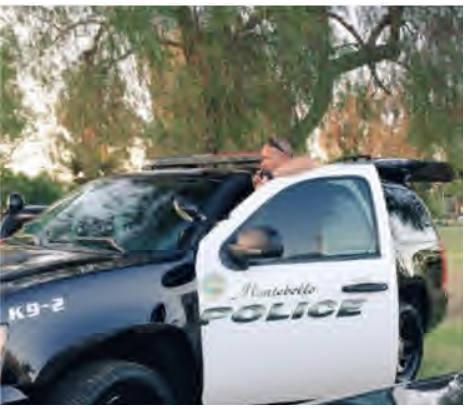
Second Draft Plan

November 15, 2016 | # Hazard Mitigation Plan



emergency planning consultants

City of MONTEBELLO CALIFORNIA

Credits

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Acknowledgements

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Mapping

The maps in this plan were provided by Emergency Planning Consultants, City of Montebello, County of Los Angeles, Federal Emergency Management Agency (FEMA), and 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 Montebello 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 | A1
Q A1: Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1)) **A:**

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Part I: PLANNING PROCESS

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 City of Montebello 2004 Local 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 public agencies have a role in hazard identification and 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: A3. 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.

Stakeholders

A Hazard Mitigation Planning Team (Planning Team) consisting of department representatives from City of Montebello worked with Emergency Planning Consultants to create the updated Plan. **The Planning Team served as the primary stakeholders throughout the planning process.**

As required by DMA 2000, the Planning Team involved "the public" in a variety of forums. External agencies (including utility providers, special districts and adjoining jurisdictions) were emailed an invitation to attend a briefing on October 27, 2016 regarding the Mitigation Plan and the General Plan Safety Element. The Second Draft Plan was announced and posted on the City's website on November 17, 2016. External agencies were emailed information about the availability of the Second Draft Plan. On December 6, 2016, a Community Meeting was held to provide an overview on both the Mitigation Plan and Safety Element. Also on December 6, 2016, both plans were presented to the City's Planning Commission which is open to the public.

The general public, external agencies, Community Meeting attendees, and Planning Commission attendees all served as secondary stakeholders with opportunity to contribute to the plan during the Plan Writing Phase of the planning process.

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:
  - o Brush control and maintenance
  - o Fuel break lines in shrubbery
  - o 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.

"Floods and hurricanes happen. The hazard itself is not the disaster – it's our habits, it's how we build and live in those areas…that's the disaster."

Craig Fugate, FEMA Director

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: C2. 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

Established in 1968, the NFIP provides federally-backed flood insurance to homeowners, renters, and businesses in communities that adopt and enforce floodplain management ordinances to reduce future flood damage. The City of Montebello adopted a floodplain management ordinance in 1998 and has Flood Insurance Rate Maps (FIRM) that show floodways, 100-year flood zones, and 500-year flood zones. The City Engineer is designated as floodplain administrator.

NFIP Participation

The City of Montebello participates in NFIP and the FEMA FIRM maps for the City of Montebello were last updated September 26, 2008. Unfortunately, FEMA flood maps are not entirely accurate. These studies and maps represent flood risk at the point in time when FEMA completed the studies, and does not incorporate planning for floodplain changes in the future due to new development. Although FEMA is considering changing that policy, it is optional for local communities. According to FEMA, the City of Montebello is designated a No Special Flood Hazard Area (NSFHA). A Non-Special Flood Hazard Area (NSFHA) is an area that is in a moderate- to low-risk flood zone (Zones B, C, X Pre- and Post-FIRM). An NSFHA is not in any immediate danger from flooding caused by overflowing rivers or hard rains. City of Montebello is rated as Zone X.

However, it's important to note that structures within a NSFHA are still at risk. In fact, over 20-percent of all flood insurance claims come from areas outside of mapped high-risk flood zones.

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

Q: B4. 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

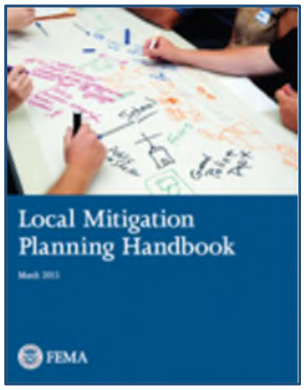
potential mitigation measures and activities to best address the problems and needs of communities with repetitive loss properties. A repetitive loss property is one for which two or more claims of $1,000 or more have been paid by the National Flood Insurance Program (NFIP) within any given ten-year period. According to NFIP resources, there are no Repetitive Loss Properties (RLPs) within the City of Montebello.

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 | Flooding | Dam Failure | Drought

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) action item 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 Staff Report
City Council Resolution
Community Meeting Sign-in Sheet
Planning Commission Notice and Minutes
Planning Team Sign-in Sheets
Web Postings and Notices

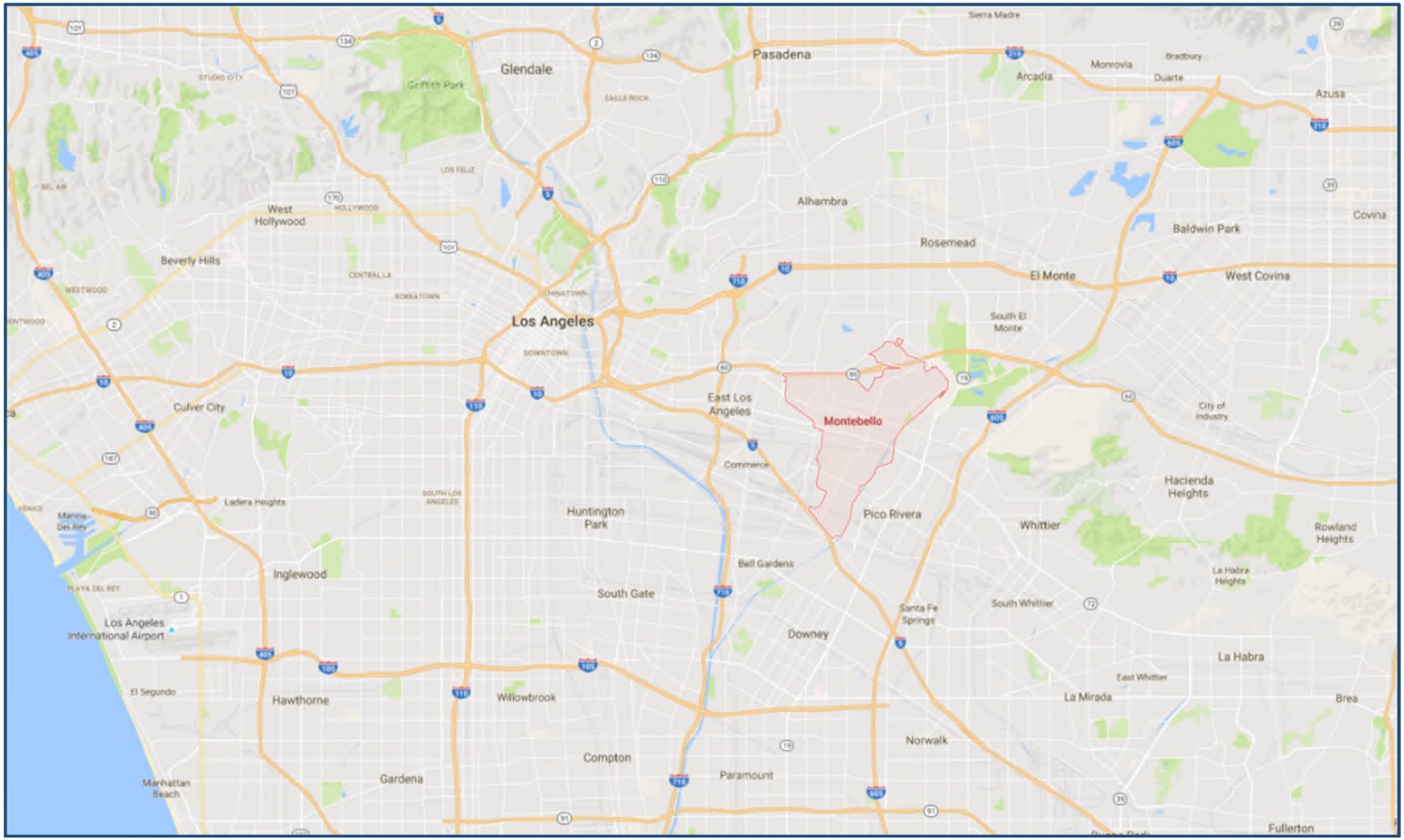
Plan Adoption and Approval

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 Montebello** shows the regional proximity of the City to its adjoining communities.

