	4.11	5.36	12.09	2.00	12.15
RM	68.90	2.47	19.33	1.59	17.63	5.63	8.49	19.14	2.39	14.56
URM	7.77	0.28	5.07	0.42	4.59	1.47	1.77	3.99	0.59	3.57
MH	0.07	0.00	0.23	0.02	0.59	0.19	0.47	1.05	0.10	0.62
Total	2,793		1,217		313		44		16	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing



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Essential Facility Damage

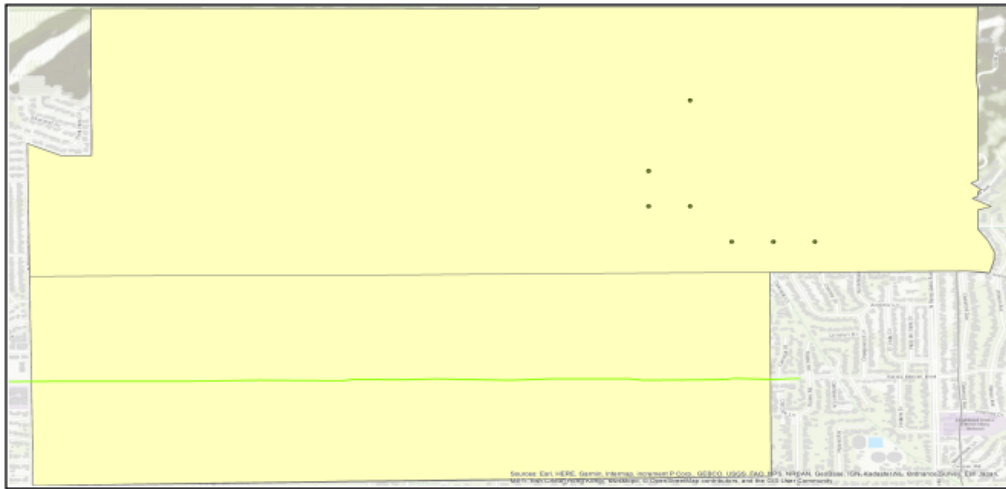
Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By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

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	6	0	0	6
EOCs	0	0	0	0
PoliceStations	1	0	0	1
FireStations	1	0	0	1



Transportation Lifeline Damage





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Table 6: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	55	0	0	30	30
	Bridges	8	0	0	8	8
	Tunnels	0	0	0	0	0
Railways	Segments	4	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	1	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

Table 6 provides damage estimates for the transportation system.

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 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 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 9 provides a summary of the system performance information.



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Table 7 : Expected Utility System Facility Damage

System	Total #	# of Locations			
		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	0	0	0	0	0
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 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	59	118	29
Waste Water	35	59	15
Natural Gas	24	20	5
Oil	0	0	0

Table 9: 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	4,837	911	0	0	0	0
Electric Power		0	0	0	0	0



Induced Earthquake Damage

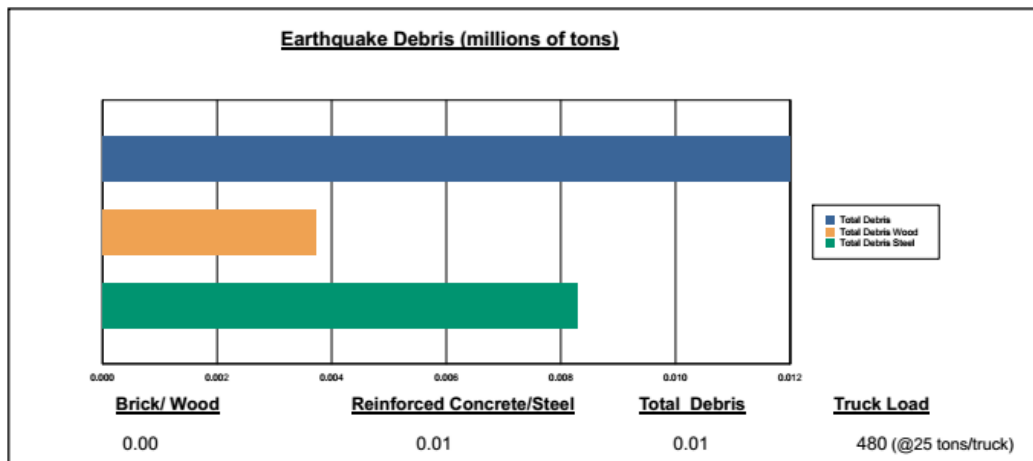
Fire Following Earthquake

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 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (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.

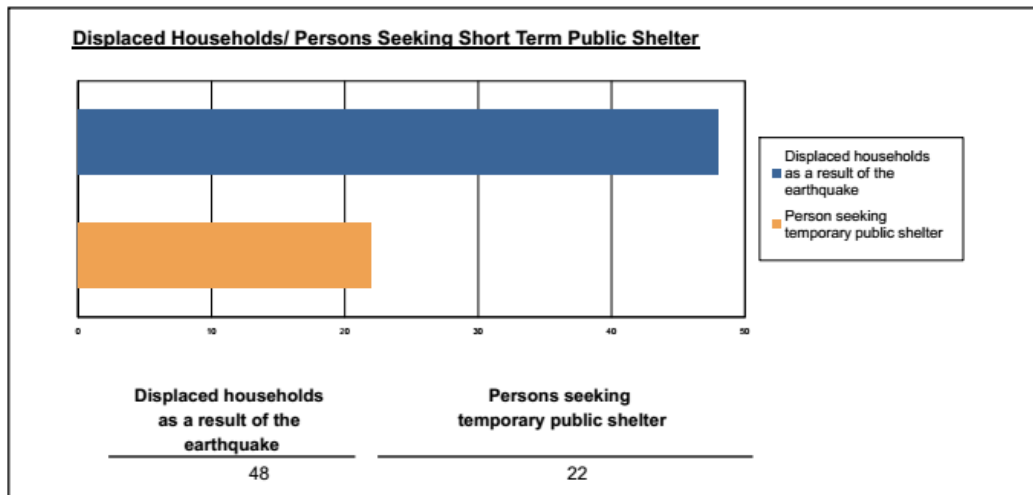
The model estimates that a total of 12,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 31.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 480 truckloads (@25 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 48 households to be displaced due to the earthquake. Of these, 22 people (out of a total population of 10,917) 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 10 provides a summary of the casualties estimated for this earthquake



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Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0.50	0.13	0.02	0.04
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.29	0.08	0.01	0.02
	Other-Residential	2.16	0.52	0.08	0.16
	Single Family	3.52	0.36	0.02	0.04
	Total	6	1	0	0
2 PM	Commercial	28.32	7.46	1.16	2.29
	Commuting	0.00	0.01	0.01	0.00
	Educational	5.21	1.42	0.23	0.45
	Hotels	0.00	0.00	0.00	0.00
	Industrial	2.12	0.56	0.09	0.17
	Other-Residential	0.43	0.11	0.02	0.03
	Single Family	0.73	0.08	0.00	0.01
	Total	37	10	2	3
5 PM	Commercial	19.02	4.99	0.78	1.52
	Commuting	0.03	0.14	0.11	0.03
	Educational	0.34	0.09	0.02	0.03
	Hotels	0.00	0.00	0.00	0.00
	Industrial	1.33	0.35	0.05	0.10
	Other-Residential	0.83	0.20	0.03	0.06
	Single Family	1.32	0.14	0.01	0.01
	Total	23	6	1	2



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Economic Loss

The total economic loss estimated for the earthquake is 79.01 (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 78.08 (millions of dollars); 15 % 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 61 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

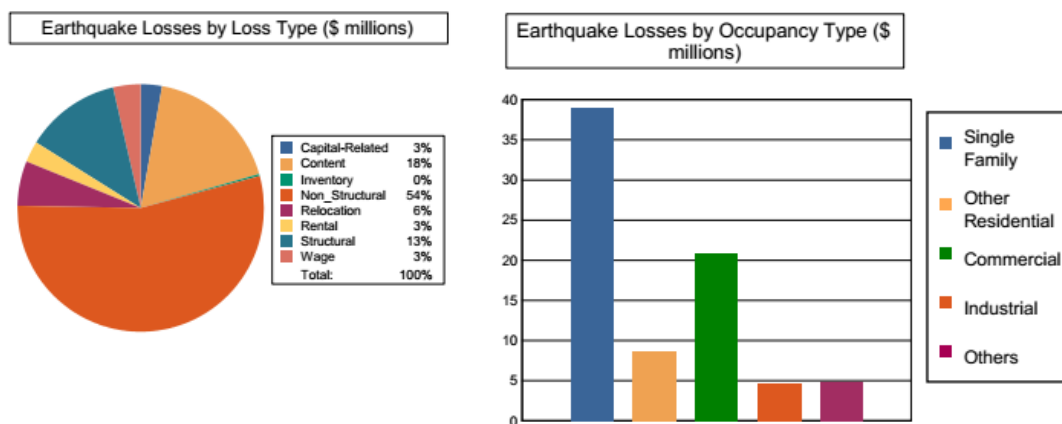


Table 11: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.2340	2.3206	0.0742	0.0995	2.7283
	Capital-Related	0.0000	0.0991	1.9981	0.0532	0.0390	2.1894
	Rental	0.5380	0.4448	1.1096	0.0291	0.0650	2.1865
	Relocation	1.8343	0.3109	1.6110	0.1676	0.6010	4.5248
	Subtotal	2.3723	1.0888	7.0393	0.3241	0.8045	11.6290
Capital Stock Losses							
	Structural	4.7293	0.9090	2.6037	0.6838	0.8802	9.8060
	Non_Structural	24.6405	5.4593	8.0177	2.1382	2.2561	42.5118
	Content	7.2438	1.2040	3.2201	1.2895	0.9385	13.8959
	Inventory	0.0000	0.0000	0.0481	0.1753	0.0140	0.2374
	Subtotal	36.6136	7.5723	13.8896	4.2868	4.0888	66.4511
	Total	38.99	8.66	20.93	4.61	4.89	78.08



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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 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	477.5368	0.0000	0.00
	Bridges	1.3807	0.0427	3.09
	Tunnels	0.0000	0.0000	0.00
	Subtotal	478.9175	0.0427	
Railways	Segments	17.9528	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	17.9528	0.0000	
Light Rail	Segments	2.8241	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	2.8241	0.0000	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
	Total	499.69	0.04	



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

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	1.8913	0.5303	28.04
	Subtotal	1.8913	0.5303	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	1.1348	0.2664	23.48
	Subtotal	1.1348	0.2664	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	0.7565	0.0913	12.07
	Subtotal	0.7565	0.0913	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
	Total	3.78	0.89	



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Appendix A: County Listing for the Region

Los Angeles, CA



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Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Los Angeles	10,917	1,653	202	1,856
Total Region		10,917	1,653	202	1,856



HAZUS: Sierra Madre M7.2



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RiskMAP
Increasing Resilience Together

Hazus: Earthquake Global Risk Report

Region Name: CityofSierraMadre

Earthquake Scenario: M7.2-Sierra Madre v11

Print Date: July 09, 2019

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

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-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard 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 multi-hazards 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 2.96 square miles and contains 2 census tracts. There are over 4 thousand households in the region which has a total population of 10,917 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 4 thousand buildings in the region with a total building replacement value (excluding contents) of 1,856 (millions of dollars). Approximately 93.00 % of the buildings (and 89.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 499 and 3 (millions of dollars), respectively.



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Building and Lifeline Inventory

Building Inventory

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For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 6 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no 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 1 and 2.

The total value of the lifeline inventory is over 502.00 (millions of dollars). This inventory includes over 36.04 miles of highways, 8 bridges, 117.44 miles of pipes.



FEMA

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	Subtotal		478.9175
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	Facilities	0	0.0000
	Segments	4	17.9528
	Tunnels	0	0.0000
	Subtotal		17.9528
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	1	2.8241
	Tunnels	0	0.0000
	Subtotal		2.8241
Bus	Facilities	0	0.0000
	Subtotal		0.0000
Ferry	Facilities	0	0.0000
	Subtotal		0.0000
Port	Facilities	0	0.0000
	Subtotal		0.0000
Airport	Facilities	0	0.0000
	Runways	0	0.0000
	Subtotal		0.0000
		Total	499.70



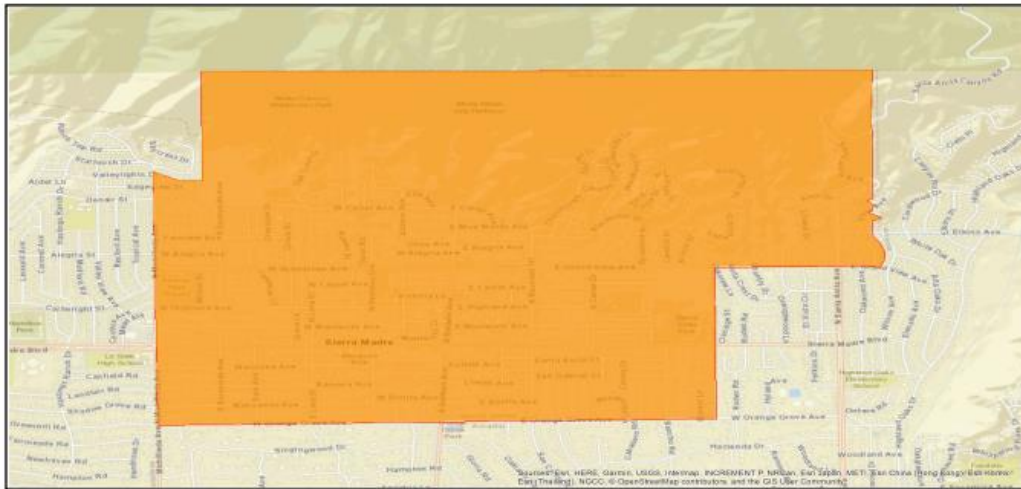
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Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	1.8913
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		1.8913
Waste Water	Distribution Lines	NA	1.1348
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		1.1348
Natural Gas	Distribution Lines	NA	0.7565
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		0.7565
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		0.0000
Electrical Power	Facilities	0	0.0000
	Subtotal		0.0000
Communication	Facilities	0	0.0000
	Subtotal		0.0000
		Total	3.80

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	M7.2-Sierra Madre v11
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	7.16
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	

Direct Earthquake Damage

Building Damage

Hazus estimates that about 1,871 buildings will be at least moderately damaged. This is over 43.00 % of the buildings in the region. There are an estimated 122 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 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