Map: City of Montebello
(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 review by the City's Hazard Mitigation Planning Team who served as the primary stakeholders. Next, following necessary updates from the internal review, a Second Draft Plan was shared with the secondary stakeholders including: general public, external agencies (utilities, special districts, adjoining jurisdictions) - all during the plan writing phase. Next, the comments gathered from the secondary stakeholders were incorporated into the Staff Report for presentation of the Second Draft Plan to City Council. The Third Draft Plan included comments gathered during the City Council meeting and was submitted to Cal OES and FEMA. Mandated revisions were incorporated into the Final Draft Plan. FEMA granted approval of the Plan. The planning process described above is portrayed below in the Planning Process Timeline:

Q&A | ELEMENT A: PLANNING PROCESS | A1

Q: A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))

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

Q&A | ELEMENT A: PLANNING PROCESS | A2

Q: A2. 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 interests to be involved in the planning process? (Requirement §201.6(b)(2))

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

Q&A | ELEMENT A: PLANNING PROCESS | A3

Q: A3. 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.

Q&A | ELEMENT E: PLAN ADOPTION | E1

Q: E1. 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 **Planning Phases Timeline** below.

Figure: Planning Phases Timeline

PLANNING PROCESS TIMELINE			
Plan Writing Phase (First & Second Draft Plan)	**Plan Adoption Phase (Second & Third Draft Plan)**	**Plan Approval Phase (Final Draft & Final Plan)**	**Plan Implementation Phase**
• Planning Team input – research, meetings, writing, reading of First Draft Plan • Incorporate input into Second Draft Plan • Post Second Draft Plan and encourage input by the general public and external agencies. • Incorporate input gathered on Second Draft Plan into Staff Report for City Council. Post notice for City Council meeting.	• Second Draft Plan presented to City Council along with Resolution to adopt the Plan. • Incorporate input from the City Council meeting into the Third Draft Plan. • Forward Third Draft Plan along with FEMA Review Tool to Cal OES and FEMA.	• Incorporate any mandated revisions into the Final Draft Plan • Receive FEMA approval. • Incorporate FEMA approval into Final Plan.	• 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 regulatory changes.

The rest of this section describes the mitigation planning process including 1) Planning Team involvement, 2) inclusion of secondary stakeholders – general public, external agencies, Community Meeting, and Planning Commission, and 3) integration of existing data and plans.

Q&A | ELEMENT A: PLANNING PROCESS | A1

Q: A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (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 Montebello departments related to hazard mitigation processes including: Fire, Planning and Community Development, Public Works, and Recreation and Community Services, and Police. The Planning Team served as the primary stakeholders throughout 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 the general 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 meeting
- ✓ Provide existing resources including maps and data

Table: Planning Team Level of Participation

Name	Research and Writing of Plan	Project Kickoff Meeting 9/6/2016	Planning Team Meeting 9/15/2016	Planning Team Meeting 10/25/2016	Planning Team Meeting 11/7/2016	Planning Team Meeting 11/14/2016	Review First Draft Plan	Attend City Council Meeting 11/30/2016	Submit Final Draft Plan to Cal OES and FEMA
City of Montebello									
Dan Amador			X						
Danilo Batson			X	X	X	X			
Matthew Feske		X	X	X	X	X			
Dan France				X	X				
Kurt Johnson		X		X	X	X			
Brad Keller			X						
Ben Kim		X	X	X	X	X			
Rick Rojas			X						
David Sosnowski				X	X	X			
California Consulting									
Allison Richards		X	X						
Emergency Planning Consultants									
Carolyn J. Harshman	X	X	X	X	X	X			

Table: Planning Team Timeline

Task	September 2016	October	November	December
EPC Team Research, Writing, and HAZUS Mapping	X	X	X	X
Hazard Mitigation Plan				
Planning Team Meetings (4 hours)				
- Meeting #1 Hazard Overview	September 15th			
- Meeting #2 Status of Hazard Mitigation Action Items and Develop New Items and Review Existing Safety Element Goals and Policies		October 25th		
- Meeting #3 Review First Draft Plan (Drafts distributed on November 11th)			November 14th	
Second Draft Plan Posted on City's Website			November 17th	
City Council Public Meeting				November 30th
Submit Third Draft Plan to Cal OES and FEMA				December 7th

Q&A | ELEMENT A: PLANNING PROCESS | A2

Q: A2. 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 interests to be involved in the planning process? (Requirement §201.6(b)(2))

A: See **General Public and External Agency Involvement** below.

Q&A | ELEMENT A: PLANNING PROCESS | A3

Q: A3. 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 Involvement** below.

Secondary Stakeholder Involvement

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 (utilities, special districts, and adjoining jurisdictions). All gathered input was directed to the Chair of the Planning Team who incorporated the information into the Second Draft Plan. Following is a specific accounting of the agency, date, and information gathered:

Agency	Name and Position Title	Date and Information Received

External agencies were invited via email and provided with an electronic link to the City's website containing the Second Draft Plan. In the same email the external agencies were invited to attend a briefing on November 14th of both the updated Mitigation Plan and the updated General Plan Safety Element. Following is the email distributed along with the invitation to comments:

Figure: External Agencies Email Invitation

Q&A | ELEMENT C. MITIGATION STRATEGY | C1
Q: C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (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 Programs

Process	Action	Implementation of Plan
Administrative	Departmental or organizational work plans, policies, and procedural changes	✓ *Planning and Community Development Department* ✓ *Public Works Department* ✓ *Other departments as appropriate*
Administrative	Other plans	✓ *Reference plan in Emergency Operations Plan*
Budgetary	Capital and operational budgets	✓ *Include line item mitigation measures in budget as appropriate*

Process	Action	Implementation of Plan
Regulatory	Executive orders, ordinances, and other directives	✓ *Building Code* ✓ *Capital Improvement Plan (Project related to hazard mitigation)* ✓ *Incorporate mitigation goals in future updates to the General Plan Safety Element* ✓ *General Plan (Institutionalize hazard mitigation in land use and new construction)* ✓ *National Flood Insurance Program* ✓ *Storm Water Management Plan* ✓ *Zoning Ordinance*
Funding	Traditional and nontraditional sources	✓ *Once plan is approved, seek authority to use bonds, fees, loans, and taxes to finance projects* ✓ *Seek assistance from federal and state government, foundation, nonprofit, and private sources, such as Hazard Mitigation Grant Program* ✓ *Research and grant opportunities through U.S. Department of Housing and Urban Development, Community Development Block Grant*
Partnerships	Creative funding and initiatives	✓ *Community volunteers* ✓ *In-kind resources* ✓ *Public-private partnerships* ✓ *State support*
Partnerships	Advisory bodies and committees	✓ *Disaster Management Area Coordinator*

Q&A | ELEMENT A: PLANNING PROCESS | A4

Q: A4. 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 Montebello General Plan and Elements
  - *Zoning map included in the Community Profile section.*
  - *The Community Profile sections includes City specific geography, environmental, population, housing and demographic information, and transportation information.*
- ✓ City of Montebello Emergency Operations Plan
  - *The Community Profile section includes City specific employment and transportation information.*

- ✓ County of Los Angeles All-Hazards Mitigation Plan (2014)
  - o *Information about hazards in the County contributed to the hazard-specific sections in the City's Mitigation Plan.*
- ✓ California State Hazard Mitigation Plan (2013)
  - o *Used to identify hazards posing greatest threats to State.*
- ✓ HAZUS maps and reports
  - o *Numerous HAZUS results have been included for Earthquake, Flooding, and Dam Failure scenarios to determine specific risk to City of Montebello.*
- ✓ Census data
  - o *The Community Profile includes Census information from the California Department of Finance.*
- ✓ FEMA "How To" Mitigation Series (386-1 to 386-9)
  - o *The Series were introduced as resources in each of the Planning Team meetings.*
  - o *Mitigation Measures Categories and 4-Step Planning Process are quoted in the Executive Summary.*
- ✓ National Flood Insurance Program
  - o *The NFIP website was used to confirm there are no repetitive loss properties within the City.*
- ✓ Local Flood Insurance Rate Maps
  - o *Provided by FEMA and included in Flood Hazard section.*

Q&A | ELEMENT E: PLAN ADOPTION | E1
Q: E1. 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 was presented the Second Draft Plan following input gathered through primary and secondary stakeholders. After incorporating input gathered during the City Council meeting, a Final Draft Plan was forwarded along with a FEMA Review Tool to Cal OES and 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 plan writing phase as well as the review phase immediately preceding the City Council public meeting. During the Council meeting, the Mayor encouraged participants to present their views and make suggestions on the Plan.

The City Council heard the item on November 30, 2016. The City Council voted _____ to adopt the updated Mitigation Plan. The Resolution of adoption by the City Council is in the **Appendix**.

Plan Approval

FEMA issued an approval on _____. 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's General Plan Housing Element (2013), the City of Montebello has a total land area of 8.25 square miles. The City of Montebello is located approximately 7 miles southeast of downtown Los Angeles and is bounded by the cities of Monterey Park and Rosemead on the north, the City of Commerce and unincorporated portions of Los Angeles County on the west, the Whittier Narrows Recreation area on the east, the City of Commerce on the southwest and the City of Pico Rivera on the southeast.

Originally an agricultural community, Montebello had an ideal climate, productive soil, and an abundance of water for farming. From the turn of the century continuing through the 1920's, the area was well known for its production of flowers, vegetables, berries, and fruits. The discovery of oil by Standard Oil Company on the Anita Baldwin property in 1917, brought about a new era for the City. By 1920, Montebello oil fields accounted for one-eighth of total California crude oil production. On October 19, 1920, Montebello was incorporated as the 35th of the present cities in Los Angeles County.

Climate

The City of Montebello is located 15 miles inland from the Pacific providing a moderate Mediterranean climate. Marine layer clouds are common early in the day before giving way to sunny afternoons. The City experiences dry summers with an average temperature of about 71°F and cool, wet winters with an average temperature of 57°F. Montebello receives an average of 17 inches of rainfall per year.

As the State of California and the Los Angeles region has undergone a several-year drought, rainfall has been much lower in the City. However, rainfall totals should increase as the City is expected to be in an El Niño year for 2016.

Furthermore, actual rainfall in the Southern California region tends to fall in large amounts during sporadic and often heavy storms rather than consistently over storms at somewhat regular intervals. In short, rainfall in Southern California might be characterized as feast or famine within a single year.

Population and Demographics

Montebello experienced steady population growth in its earlier days and a boom after the end of World War II. Population growth continued into the 1980's though the rate of growth slowed in the decade following 2000 due to demographic trends and limited new housing development. According to the California Department of Finance (2014), the population has grown to 63,745

as of 2014. From 2000 to 2014, the City's population growth rate of 2.6% was lower than the Los Angeles County rate of 5.7%.

According to the California Department of Finance (2014), the demographic makeup of the City is as follows:

Table: City of Montebello Demographics
(Source: California Department of Finance, E-5, 2014)

Racial/Ethnic Group	2000	2014	Change	Change %
Hispanic	46,364	51,506	5,142	11%
White	6,899	4,908	(1,991)	-29%
Black	373	382	9	2%
American Indian Eskimo	124	128	4	3%
Asian or Pacific Islander	7,085	6,438	(647)	-9%
Other	1,305	383	(922)	-71%
Total	**62,150**	**63,745**	**1,595**	**3%**

Housing and Community Development

Table: City of Montebello Housing
(Source: California Department of Finance, E-5, 2014)

2014	Number	Percent %
Housing Type:		
1-unit, detached	9,823	49.6%
1-unit, attached	1,542	7.8%
2-4 Units	2,466	12.4%
5+ Units	5,717	28.9%
Mobile homes/Other	266	1.3%
Housing Statistics:		
Total Available Housing Units	19,814	100%
Owner-Occupied Housing	9,035	45.6%
Renter-Occupied	10,779	54.5%
Average Household Size:	3.3 persons	
Median Home Price:	$385,000	

Employment and Industry

According to the City of Montebello General Plan Housing Element (2013), during the 24 years between 1990 and 2014, the number of residents employed in the manufacturing and retail trade sectors experienced significant declines. During this same period, the number of residents employed in the health services, education, arts, and public administration increased.

Jobs in education account for the majority of jobs offered in Montebello. The Montebello Unified School District is the largest employer in the City, with multiple schools providing jobs for administrators, teachers, and custodians, as well jobs located at the central administration offices.

Table: City of Montebello Industry
(Source: American Community Survey - 2014)

Industry	2014	
	Number	Percent %
Agriculture, forestry, fishing and hunting, and mining	77	0.3%
Construction	1,391	5.3%
Manufacturing	2,947	11.2%
Wholesale Trade	1,316	5.0%
Retail Trade	2,912	11.1%
Transportation and Warehousing, and Utilities	1,881	7.1%
Information	587	2.2%
Finance and insurance, and real estate and rental and leasing	1,570	6.0%
Professional, scientific, and management, and administrative and waste management services	2,506	9.5%
Educational services, and health care and social assistance	5,734	21.8%
Arts, entertainment, and recreation, and accommodation and food services	2,321	8.8%
Other services, except public administration	1,762	6.7%
Public administration	1,308	5.0%

Table: City of Montebello Occupation
(Source: American Community Survey - 2014)

Occupation	2014	
	Number	Percent
Civilian employed population (16 years and over)	26,312	100.0%
Management, business, science, and arts occupations	7,658	29.1%
Service occupations	4,589	17.4%
Sales and office occupations	7,475	28.4%
Natural resources, construction, and maintenance occupations	2,039	7.8%
Production, transportation, and material moving	4,551	17.3%

Transportation

According to the City of Montebello's Emergency Operations Plan (2005), there are 122 miles of streets within the City including four major east west routes and two north south routes. The City is bounded by the Santa Ana Freeway (Highway 5) on the south and the Pomona Freeway (605 Freeway) on the east. These freeways are major north-south transportation routes. South Montebello is home to 10 major trucking company terminals and is a corridor for two major rail lines.

Montebello Bus Lines' (MBL) provides transportation services to residents of Montebello and neighboring cities. MBL is the third largest municipal bus system in Los Angeles County, behind Long Beach Transit and Santa Monica's Big Blue Bus. With a fleet of 66 buses, MBL serves over 8 million passengers a year throughout the communities of Alhambra, Bell Gardens, Boyle Heights, Commerce, Downtown Los Angeles, East Los Angeles, La Mirada, Montebello, Monterey Park, Pico Rivera, Rosemead, South Gate and Whittier. In addition to providing transportation services, MBL also maintains the Montebello Metrolink Station and over 800 bus stops. MBL secures dedicated transportation funding from federal, state and local agencies to provide public transit services.

Map: Major Roadways
Source – General Plan Circulation Element

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 | B1

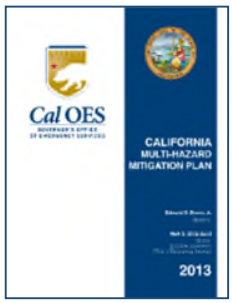
Q: B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))

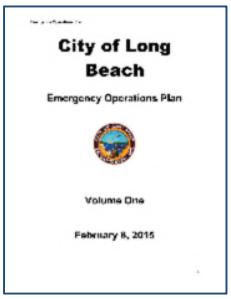
A: See **Hazard Identification** below.

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 Montebello utilized the categorization of hazards as identified in California Multi-Hazard Mitigation Plan (2013), including: Earthquakes, Floods, Levee failures, Wildfires, Landslides and earth movements, Tsunami, Climate-related hazards, and Volcanoes.

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 hazards were most likely to cause impacts that you require 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 Plan and City's Emergency Operations Plan. 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 | Flooding | Dam Failure | Drought

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 Montebello**.

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 Montebello

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Totals
Earthquake – San Andreas M8.0	3	1.35	3	1.2	4	0.6	1	0.1	**2.95**
Earthquake – Newport-Inglewood M7.1	3	1.35	3	1.2	4	0.6	1	0.1	**2.95**
Earthquake – Puente Hills M7.1	3	1.35	3	1.2	4	0.6	1	0.1	**2.95**
Earthquake – Whittier M6.8	3	1.35	3	1.2	4	0.6	1	0.1	**2.95**
Earthquake – Sierra Madre M6.8	3	1.35	3	1.2	4	0.6	1	0.1	**2.95**
Wildfire	2	.90	2	0.6	3	0.45	3	0.3	**2.25**
Flooding	2	.90	2	0.6	1	0.15	2	0.2	**1.85**
Dam Failure	2	.90	3	0.9	2	0.3	4	0.4	**2.50**
Drought	1	.45	2	0.6	1	0.15	4	0.4	**1.60**

2) Profiling Hazard Events

Profiling of hazards involves a process of describing 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 Montebello** 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 | B1

Q: B1. 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 **Table: Vulnerability: Location, Extent, and Probability for City of Montebello** below.