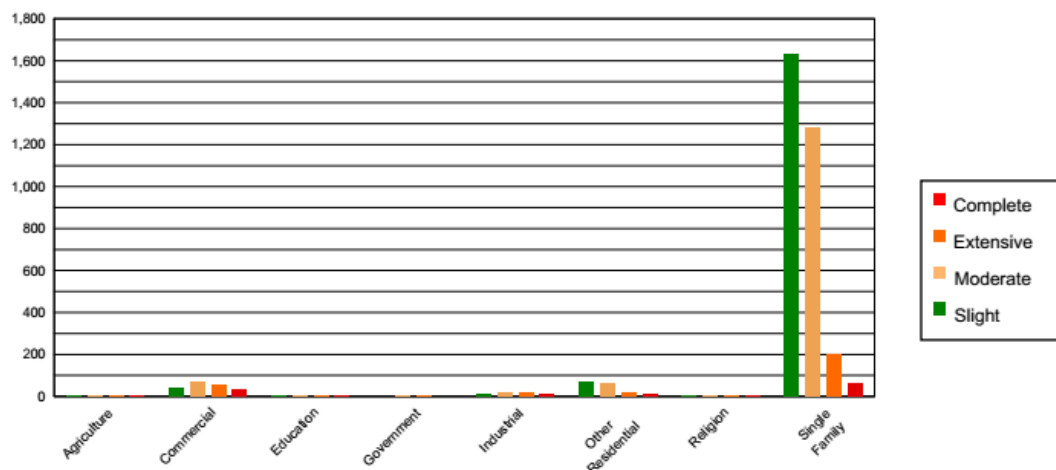


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	1.21	0.16	2.65	0.15	3.64	0.25	2.15	0.71	1.35	1.10
Commercial	16.47	2.17	37.48	2.14	71.81	4.96	57.95	19.19	35.30	28.86
Education	1.53	0.20	3.04	0.17	4.02	0.28	2.29	0.76	1.11	0.90
Government	0.19	0.02	0.43	0.02	0.93	0.06	0.86	0.29	0.59	0.48
Industrial	3.42	0.45	8.17	0.47	18.38	1.27	16.25	5.38	10.78	8.82
Other Residential	29.06	3.82	67.06	3.83	60.13	4.16	18.51	6.13	9.24	7.56
Religion	2.25	0.30	4.67	0.27	7.05	0.49	5.06	1.68	2.97	2.43
Single Family	706.43	92.88	1628.90	92.95	1280.83	88.53	198.88	65.87	60.96	49.85
Total	761		1,752		1,447		302		122	



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Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	736.51	96.84	1706.21	97.36	1341.83	92.74	204.97	67.88	64.30	52.58
Steel	3.59	0.47	7.47	0.43	22.02	1.52	22.47	7.44	13.41	10.97
Concrete	5.23	0.69	12.74	0.73	20.17	1.39	16.10	5.33	10.02	8.19
Precast	2.64	0.35	7.00	0.40	19.36	1.34	18.32	6.07	11.68	9.55
RM	12.19	1.60	17.47	1.00	38.14	2.64	33.72	11.17	15.22	12.45
URM	0.38	0.05	1.45	0.08	4.94	0.34	5.78	1.91	7.22	5.91
MH	0.01	0.00	0.06	0.00	0.35	0.02	0.60	0.20	0.45	0.37
Total	761		1,752		1,447		302		122	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing



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Essential Facility Damage

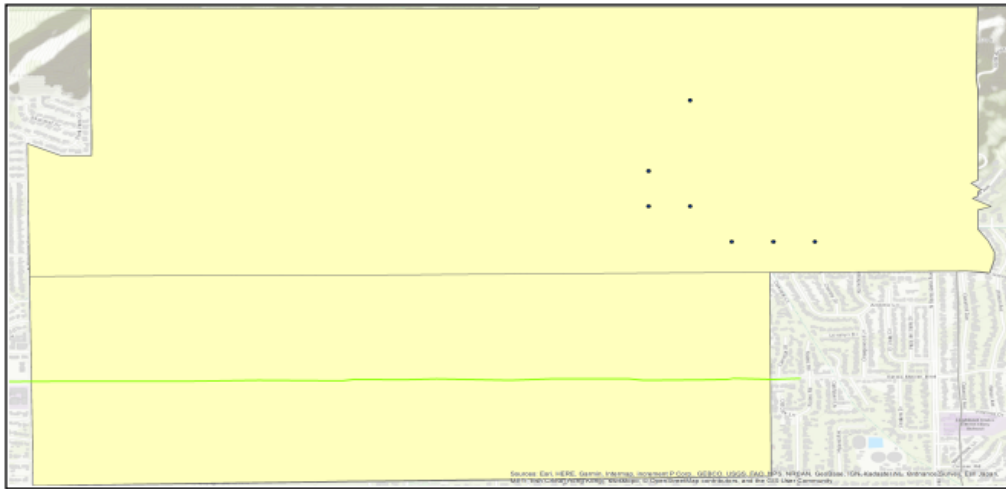
Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By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

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	6	0	0	0
EOCs	0	0	0	0
PoliceStations	1	0	0	0
FireStations	1	0	0	0



Transportation Lifeline Damage





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Table 6: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	55	0	0	30	30
	Bridges	8	0	0	8	8
	Tunnels	0	0	0	0	0
Railways	Segments	4	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	1	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

Table 6 provides damage estimates for the transportation system.

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 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 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 9 provides a summary of the system performance information.



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Table 7 : Expected Utility System Facility Damage

System	Total #	# of Locations			
		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	0	0	0	0	0
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 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	59	99	25
Waste Water	35	50	12
Natural Gas	24	17	4
Oil	0	0	0

Table 9: 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	4,837	0	0	0	0	0
Electric Power						



Induced Earthquake Damage

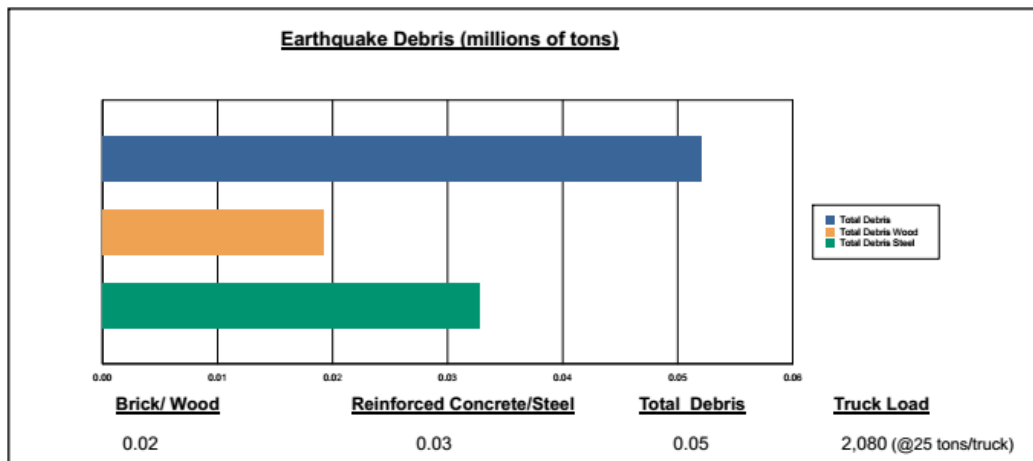
Fire Following Earthquake

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 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (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.

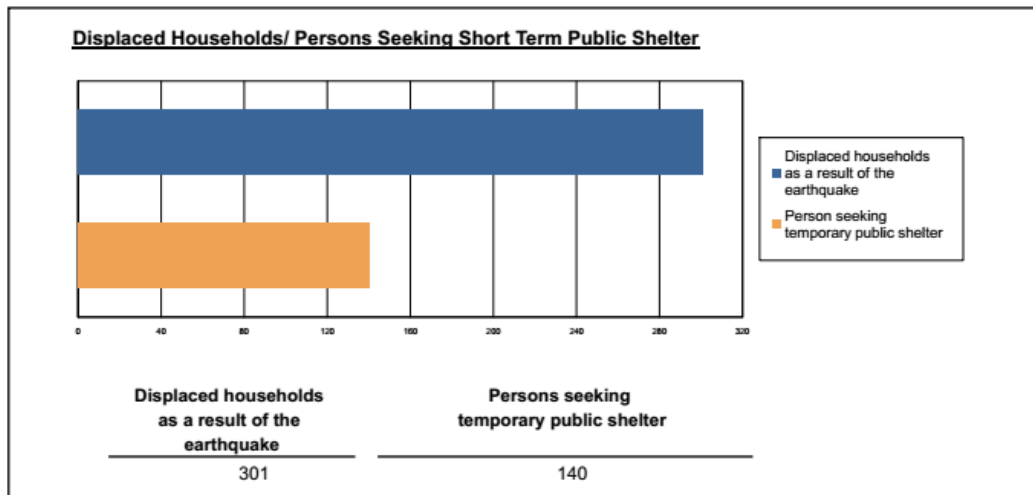
The model estimates that a total of 52,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 37.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 2,080 truckloads (@25 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 301 households to be displaced due to the earthquake. Of these, 140 people (out of a total population of 10,917) 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 10 provides a summary of the casualties estimated for this earthquake



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Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	1.56	0.46	0.08	0.15
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.91	0.26	0.04	0.08
	Other-Residential	10.65	2.83	0.41	0.80
	Single Family	23.47	3.89	0.21	0.37
	Total	37	7	1	1
2 PM	Commercial	87.02	25.63	4.23	8.33
	Commuting	0.01	0.04	0.03	0.01
	Educational	16.61	4.81	0.80	1.56
	Hotels	0.00	0.00	0.00	0.00
	Industrial	6.69	1.94	0.31	0.61
	Other-Residential	2.17	0.57	0.09	0.16
	Single Family	5.01	0.83	0.05	0.08
	Total	117	34	6	11
5 PM	Commercial	58.28	17.11	2.83	5.51
	Commuting	0.15	0.74	0.60	0.15
	Educational	1.02	0.29	0.05	0.09
	Hotels	0.00	0.00	0.00	0.00
	Industrial	4.18	1.21	0.19	0.38
	Other-Residential	4.15	1.10	0.16	0.31
	Single Family	9.19	1.53	0.10	0.14
	Total	77	22	4	7



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Economic Loss

The total economic loss estimated for the earthquake is 359.41 (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 358.49 (millions of dollars); 12 % 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 73 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

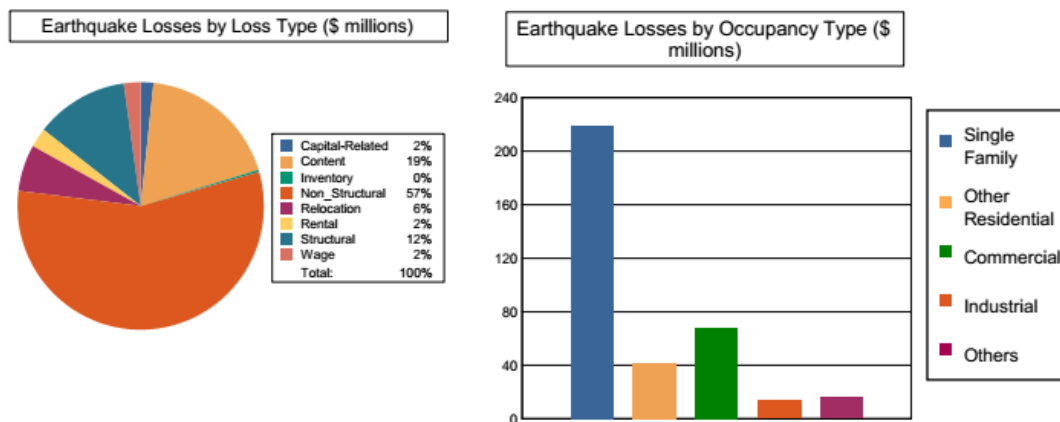


Table 11: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.9123	6.3618	0.1838	0.2586	7.7165
	Capital-Related	0.0000	0.3887	5.3805	0.1252	0.1040	5.9984
	Rental	3.8318	2.0482	2.6586	0.0694	0.1780	8.7860
	Relocation	13.8266	1.4377	3.9344	0.3780	1.7043	21.2810
	Subtotal	17.6584	4.7869	18.3353	0.7564	2.2449	43.7819
Capital Stock Losses							
	Structural	27.9296	4.0436	8.1904	1.7583	2.5803	44.5022
	Non_Structural	133.6562	26.7632	28.3202	6.5293	7.4960	202.7649
	Content	39.9236	6.3401	12.7275	4.1668	3.5081	66.6661
	Inventory	0.0000	0.0000	0.1773	0.5453	0.0495	0.7721
	Subtotal	201.5094	37.1469	49.4154	12.9997	13.6339	314.7053
	Total	219.17	41.93	67.75	13.76	15.88	358.49



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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 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	477.5368	0.0000	0.00
	Bridges	1.3807	0.1795	13.00
	Tunnels	0.0000	0.0000	0.00
	Subtotal	478.9175	0.1795	
Railways	Segments	17.9528	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	17.9528	0.0000	
Light Rail	Segments	2.8241	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	2.8241	0.0000	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
	Total	499.69	0.18	



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

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	1.8913	0.4455	23.56
	Subtotal	1.8913	0.4455	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	1.1348	0.2238	19.72
	Subtotal	1.1348	0.2238	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	0.7565	0.0767	10.14
	Subtotal	0.7565	0.0767	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
	Total	3.78	0.75	



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Appendix A: County Listing for the Region

Los Angeles, CA



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Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Los Angeles	10,917	1,653	202	1,856
Total Region		10,917	1,653	202	1,856



HAZUS: Raymond M6.7



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RiskMAP
Increasing Resilience Together

Hazus: Earthquake Global Risk Report

Region Name: CityofSierraMadre

Earthquake Scenario: M6.7-Raymond v10

Print Date: July 12, 2019

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

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-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard 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 multi-hazards 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 2.96 square miles and contains 2 census tracts. There are over 4 thousand households in the region which has a total population of 10,917 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 4 thousand buildings in the region with a total building replacement value (excluding contents) of 1,856 (millions of dollars). Approximately 93.00 % of the buildings (and 89.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 499 and 3 (millions of dollars), respectively.



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Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 4 thousand buildings in the region which have an aggregate total replacement value of 1,856 (millions of dollars). Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 92% 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 facilities (HPL). 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 0 hospitals in the region with a total bed capacity of beds. There are 6 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no 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 1 and 2.

The total value of the lifeline inventory is over 502.00 (millions of dollars). This inventory includes over 36.04 miles of highways, 8 bridges, 117.44 miles of pipes.



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Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	8	1.3807
	Segments	55	477.5368
	Tunnels	0	0.0000
	Subtotal		478.9175
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	4	17.9528
	Tunnels	0	0.0000
	Subtotal		17.9528
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	1	2.8241
	Tunnels	0	0.0000
	Subtotal		2.8241
Bus	Facilities	0	0.0000
	Subtotal		0.0000
Ferry	Facilities	0	0.0000
	Subtotal		0.0000
Port	Facilities	0	0.0000
	Subtotal		0.0000
Airport	Facilities	0	0.0000
	Runways	0	0.0000
	Subtotal		0.0000
		Total	499.70



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Table 2: Utility System Lifeline Inventory

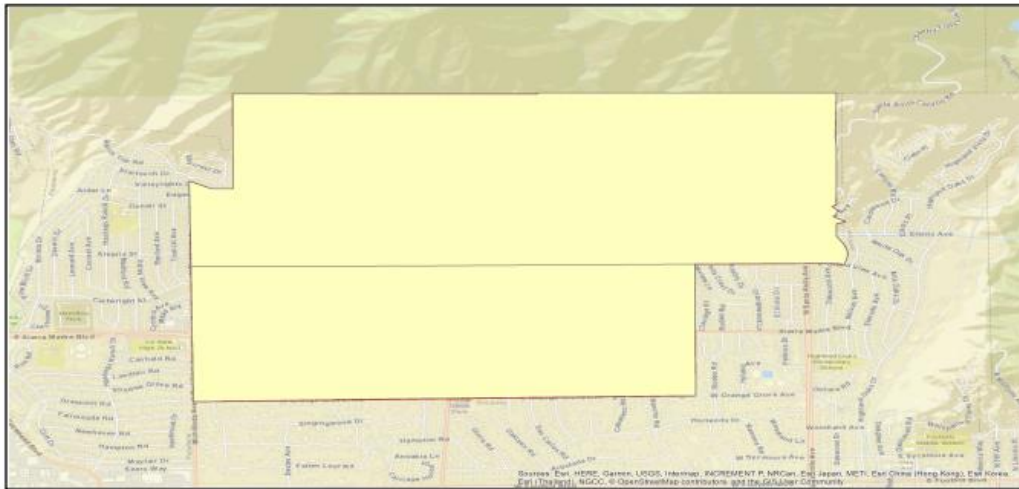
System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	1.8913
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		1.8913
Waste Water	Distribution Lines	NA	1.1348
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		1.1348
Natural Gas	Distribution Lines	NA	0.7565
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		0.7565
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		0.0000
Electrical Power	Facilities	0	0.0000
	Subtotal		0.0000
Communication	Facilities	0	0.0000
	Subtotal		0.0000
		Total	3.80