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

Q: B2. 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 **Table: Vulnerability: Location, Extent, and Probability for City of Montebello** below.

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

Q: B3. 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 **Table: Vulnerability: Location, Extent, and Probability for City of Montebello** below.

Table: Vulnerability: Location, Extent, Probability, and Previous Occurrences in City of Montebello

Hazard	Location (Where)	Extent (How Big an Event)	Probability (How Often) *	Previous Occurrences
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]	Moderate	1994 – Northridge Earthquake
Wildfire	North and Eastern boundaries of City	Cities to the east of the City maintain severe FRAP ratings.	Low	None
Flooding	Rio Hondo Flood Control Channel which runs north to south through length of City and San Gabriel River Basin along east side of City	Urban flooding from severe weather.	Moderate	November 2014 - Urban Flooding from heavy rain
Dam Failure	Eastern boundary of City along Rio Hondo Flood Control Channel	Water depth inundation up to 40 feet along Rio Hondo Flood Control Channel	Low	None
Drought	Entire Project Area	Droughts in urban areas vary considerably in scope and intensity. Likely emergency water shortage regulations would restrict such activities as watering of landscape, washing of cars, and other non-safety related activities.	Moderate	None
* Probability is defined as: Low = 1:1,000 years, Moderate = 1:100 years, High = 1:10 years				
[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.

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: Critical Facilities Vulnerable to Hazards illustrates the hazards with potential to impact critical facilities owned by or providing critical services to the City of Montebello.

Table: Critical Facilities Vulnerable to Hazards

Name of Facility	Earthquake	Wildfire	Flooding	Dam Failure	Drought
ESSENTIAL FACILITIES:					
City Hall 1600 W. Beverly Boulevard	X				X
Montebello Fire Department (Station No. 56) 600 N. Montebello Boulevard	X				X
Montebello Fire Station No. 56 1166 S. Greenwood Avenue	X				X
Montebello Fire Station No. 57 2950 Via Acosta Street	X				X
Montebello Police Department 1600 W. Beverly Boulevard	X				X
Beverly Hospital 309 W. Beverly Boulevard	X				X
HIGH POTENTIAL LOSS FACILITIES:					
Whittier Narrows Dam 909 N. Lincoln Avenue	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 Montebello 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 Montebello 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 Montebello 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. The land use composition of the City is approximately 70% residential and 30% mixed use/commercial/industrial.

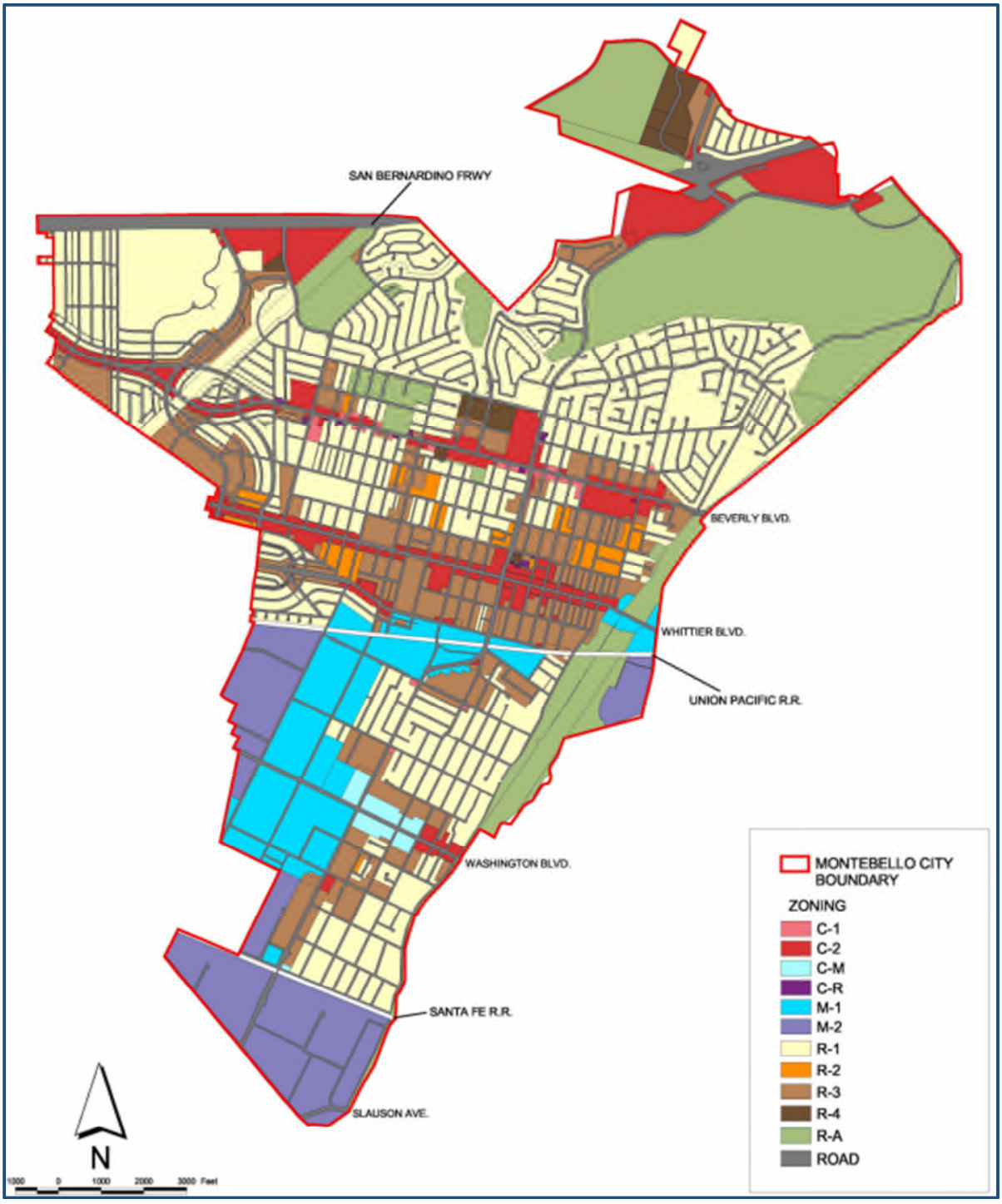
Impacts to Types of Land Uses

City of Montebello's General Plan identifies a range of land uses as shown below.

Table: Impacts to Existing and Future Land Uses in the City of Montebello
(Source: EPC Analysis Based on City of Montebello General Plan – Land Use Element)

Category of Land Use Designation	Earthquake	Wildfire	Flooding	Dam Failure	Drought
Low-Density Residential	X	X	X	X	X
Medium-Density Residential	X	X			X
High-Density Residential	X		X	X	X
Very High-Density Residential	X				X
Mixed Use	X	X	X	X	X

Map: City of Montebello Zoning Map
(Source: City of Montebello)



Earthquake Hazards

Previous Occurrences of Earthquakes in the City of Montebello

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

Q: B2. 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 Earthquakes in the City of Montebello** below.

The following earthquake event significantly impacted the region surrounding the City of Montebello.

In January 1994, the magnitude 6.7 Northridge Earthquake (thrust fault) which produced severe ground motion, caused 57 deaths, 9,253 injuries and left over 20,000 displaced. 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.

Since the writing of the 2004 Mitigation Plan, there have been no significant earthquake events impacting the City of Montebello.

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 (8.0+) 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.

Local Conditions

According to the City's General Plan, Montebello does not contain an active fault identified within its boundaries. Thus, the City is not required to withhold permit issuance or require geologic investigations to demonstrate structural safety associated with fault rupture. However, since Montebello is located close to the Whittier Fault and atop several blind thrust faults, all structures must abide by seismic reinforcement requirements of the City's Building Code.

Earthquakes that could affect the City would most likely originate from the Newport-Inglewood, San Andreas, Whittier, Puente Hills, or Sierra Madre Faults. These faults are close enough in proximity or expected to generate strong enough shaking that could significantly impact the City.