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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	M6.7-Raymond v10
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	6.71
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	

Direct Earthquake Damage

Building Damage

Hazus estimates that about 1,533 buildings will be at least moderately damaged. This is over 35.00 % of the buildings in the region. There are an estimated 76 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 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

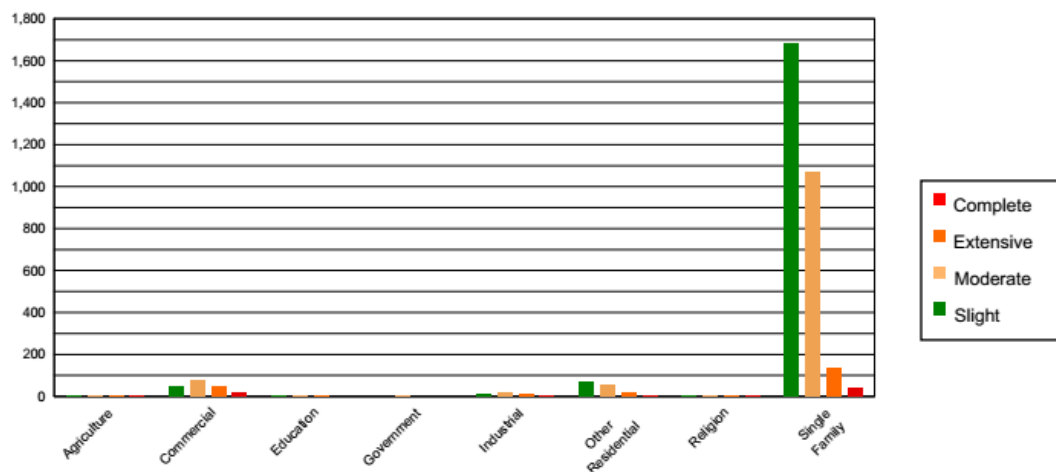


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	1.81	0.18	3.00	0.16	3.55	0.29	1.79	0.80	0.85	1.10
Commercial	27.06	2.63	46.64	2.56	74.99	6.07	48.76	21.92	21.55	28.16
Education	2.22	0.22	3.40	0.19	3.86	0.31	1.87	0.84	0.65	0.85
Government	0.30	0.03	0.55	0.03	1.00	0.08	0.77	0.34	0.38	0.49
Industrial	5.96	0.58	10.60	0.58	19.68	1.59	14.00	6.29	6.77	8.85
Other Residential	38.74	3.77	70.64	3.88	53.94	4.37	14.94	6.71	5.74	7.50
Religion	3.47	0.34	5.47	0.30	7.06	0.57	4.21	1.89	1.79	2.34
Single Family	947.93	92.26	1682.73	92.30	1070.41	86.71	136.15	61.19	38.79	50.69
Total	1,027		1,823		1,234		222		77	



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Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	986.99	96.06	1763.63	96.74	1122.63	90.94	139.56	62.73	41.01	53.59
Steel	7.08	0.69	10.72	0.59	24.26	1.96	18.70	8.40	8.20	10.72
Concrete	8.36	0.81	15.33	0.84	20.60	1.67	13.85	6.23	6.11	7.99
Precast	4.79	0.47	9.32	0.51	21.27	1.72	16.21	7.29	7.39	9.66
RM	19.30	1.88	21.47	1.18	39.22	3.18	28.17	12.66	8.57	11.20
URM	0.92	0.09	2.43	0.13	6.04	0.49	5.42	2.43	4.97	6.50
MH	0.03	0.00	0.13	0.01	0.47	0.04	0.57	0.26	0.26	0.34
Total	1,027		1,823		1,234		222		77	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing



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Essential Facility Damage

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

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	6	0	0	0
EOCs	0	0	0	0
PoliceStations	1	0	0	0
FireStations	1	0	0	0



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Table 6: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	55	0	0	30	30
	Bridges	8	0	0	8	8
	Tunnels	0	0	0	0	0
Railways	Segments	4	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	1	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

Table 6 provides damage estimates for the transportation system.

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 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 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 9 provides a summary of the system performance information.



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Table 7 : Expected Utility System Facility Damage

System	Total #	# of Locations			
		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	0	0	0	0	0
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 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	59	51	13
Waste Water	35	25	6
Natural Gas	24	9	2
Oil	0	0	0

Table 9: 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	4,837	0	0	0	0	0
Electric Power		3,534	2,191	896	171	5



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Induced Earthquake Damage

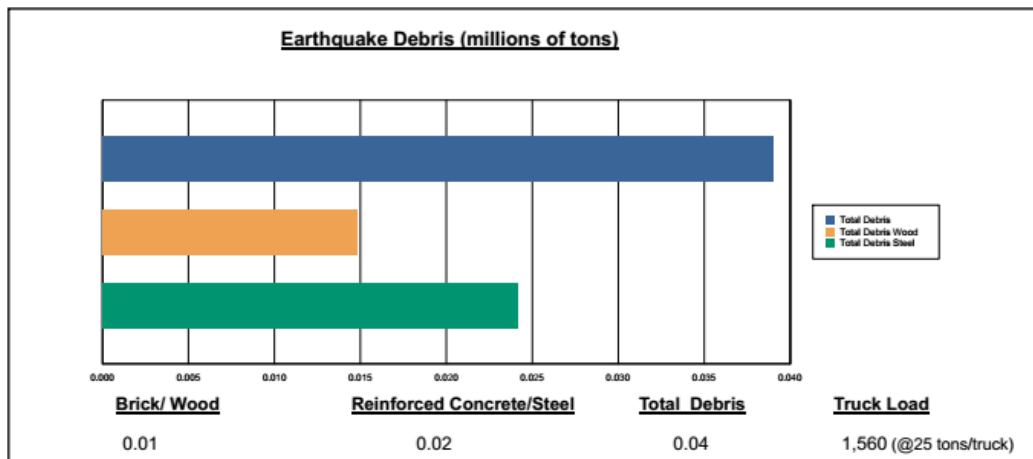
Fire Following Earthquake

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 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (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.

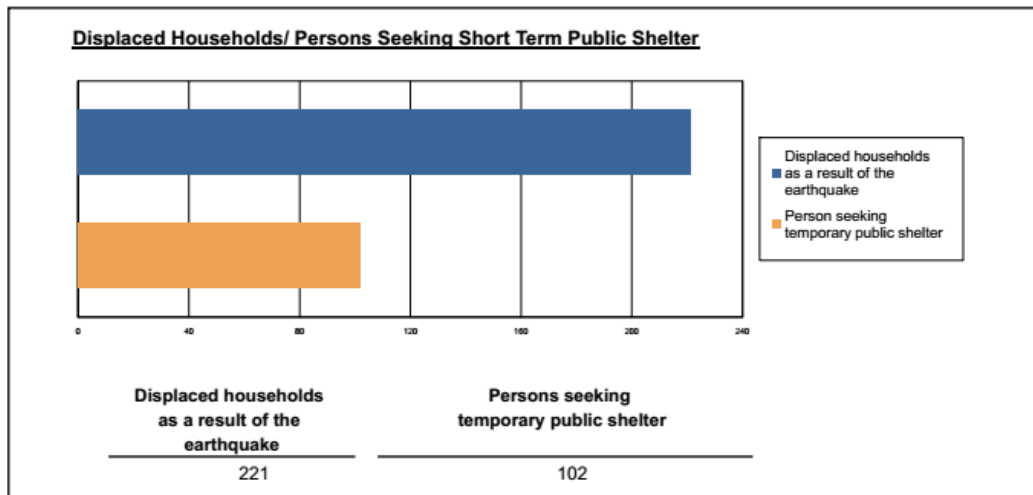
The model estimates that a total of 39,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 38.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 1,560 truckloads (@25 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 221 households to be displaced due to the earthquake. Of these, 102 people (out of a total population of 10,917) 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 10 provides a summary of the casualties estimated for this earthquake



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Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	1.27	0.35	0.06	0.11
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.58	0.16	0.02	0.05
	Other-Residential	7.64	1.90	0.26	0.52
	Single Family	17.46	2.67	0.13	0.22
	Total	27	5	0	1
2 PM	Commercial	71.15	19.72	3.15	6.20
	Commuting	0.00	0.02	0.01	0.00
	Educational	10.51	2.83	0.45	0.88
	Hotels	0.00	0.00	0.00	0.00
	Industrial	4.27	1.16	0.18	0.35
	Other-Residential	1.55	0.39	0.06	0.10
	Single Family	3.69	0.57	0.03	0.05
	Total	91	25	4	8
5 PM	Commercial	47.63	13.16	2.11	4.11
	Commuting	0.07	0.34	0.27	0.07
	Educational	0.62	0.16	0.03	0.05
	Hotels	0.00	0.00	0.00	0.00
	Industrial	2.67	0.73	0.11	0.22
	Other-Residential	2.97	0.74	0.11	0.20
	Single Family	6.80	1.05	0.06	0.09
	Total	61	16	3	5



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Economic Loss

The total economic loss estimated for the earthquake is 282.70 (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 282.22 (millions of dollars); 13 % 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 73 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

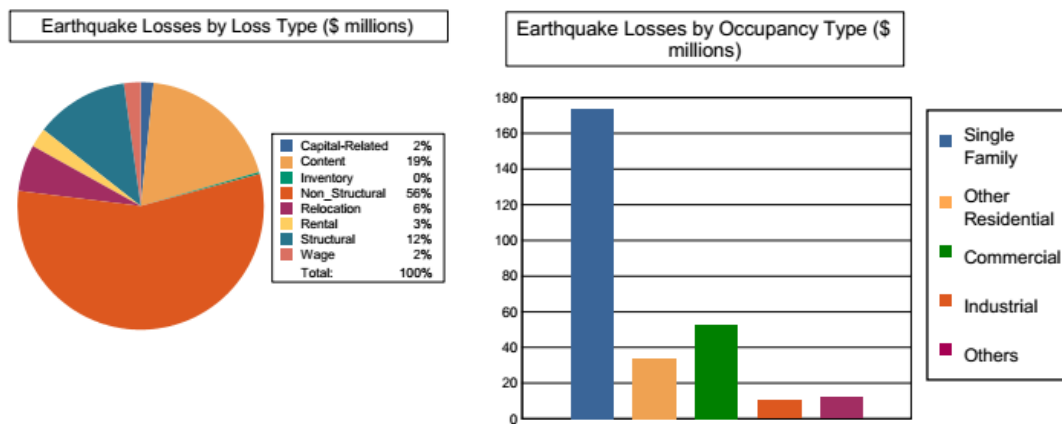


Table 11: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.7431	5.2724	0.1495	0.2114	6.3764
	Capital-Related	0.0000	0.3147	4.4384	0.1003	0.0839	4.9373
	Rental	2.9432	1.6110	2.4941	0.0552	0.1404	7.2439
	Relocation	10.7450	1.1808	3.6568	0.3189	1.3207	17.2222
	Subtotal	13.6882	3.8496	15.8617	0.6239	1.7564	35.7798
Capital Stock Losses							
	Structural	21.3762	3.1988	6.2204	1.3294	1.9415	34.0663
	Non_Structural	105.6686	21.4761	21.0852	4.7601	5.5508	158.5408
	Content	32.7201	5.2137	9.5784	3.0685	2.6487	53.2294
	Inventory	0.0000	0.0000	0.1407	0.4264	0.0403	0.6074
	Subtotal	159.7649	29.8886	37.0247	9.5844	10.1813	246.4439
	Total	173.45	33.74	52.89	10.21	11.94	282.22



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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 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	477.5368	0.0000	0.00
	Bridges	1.3807	0.0948	6.87
	Tunnels	0.0000	0.0000	0.00
	Subtotal	478.9175	0.0948	
Railways	Segments	17.9528	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	17.9528	0.0000	
Light Rail	Segments	2.8241	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	2.8241	0.0000	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
	Total	499.69	0.09	



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

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	1.8913	0.2283	12.07
	Subtotal	1.8913	0.2283	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	1.1348	0.1147	10.11
	Subtotal	1.1348	0.1147	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	0.7565	0.0393	5.19
	Subtotal	0.7565	0.0393	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
	Total	3.78	0.38	



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Appendix A: County Listing for the Region

Los Angeles, CA



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Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Los Angeles	10,917	1,653	202	1,856
Total Region		10,917	1,653	202	1,856



Quarterly Implementation Report

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
Multi-Hazard Mitigation Action Items															
MH-1 Integrate the goals and action items from the City of Sierra Madre Hazard Mitigation Plan into existing regulatory documents and programs, where appropriate.	Executive Team (ETeam)	Ongoing	X	X		X			FY, FY	Y	M	L	L	Revised, Note: 2015 General Plan Update	
MH-2 Identify and pursue funding opportunities to develop and implement neighborhood and city mitigation activities.	Fire Department	Ongoing	X	X	X	X	X	X	FY, FY	Y	H	L	H	Revised	
MH-3 Develop inventories of Unreinforced Masonry Buildings and Soft-Story Structures.	Planning Department	1-2 Years	X	X	X	X	X	X	FY, FY	Y	H	H	H	Revised	
MH-4 Strengthen emergency services preparedness by	Police Department	Ongoing	X	X	X	X	X	X	FY, FY		H	L	H	Revised	



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
enhancing public awareness.															
MH-5 Develop a Multi-Hazard Emergency Evacuation Plan	Police Department, Fire Department	1 year	X	X	X	X	X		FY, FY		H	L	H	New	
MH-6 Buy Vactor to pneumatically collect liquids, sludges, slurries, sewage or other spills from a location thereby reducing the threat of exposure to hazardous spills.	Public Works Department		X						GF, GF		H	H	M	New	
MH-7 (General Plan – Safety Element Policy Hz 3.1) Continue to cooperate with Area C Fire Departments for second and third alarm calls and continue with the State-wide Mutual Aid Agreements	Fire Department	Ongoing	X			X	X		FY		H	L	H	New	
MH-8 (General Plan – Safety Element Policy Hz	Fire Department, Police Department,	Ongoing	X			X	X		FY		H	L	H	New	