Map: Regional Faults plots the various major faults located closest to the City of Montebello, the closest being the Whittier Fault Zone.

Newport-Inglewood Fault Zone

The Newport-Inglewood Fault Zone lies approximately 14 miles southwest of Montebello. The Newport-Inglewood Fault System is a nearly linear alignment of faults extending 45 miles along the southwestern side of the Los Angeles basin. It can be traced as a series of topographic hills, ridges, and mesas from the Santa Monica Mountains to Newport Beach, where it trends offshore. Structures along the zone of deformation act as groundwater barriers and, at greater depths, as petroleum traps. Continuing seismic activity has been evidenced most prominently in recent times by the 1920 Inglewood and 1933 Long Beach earthquakes.

San Andreas Fault Zone

The San Andreas Fault Zone is located approximately 34 miles northeast of the City of Montebello. 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 earthquake (comparable to the great San Francisco earthquake of 1906) within the next 30 years.

Whittier Fault Zone

The Whittier fault zone lies approximately 7 miles southeast of Montebello. The Whittier Fault is a 25 mile right-lateral strike-slip fault that runs along the Chino Hills range between the cities of Chino Hills and Whittier. It is estimated that this fault could generate up to a magnitude 7.2 earthquake.

Puente Hills Fault Zone

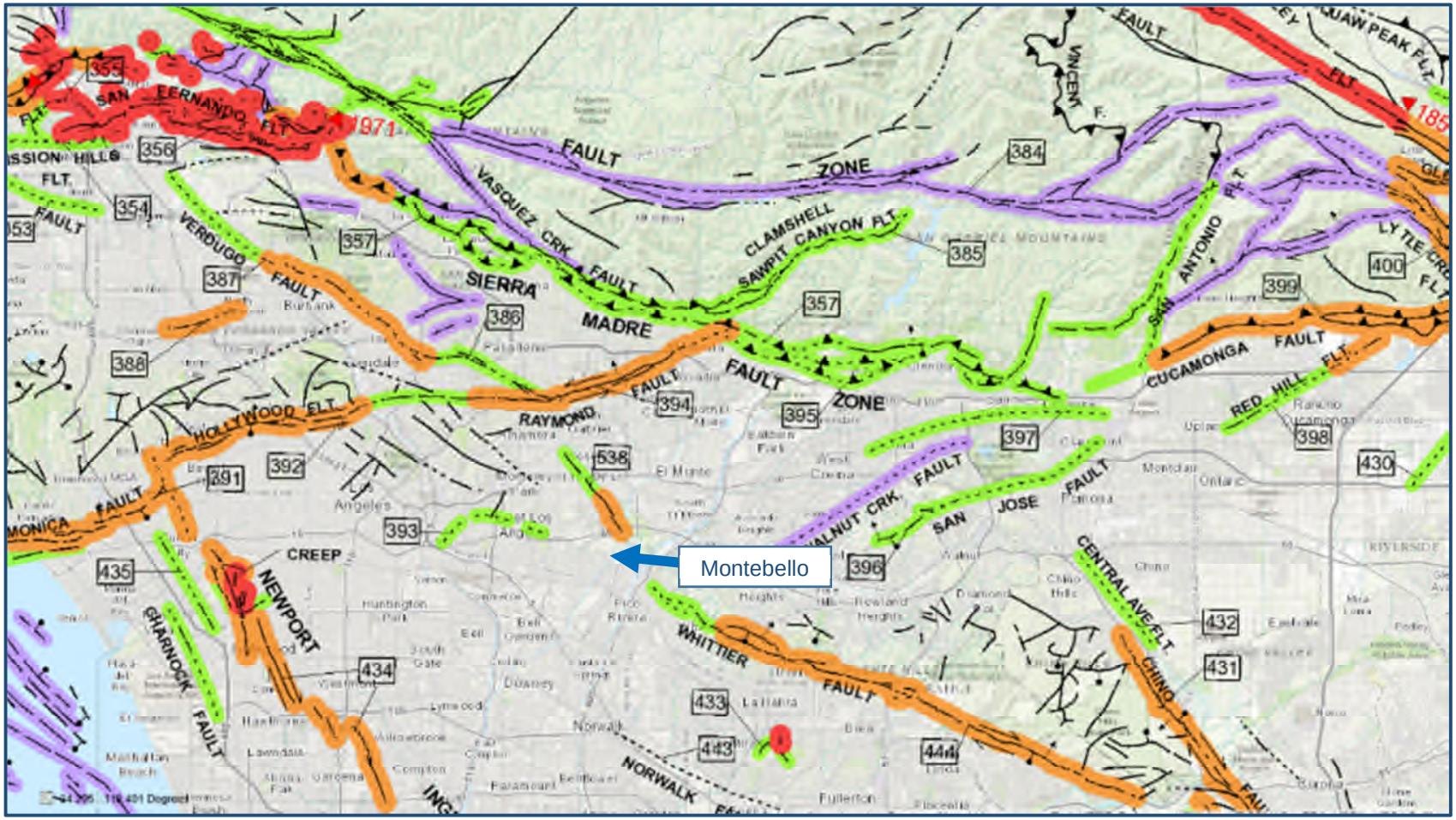
The Puente Hills Fault is located approximately 8 miles south of the City. According to USGS, the Puente Hills Fault was most recently responsible for the M5.1 La Habra earthquake on March 28, 2014 which caused an estimated $2.6 million in damage. The USGS estimates that a future, larger M7.5 earthquake along the Puente Hills Fault could kill 3,000 to 18,000 people and cause up to $250 billion in Southern California region. In contrast, a larger M8.0 quake along the San Andreas would cause an estimated 1,800 deaths.

Sierra Madre Fault Zone

The Sierra Madre Fault Zone lies approximately 12 miles northeast of Montebello. 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.

Map: Regional Faults
(Source: State of California Department of Conservation)



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

Q: B3. 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 Earthquakes in the City of Montebello** below.

Impact of Earthquakes in the City of Montebello

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

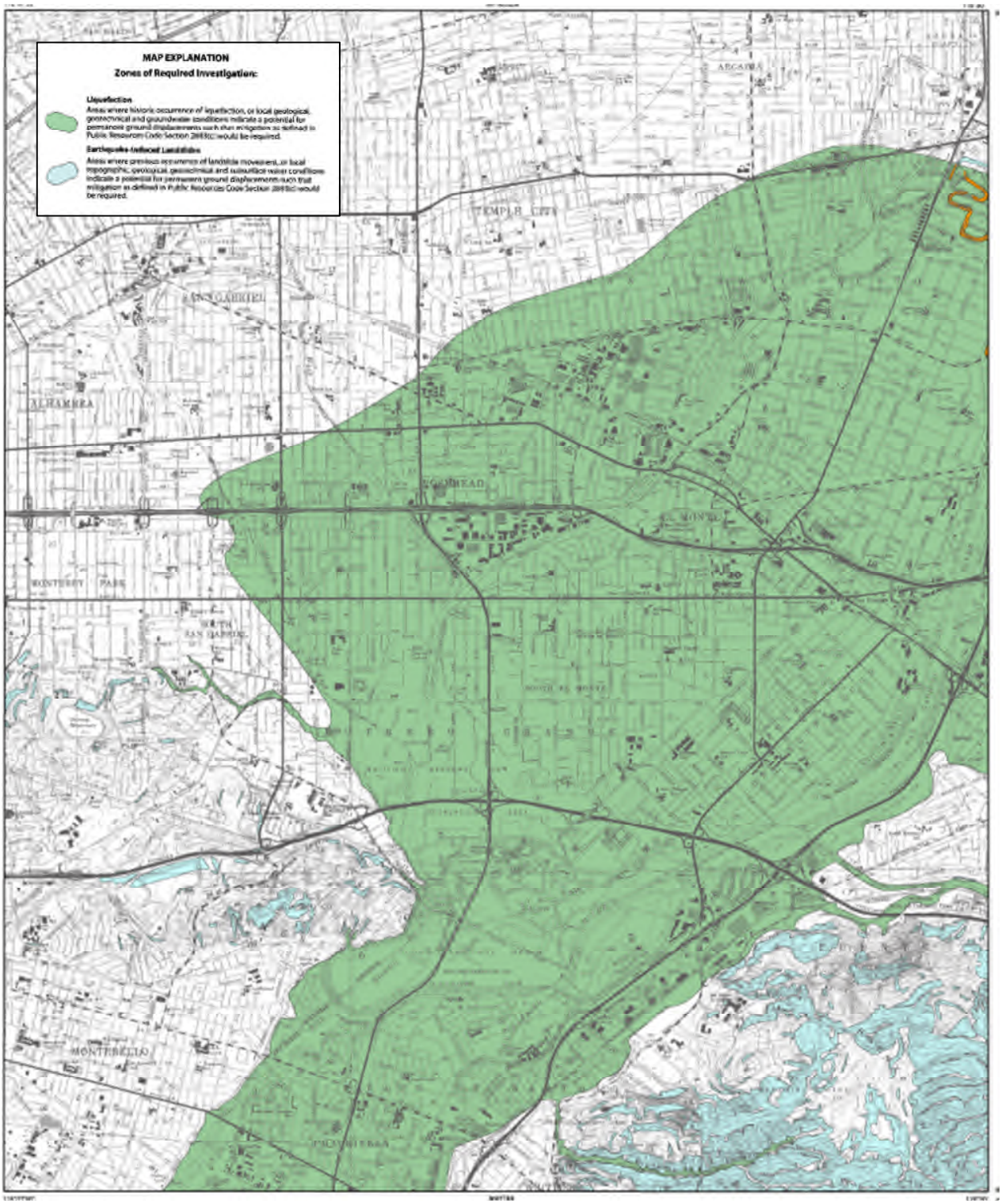
Earthquake-induced landslides are secondary earthquake hazards that occur from ground shaking. They can destroy the roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake. Many communities in Southern California have a high likelihood of encountering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

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 City of Montebello General Plan, areas of Montebello that may be subject to potential liquefaction are located along the eastern boundary of the City, parallel to the Rio Hondo River.

Map: Landslide and Liquefaction Zones shows the moderate risk of earthquake-induced landslide and liquefaction risk within the City.

Map: Landslide and Liquefaction Zones in Montebello
(Source: California Department of Conservation)



Exposure

The data in this section was generated using the Hazards United States – Multi Hazard (HAZUS-MH) software program. 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.

Building Inventory

HAZUS estimates approximately 90% of the building stock within the City of Montebello is residential housing. In terms of building construction types found in the region, wood frame construction makes up 88% of the building inventory.

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.

Table: Critical Facility Inventory – HAZUS

Essential Facilities	Count
Hospitals	1
Schools	21
Fire Stations	1
Police Stations	1
Emergency Operations Facilities	0

High Potential Loss (HPL) Facilities	Count
Dams	0
Levees	0
Military Installations	0
Nuclear Power Plants	0
Hazardous Material Sites	18

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. Transportation systems include highways, railways, light rail, bus, ports, ferry and airports. Utility systems include potable water, wastewater, natural gas, crude & refined oil, electric power and communications.

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.

Building-Related Losses

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.

HAZUS Earthquake Event Summary Results

Newport-Inglewood M7.1 Earthquake Scenario

Building Damage

Table: Expected Building Damage by Occupancy – Newport-Inglewood M7.1

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Agriculture	8	2	1	0	0
Commercial	761	199	109	20	2
Education	26	6	2	0	0
Government	10	2	1	0	0
Industrial	148	43	27	5	0
Other Residential	995	302	113	20	1
Religion	62	15	7	1	0
Single Family	8,975	2,381	373	12	3
Total	**10,986**	**2,949**	**635**	**59**	**7**

Table: Expected Building Damage by Building Type – Newport-Inglewood M7.1

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Wood	9,796	2,624	411	12	4
Steel	231	59	40	7	1
Concrete	224	62	30	6	0
Precast	188	55	41	9	0
RM	384	65	43	9	0
URM	61	22	14	3	1
MH	102	62	57	13	1
Total	**10,986**	**2,949**	**635**	**59**	**7**

Transportation and Utility Lifeline Damage

Table: Expected Utility System Pipeline Damage – Newport-Inglewood M7.1

System	Total Pipelines (Length km)	Number of Leaks	Number of Breaks
Potable Water	2,555	98	25
Waste Water	1,533	70	18
Natural Gas	1,022	20	5
Oil	0	0	0

Table: Potable Water and Electric Power System Performance – Newport-Inglewood M7.1

	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	**19,552**	0	0	0	0	0
Electric Power		0	0	0	0	0

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 60 households to be displaced due to the earthquake. Of these, 58 people (out of a total population of 64,394) will seek temporary shelter in public shelters.

Casualties

The table below represents a summary of casualties estimated for Newport-Inglewood M7.1 earthquake scenario.

Table: Casualty Estimates – Newport-Inglewood M7.1

Time	Sector	Level 1	Level 2	Level 3	Level 4
2AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	7	1	0	0
	Single-Family	9	1	0	0
	TOTAL	**16**	**2**	**0**	**0**
2PM	Commercial	14	2	0	0
	Commuting	0	0	0	0
	Educational	5	1	0	0
	Hotels	0	0	0	0
	Industrial	3	0	0	0
	Other-Residential	2	0	0	0
	Single-Family	2	0	0	0
	TOTAL	**26**	**3**	**0**	**0**
5PM	Commercial	10	1	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	2	0	0	0
	Other-Residential	3	0	0	0
	Single-Family	3	0	0	0
	TOTAL	**18**	**1**	**0**	**0**

Economic Losses

The total economic loss estimated for the Newport-Inglewood M7.1 earthquake scenario is **$137.45 million dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Building-Related Economic Losses ($ Dollars) – Newport-Inglewood M7.1

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	$0	$120,200	$2,993,400	$300,200	$132,700	$3,546,500
	Capital-Related	$0	$51,100	$2,298,100	$182,300	$34,800	$2,566,300
	Rental	$514,800	$1,135,800	$1,985,200	$124,800	$49,600	$3,810,200
	Relocation	$1,770,600	$867,700	$2,969,500	$488,000	$454,100	$6,549,900
	Subtotal	**$2,285,400**	**$2,174,800**	**$10,246,200**	**$1,095,300**	**$671,200**	**$16,472,900**
Capital Stock Losses	Structural	$4,894,500	$2,294,100	$5,408,100	$1,787,100	$600,500	$14,984,300
	Non-Structural	$27,429,500	$17,688,800	$16,943,700	$7,768,500	$2,731,100	$72,561,600
	Content	$8,780,900	$4,668,700	$9,553,200	$5,666,700	$1,477,900	$30,147,400
	Inventory	$0	$0	$370,200	$1,089,900	$2,900	$1,463,000
	Subtotal	**$41,104,900**	**$24,651,600**	**$32,275,200**	**$16,312,200**	**$4,812,400**	**$119,156,300**
	TOTAL	**$43,390,300**	**$26,826,400**	**$42,521,400**	**$17,407,500**	**$5,483,600**	**$135,629,200**