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
4.1) Update the Emergency Operations Plan annually (EOC Related)	Public Works, Community Planning and Preservation Department														
MH-9 (General Plan – Safety Element Policy Hz 4.2) Maintain a fully operational Emergency Operations Center (EOC Related)	Fire Department, Police Department, Public Works, IT	Ongoing	X			X	X		FY		H	L	H	New	
MH-10 (General Plan – Safety Element Policy Hz 4.3) Enlist participation from the community and City staff for emergency operations (EOC Related)	Public Works, Fire Department	Ongoing	X			X	X		FY		H	L	H	New	
MH-11 (General Plan – Safety Element Hz 4.4) Provide emergency operations training and conduct test runs (EOC Related)	Public Works, Fire Department	Ongoing	X			X	X		FY		H	L	H	New	
MH-12 (General Plan – Safety Element Hz 4.5)	Police Department, Fire Department, IT	Ongoing	X			X	X		FY		H	H	H	New	



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
Review and upgrade emergency operations equipment such as 911 equipment, and the police dispatch system as needed to maintain modern levels of service (EOC Related)															
MH-13 (General Plan – Safety Element Policy Hz 4.6) Develop and utilize emergency public communication systems	Police Department, Fire Department, IT	Ongoing	X			X	X		FY		H	H	H	New	
Earthquake Mitigation Action Items															
EQ-1 Utilize contemporary seismic maps during plan/permit review process.	Community Planning & Preservation Department	Ongoing	X	X	X	X	X	X	FY, FY	Y	H	L	H	Revised	
EQ-2 Incorporate the Regional Earthquake Transportation Evacuation Route updated developed by the Area D Disaster	Fire Department	Ongoing	X	X	X	X	X		FY, FY		H	L	H	Revised	



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
Management Area Coordinators into the Emergency Operations Plan.															
EQ-3 Identify funding sources for structural and non-structural retrofitting of City-owned structures that are seismically vulnerable (e.g. City Library).	Community Planning & Preservation Department	1-2 years	X	X	X	X	X		GR, GR	Y	H	H	H	Revised	
EQ-4 Encourage purchase of earthquake hazard insurance for private properties and uninsured City-owned properties.	ETeam	2 years		X					FY, FY		H	L	H	Revised	
EQ-5 Encourage hazard reduction with non-structural and structural earthquake retrofits and other strategies in homes, businesses, and City facilities.	Administration	Ongoing	X	X			X		FY, FY	Y	H	L	H	Revised	



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
EQ-6 Replace water mains in fault zones with seismic pipe thereby maintaining water system integrity and reducing the threat to life and property loss by providing fire suppression.	Public Works Department	5 years	X	X	X		X	X	GF, GF	Y	H	H	H	New	
EQ-7 Renovate main booster plant with new booster pumps and control panels thereby ensuring reliable water delivery to City's distribution system.	Public Works Department	3-5 years	X	X	X		X	X	GR, GR	Y	H	H	H	New	
EQ-8 Seismic retrofit of Auburn reservoir thereby preserving stored water for domestic use and fire suppression.	Public Works Department	3-5 years	X	X	X		X	X	GR, GR	Y	H	H	H	New	
EQ-9 (General Plan – Safety Element Policy Hz 10.1) Require that earthquake survival and efficient post-disaster	Public Works Department	Ongoing	X				X	X	CIP	Y	H	H	H	New	



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
functioning be a primary concern in the siting, design and construction standards for essential facilities in Sierra Madre															
EQ-10 (General Plan – Safety Element Policy Hz 10.2) Conduct geological studies on fault zones within the City and identify threatened structures and limitations on land for potential construction	Public Works, Building and Safety, Planning	Ongoing	X			X		X	GP	Y	H	H	H	New	
EQ-11 (General Plan – Safety Element Policy Hz 10.3) Adopt/Amend ordinance addressing structures identified as having seismic hazards to require retrofits.	Building and Safety, Planning	Ongoing	X					X	FY		H	L	H	New	
EQ-12 (General Plan – Safety Element Policy Hz 10.4) Require a thorough subsurface fault	Public Works, Building and Safety	Ongoing	X		X	X		X	GP	Y	H	H	H	New	



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
investigation for any proposed habitable structure on private property in close proximity of an active fault zone and monitor any trenching for public buried water lines in the same area.															
EQ-13 (General Plan – Safety Element Policy Hz 10.5) Create a central depository of all Sierra Madre geological information the City obtains through any project approvals process, including any government projects (URM, Soft-first Story)	Public Works, Planning, Building and Safety	Ongoing	X	X	X	X		X	GP		H	L	M	New	
EQ-14 General Plan – Safety Element Policy (Hz 11.1) Promote public awareness of the need to upgrade seismically	Planning, Public Works, Building and Safety	5 Years	X	X		X	X	X	GP	Y	H	H	H	New	



Action Item	Coordinating Organization	Timeline	Plan Goals Addressed						Funding Source and Planning Mechanisms (FY=Fiscal Year Budget, GR=Grant, CIP, GP=General Plan)	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Priority (L=Low, M=Med, H=High)	2020 Comments (Status – Completed, Revised, Deleted, New, and Deferred)	Quarter Comments
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
hazardous buildings for the protection of health and safety in the City (URM, Soft-first story)															
EQ-15 (General Plan – Safety Element Policy Hz 11.2) Require seismic review of buildings (URM, Soft-first story)	Building and Safety	5 Years	X	X		X	X	X	GP	Y	H	H	H	New	
EQ-16 (General Plan – Safety Element Policy Hz 11.3) Promote seismic upgrading of older residential and commercial structures with special attention given to historic structures (URM, Soft-first story)	Building and Safety	5 Years	X	X		X	X	X	GP	Y	H	H	H	New	
EQ-17 General Plan – Safety Element Policy (Hz 12.1) Maintain and update multi-hazard emergency preparedness plan for the	Public Works, Planning, Police Department, Fire Department, IT	Ongoing	X			X	X		GP		H	H	H	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
City that includes seismic safety															
EQ-18 (General Plan – Safety Element Policy Hz 12.2) Maintain and upgrade the City's disaster response plans at least annually, conduct periodic tests of their practicality and effectiveness, and involve residents and business in the preparation and testing of the plans	Public Works, Fire Department, Planning, Police Department, IT	Ongoing	X	X		X	X		GP		H	M	H	New	
EQ-19 (General Plan – Safety Element Policy Hz 12.3) Prepare and disseminate to residents and businesses information regarding seismic risks affecting the City, measures to protect life and property before and during an earthquake,	Public Works, Fire Department, Building and Safety, Community Services, Library	Ongoing	X	X		X	X		GP		H	H	H	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
and emergency procedures to follow after an earthquake															
EQ-20 (General Plan – Safety Element Policy Hz 12.4) Incorporate planning for potential incidents affecting critical, sensitive and high-occupancy facilities into the City's contingency plans for disaster response and recovery	Public Works, Fire Department, Building and Safety, Community Services, Library	Ongoing	X				X		GP, CIP	Y	H	H	H	New	
EQ-21 (General Plan – Safety Element Policy Hz 12.5) Ensure that emergency preparedness is the mutual responsibility of City agencies, City residents and the business community	All City Departments	Ongoing	X	X		X	X		GP		H	H	H	New	
EQ-22 (General Plan – Safety Element Policy Hz 12.6) Develop and	All City Departments	Ongoing	X				X		GP		H	H	H	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
implement ongoing City-wide programs for disaster preparedness and recovery planning															
EQ-23 (General Plan – Safety Element Policy Hz 13.1) Provide residents and business owners with a continuing awareness and expanding knowledge of the seismic hazards affecting the City.	Public Works, Community Services	Ongoing	X	X		X			GP		H	L	M	New	
Wildfire Mitigation Action Items															
WF-1 Enhance emergency services to increase the efficiency of wildfire response and recovery activities through purchase of a Type 5 Vehicle.	Fire Department	4 years	X		X		X		GR, GR	Y	M	H	H	Revised	
WF-2 Maintain contemporary collection of maps relating to the fire	Fire Department, Planning Department	Ongoing	X	X	X	X	X	X	FY, FY	Y	H	L	H	Revised	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
hazard to help educate and assist builders and homeowners in mitigating against wildfire.															
WF-3 Enhance outreach and education programs (e.g. CAL FIRE, Vegetation Management) aimed at mitigating wildfire hazards.	Fire Department	Ongoing	X	X	X	X	X	X	FY, FY	Y	H	L	H	Revised	
WF-4 Develop a Vegetation Management Program.	Fire Department	1 year	X	X	X	X	X	X	FY, FY	Y	H	L	H	New	
WF-5 (General Plan – Safety Element Policy Hz 2.4) Ensure the quantity and capacity of resources are available for safety purposes for new construction projects	Public Works	Ongoing	X				X	X	FY	Y	H	M	H	New	
WF-6 (General Plan – Safety Element Policy Hz 2.5) Assess the	Building & Safety, Fire Department	Ongoing	X					X	FY	Y	H	M	H	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
environmental impacts of development on fire hazards and emergency response time, and ensure fire protection standards are met throughout the review process															
WF-7 (General Plan – Safety Element Policy Hz 2.9) Maintain and update the fire prevention design measures of the hillside development standards	Fire Department, Planning	Ongoing	X			X	X	X	FY		H	L	M	New	
WF-8 (General Plan Safety Element Policy Hz 2.10) Develop a solution to parking issues that affect Fire Department access in the canyon areas	Public Works, Police Department, Community	Ongoing	X			X	X	X	FY	Y	H	M	H	New	
WF-9 (General Plan - Safety Element Policy Hz 5.1) Mandate annual brush removal	Public Works, Fire Department	Ongoing	X		X			X	FY		M	H	M	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
WF-10 (General Plan – Safety Element Policy Hz 5.2) Work with community groups in presenting information and trainings regarding wildfire prevention and awareness	Public Works, Fire Department, Library	Ongoing	X	X	X	X			FY		M	H	M	New	
Landslide Mitigation Action Items															
LND-1 Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	Planning Department	Ongoing	X	X		X	X	X	FY, FY	Y	H	L	H	Revised	
LND-2 To the extent feasible, provide protective measures designed to limit debris flow resulting from the fire/mudflow sequence, thereby reducing the threat to life and property relative to existing	Public Works Department	Ongoing	X	X	X		X		GR, GR	Y	M	H	H	Revised	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
development in threatened areas including debris basins enhancements, and property purchases.															
LND-3 Amend Hillside Management Zone.	Planning Department	1 year	X	X	X			X	FY, FY	Y	H	L	H	New	
Flood Mitigation Action Items															
FLD-1 Identify surface water drainage obstructions for all parts of the City of Sierra Madre.	Public Works Department	5 years	X						GR, GR					Revised	
FLD-2 Capture flood waters to lessen the flow within the City streets.	Public Works	10 years	X	X				X	GR, GR	Y	L	H	M	New	
FLD-3 (General Plan – Safety Element Policy Hz 6.1) Require that all new development incorporates sufficient measures to mitigate flood hazards, including the design of containment systems to capture stormwater runoff	Building and Safety, Public Works	Ongoing	X		X	X		X	FY	Y	H	L	H	Yes	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
on-site, and site grading that minimizes stormwater runoff from increased impervious surfaces, thereby addressing impacts to on-site structures and adjacent properties (change language to require LID/NPDES)															
FLD-4 (General Plan – Safety Element Policy Hz 6.2) Require that the landscape of open space areas provide the maximum permeable surface area to reduce site runoff, and prohibit the paving of a majority of these areas	Building and Safety, Public Works, Planning	Ongoing	X		X	X		X	FY		H	L	H	Yes	
FLD-5 (General Plan – Safety Element Policy Hz 7.1) In the event of a flood, utilize the Incident	Fire Department, Police Department, Public Works,	Ongoing	X			X	X		FY	Y	H	H	H	Yes	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
Command and the National Incident Management System	Volunteer Search and Rescue														
FLD-6 (General Plan – Safety Element Policy Hz 7.2) Schedule emergency evacuation drills to prepare for the event of floods	All City Departments	Ongoing	X				X		FY	Y	H	L	H	Yes	
FLD-7 (General Plan – Safety Element Policy Hz 8.1) Require that residential tract developers be responsible for construction of drainage/storm drain systems improvements that are compatible with City and County systems within or adjacent to their project site	Public Works, Planning	Ongoing	X			X	X	X	GP	Y	H	H	H	New	
FLD-8 (General Plan – Safety Element Policy Hz 8.2) Install required public	Public Works	Ongoing	X			X	X	X	GP, CIP	Y	H	H	H	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
storm drainage improvements															
FLD-9 (General Plan – Safety Element Policy Hz 8.3) Maintain efforts to keep the debris basins clean	Public Works, LA County	Ongoing	X			X	X	X	FY	Y	H	H	H	New	
FLD-10 (General Plan – Safety Element Policy Hz 9.1) Obtain and make available to the public updated flood hazard maps prepared by FEMA	Public Works, Planning & Library	Ongoing	X	X	X		X	X	GP, GP	Y	H	L	H	New	
FLD-11 Work with NFIP to have the FIRM updated for the project area.	Public Works, Administration	5 years	X	X	X	X	X	X	FY, FY	Y	H	n/a	H	New	
Windstorm Mitigation Action Items															
WND-1 Develop Public Awareness Campaign: To provide public education materials to City residents pertaining to the protection of life and property before,	Fire Department, Library	1-2 years	X	X	X	X	X	X	FY, FY		H	L	H	Revised	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
during, and after a windstorm.															
WND-2 Create local City awareness of tree appropriateness in regard to the Fire Code Sections relevant to utility operations.	Public Works Department	Ongoing	X	X	X	X	X	X	FY, FY		H	L	H	Revised	
WND-3 Encourage property owners and Critical Facilities to purchase and/or test backup power facilities for use during a power failure. Create an equipment/testing log to ensure backup power equipment is in working service.	Public Works	Ongoing	X	X	X	X	X	X	GR, GR	Y	H	H	H	Revised	
Utility-Related Mitigation Action Items															
UT-1 Install Public Safety protective shut-offs for power.	Public Works	5 years	X	X	X	X	X	X	GR, GR	Y	H	H	H	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
UT-2 Prepare public and emergency services for Public Safety Power Shutoffs (PSPS) by providing back-up generators for critical City facilities and at-risk members of the community. Pursue solar power and energy storage as alternative sources of power during PSPS events for critical City facilities.	Public Works	1 year	X	X			X		GR, GR	Y	H	H	H	New	
UT-3 Secure adequate water surplus and sources during drought years to meet demands of public health and safety and emergency response.	Public Works	3 years	X	X	X	X		X	GR, GR	Y	H	H	H	New	
UT-4 Identify alternative sources of water and distribution capabilities in the event of a system-	Public Works	3 years	X	X	X	X	X		GR, GR	Y	H	H	H	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
wide contamination emergency															
UT-5 Make necessary upgrades to sewer infrastructure and overflow response actions to prevent major sewer overflows.	Public Works	3 years	X				X		GR, GR	Y	H	H	M	New	
Epidemic / Pandemic / Vector-Borne Mitigation Action Items															
EPV-1 Develop inventories of PPE, and emergency supplies for pandemic distribution.	Fire Department	Ongoing	X	X		X	X		FY		H	M	H	New	
EPV-2 Encourage community preventive measures, through implementation of signage in all public facilities.	Public Works	Ongoing	X	X		X	X		FY		H	L	H	New	
EPV-3 Implement annual community wellness campaign, providing educational information to public, formatted to	Fire Department	Ongoing	X	X		X	X		FY		H	L	H	New	



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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services	Regulation and Permitting							
stopping the spread of illness.															
EPV-4 Identify and pursue funding opportunities to develop and implement neighborhood and city mitigation activities.	ETeam	Ongoing	X	X		X	X		FY		H	L	H	New	