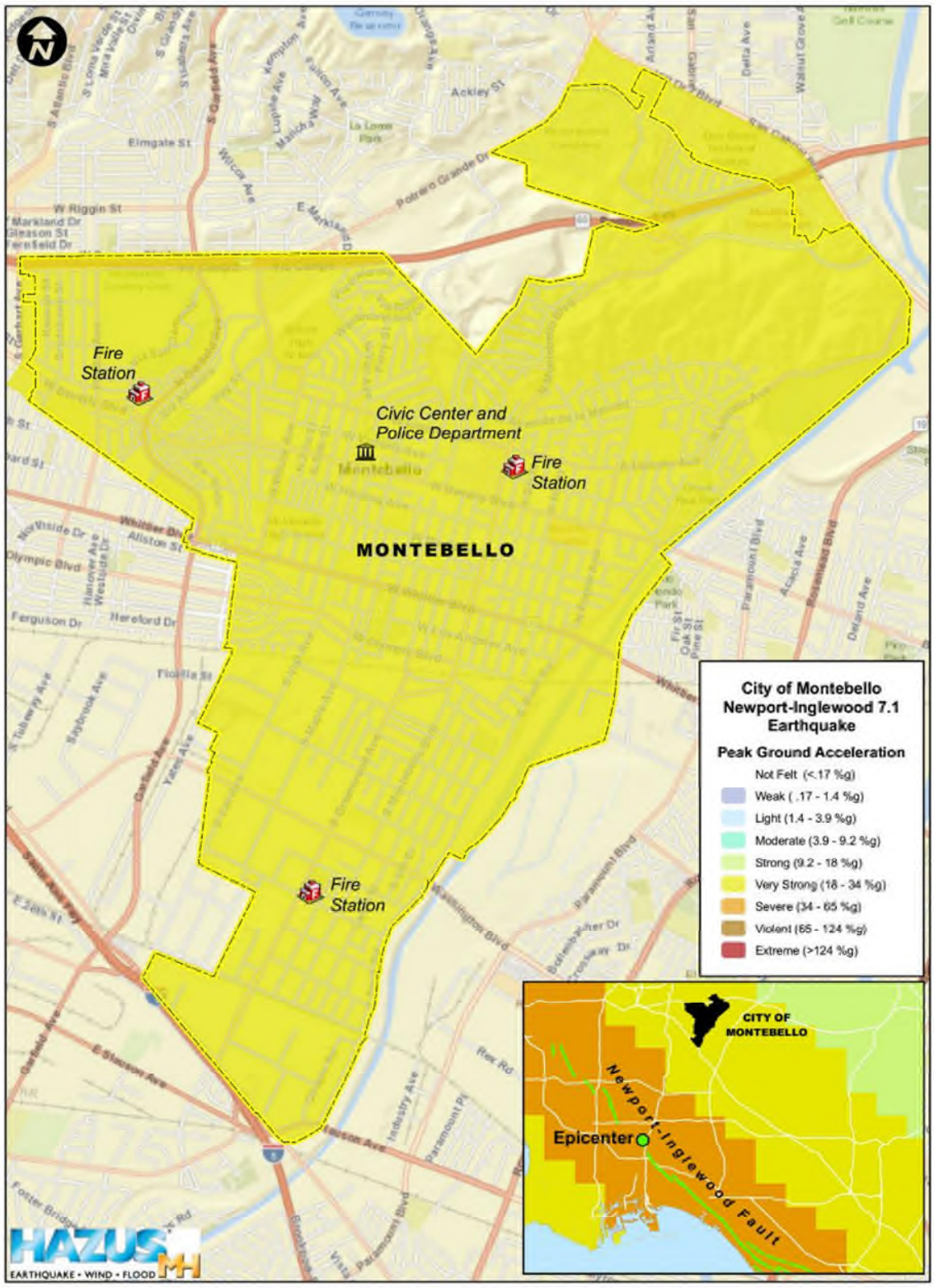
Table: Transportation System Economic Losses ($ Dollars) – Newport-Inglewood M7.1

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Highway	Segments	$389,155,800	$0	0%
	Bridges	$37,540,300	$414,500	1%
	Tunnels	$0	$0	0%
Railways	Segments	$7,156,200	$0	0%
	Bridges	$102,600	$600	1%
	Tunnels	$0	$0	0%
	Facilities	$2,663,000	$556,000	20%
Light Rail	Segments	$36,013,100	$0	0%
	Bridges	$0	$0	0%
	Tunnels	$0	$0	0%
	Facilities	$0	$0	0%
Bus	Facilities	$0	$0	0%
Ferry	Facilities	$0	$0	0%
Port	Facilities	$0	$0	0%
Airport	Facilities	$0	$0	0%
	TOTAL	**$472,631,000**	**$971,100**	

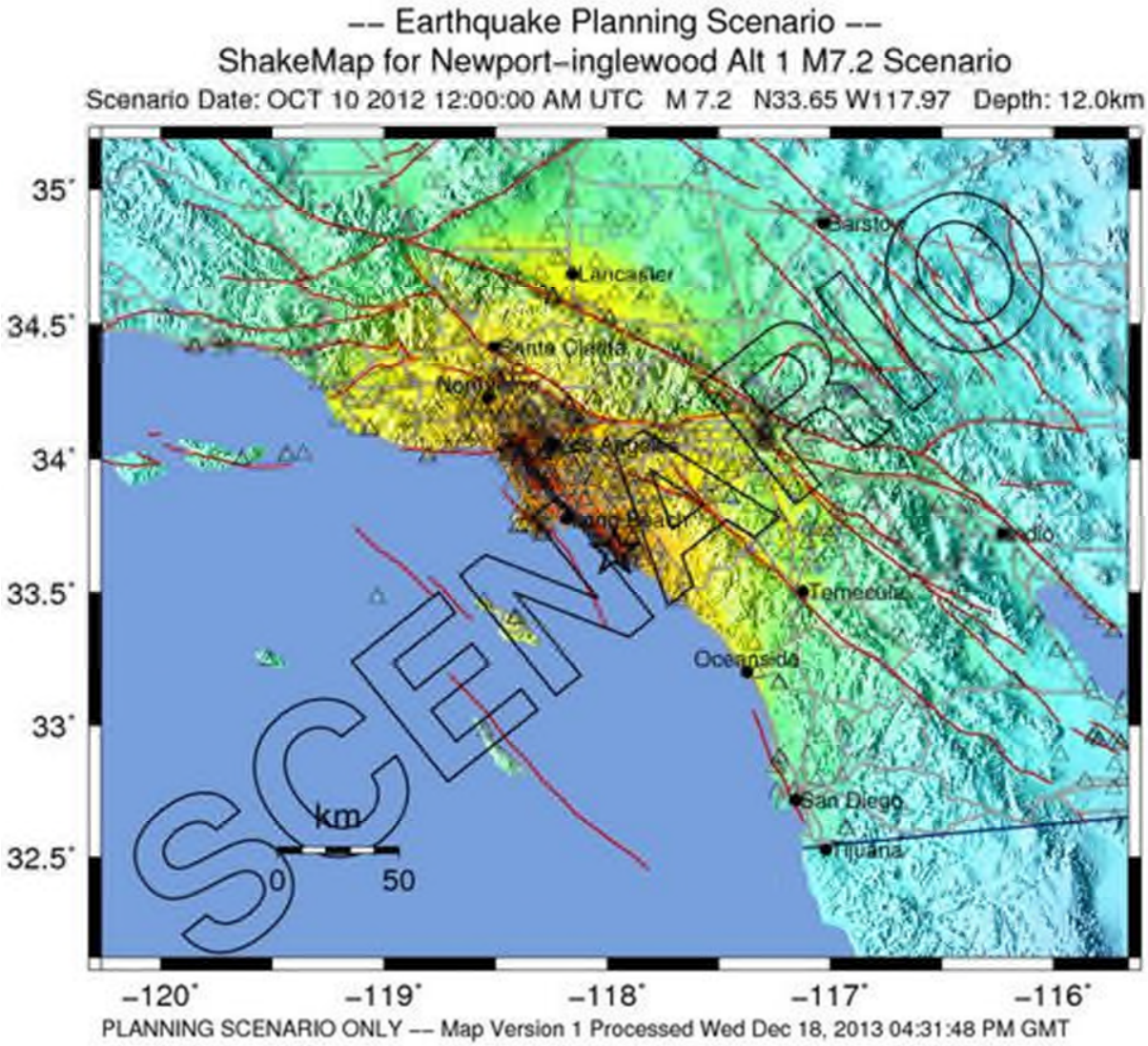
Table: Utility System Economic Losses ($ Dollars) – Newport-Inglewood M7.1

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Potable Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$51,096,200	$442,200	1%
Waste Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$30,657,700	$316,900	1%
Natural Gas	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$20,438,500	$90,900	1%
Oil Systems	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
Electrical Power	Facilities	$0	$0	0%
Communication	Facilities	$0	$0	0%
	TOTAL	**$102,192,400**	**$850,000**	

Map: Shake Intensity Map – Newport-Inglewood M7.1
(Source: Emergency Planning Consultants)



Map: Seismic Shaking Intensities for the Newport-Inglewood M7.2
(Source: State of California Department of Conservation)



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.1	0.5	2.4	6.7	13	24	44	83	>156
PEAK VEL.(cm/s)	<0.07	0.4	1.9	5.8	11	22	43	83	>160
INSTRUMENTAL INTENSITY	I	II–III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Wald, et al.; 1999

San Andreas M8.0 Earthquake Scenario

Building Damage

Table: Expected Building Damage by Occupancy – San Andreas M8.0

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Agriculture	5	3	2	1	1
Commercial	455	276	171	97	93
Education	18	9	3	2	2
Government	7	3	2	1	2
Industrial	88	55	37	20	24
Other Residential	784	379	159	58	52
Religion	40	22	11	6	7
Single Family	7,983	3,579	181	1	0
Total	**9,379**	**4,326**	**566**	**184**	**181**

Table: Expected Building Damage by Building Type – San Andreas M8.0

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Wood	8,701	3,891	206	32	16
Steel	85	84	99	35	35
Concrete	135	85	33	25	45
Precast	119	88	53	14	19
RM	300	96	43	30	31
URM	33	35	27	6	1
MH	8	47	104	43	34
Total	**9,379**	**4,326**	**566**	**184**	**181**

Transportation and Utility Lifeline Damage

Table: Expected Utility System Pipeline Damage – San Andreas M8.0

System	Total Pipelines (Length km)	Number of Leaks	Number of Breaks
Potable Water	2,555	53,757	13,439
Waste Water	1,533	38,526	9,632
Natural Gas	1,022	11,050	2,763
Oil	0	0	0

Table: Potable Water and Electric Power System Performance – San Andreas M8.0

	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	**19,552**	19,552	19,552	19,552	19,552	19,552
Electric Power		0	0	0	0	0

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 298 households to be displaced due to the earthquake. Of these, 271 people (out of a total population of 64,394) will seek temporary shelter in public shelters.

Casualties

The table below represents a summary of casualties estimated for San Andreas M8.0 earthquake scenario.

Table: Casualty Estimates – San Andreas M8.0

Time	Sector	Level 1	Level 2	Level 3	Level 4
2AM	Commercial	3	1	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	5	1	0	0
	Other-Residential	57	17	3	6
	Single-Family	11	1	0	0
	TOTAL	**76**	**20**	**3**	**6**
2PM	Commercial	187	57	10	19
	Commuting	0	0	1	0
	Educational	76	24	4	8
	Hotels	0	0	0	0
	Industrial	36	11	2	3
	Other-Residential	13	4	1	1
	Single-Family	2	0	0	0
	TOTAL	**316**	**97**	**17**	**33**
5PM	Commercial	132	40	7	13
	Commuting	4	5	9	2
	Educational	8	2	0	1
	Hotels	0	0	0	0
	Industrial	23	7	1	2
	Other-Residential	22	6	1	2
	Single-Family	4	0	0	0
	TOTAL	**192**	**61**	**19**	**20**

Economic Losses

The total economic loss estimated for the San Andreas M8.0 earthquake scenario is **$936.08 million dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Building-Related Economic Losses ($ Dollars) – San Andreas M8.0

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	$0	$1,072,100	$17,255,100	$1,247,900	$760,700	$20,335,800
	Capital-Related	$0	$455,000	$13,868,100	$757,100	$206,900	$15,287,100
	Rental	$334,400	$3,505,900	$8,260,200	$438,500	$328,100	$12,867,100
	Relocation	$810,800	$2,221,200	$12,303,500	$1,555,400	$2,948,600	$19,839,500
	Subtotal	**$1,145,200**	**$7,254,200**	**$51,686,900**	**$3,998,900**	**$4,244,300**	**$68,329,500**
Capital Stock Losses	Structural	$5,072,900	$7,120,200	$28,774,700	$9,039,600	$4,529,800	$54,537,200
	Non-Structural	$41,589,300	$47,615,200	$86,829,700	$36,377,600	$16,822,700	$229,234,500
	Content	$20,444,400	$13,148,000	$41,387,200	$24,388,200	$7,854,700	$107,222,500
	Inventory	$0	$0	$1,433,300	$4,893,800	$16,100	$6,343,200
	Subtotal	**$67,106,600**	**$67,883,400**	**$158,424,900**	**$74,699,200**	**$29,223,300**	**$397,337,400**
	TOTAL	**$68,251,800**	**$75,137,600**	**$210,111,800**	**$78,698,100**	**$33,467,600**	**$465,666,900**

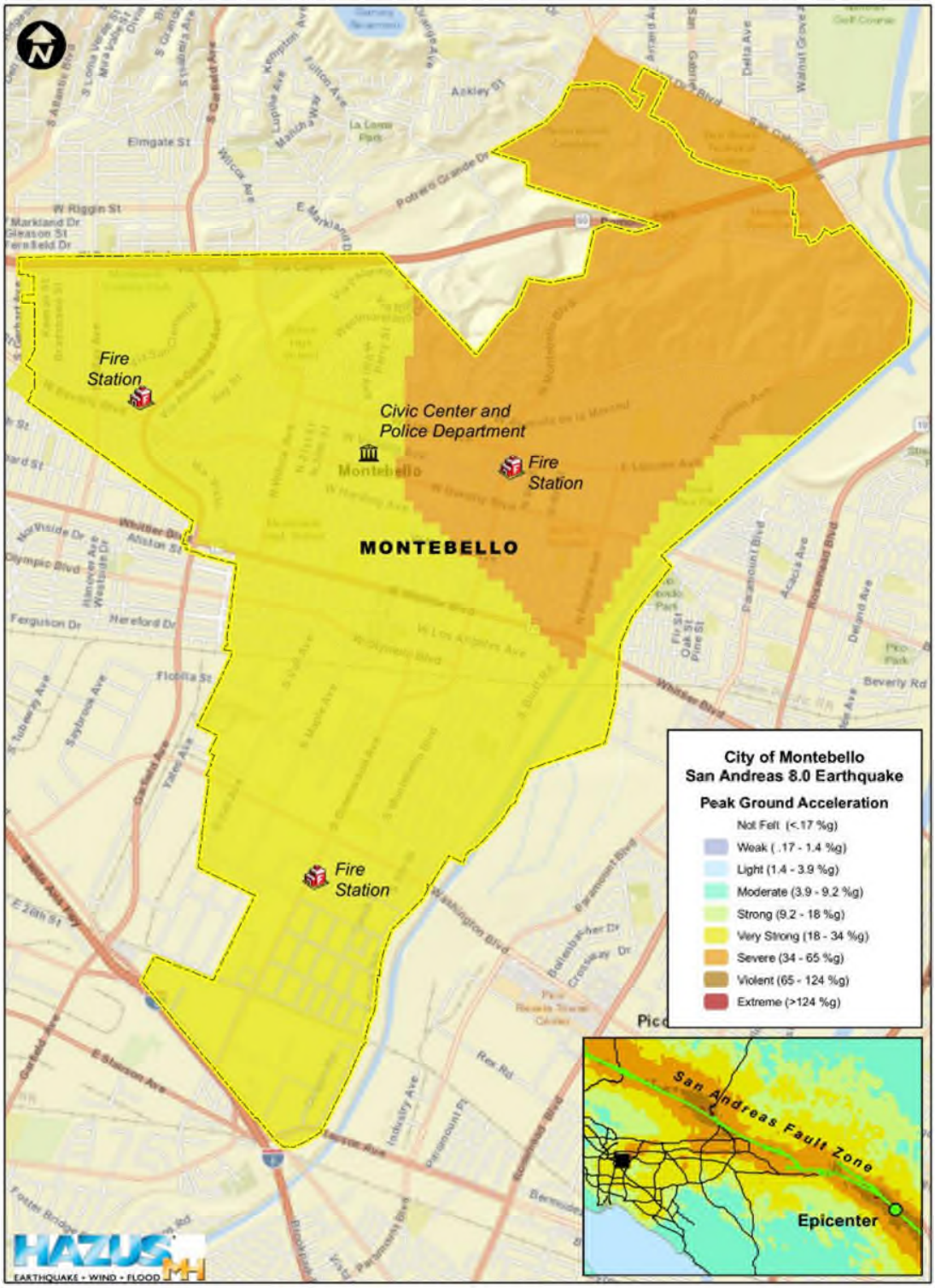
Table: Transportation System Economic Losses ($ Dollars) – San Andreas M8.0

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Highway	Segments	$389,155,800	$0	0%
	Bridges	$37,540,300	$4,691,800	13%
	Tunnels	$0	$0	0%
Railways	Segments	$7,156,200	$0	0%
	Bridges	$102,600	$7,300	7%
	Tunnels	$0	$0	0%
	Facilities	$2,663,000	$708,800	27%
Light Rail	Segments	$36,013,100	$0	0%
	Bridges	$0	$0	0%
	Tunnels	$0	$0	0%
	Facilities	$0	$0	0%
Bus	Facilities	$0	$0	0%
Ferry	Facilities	$0	$0	0%
Port	Facilities	$0	$0	0%
Airport	Facilities	$0	$0	0%
	TOTAL	**$472,631,000**	**$5,407,900**	

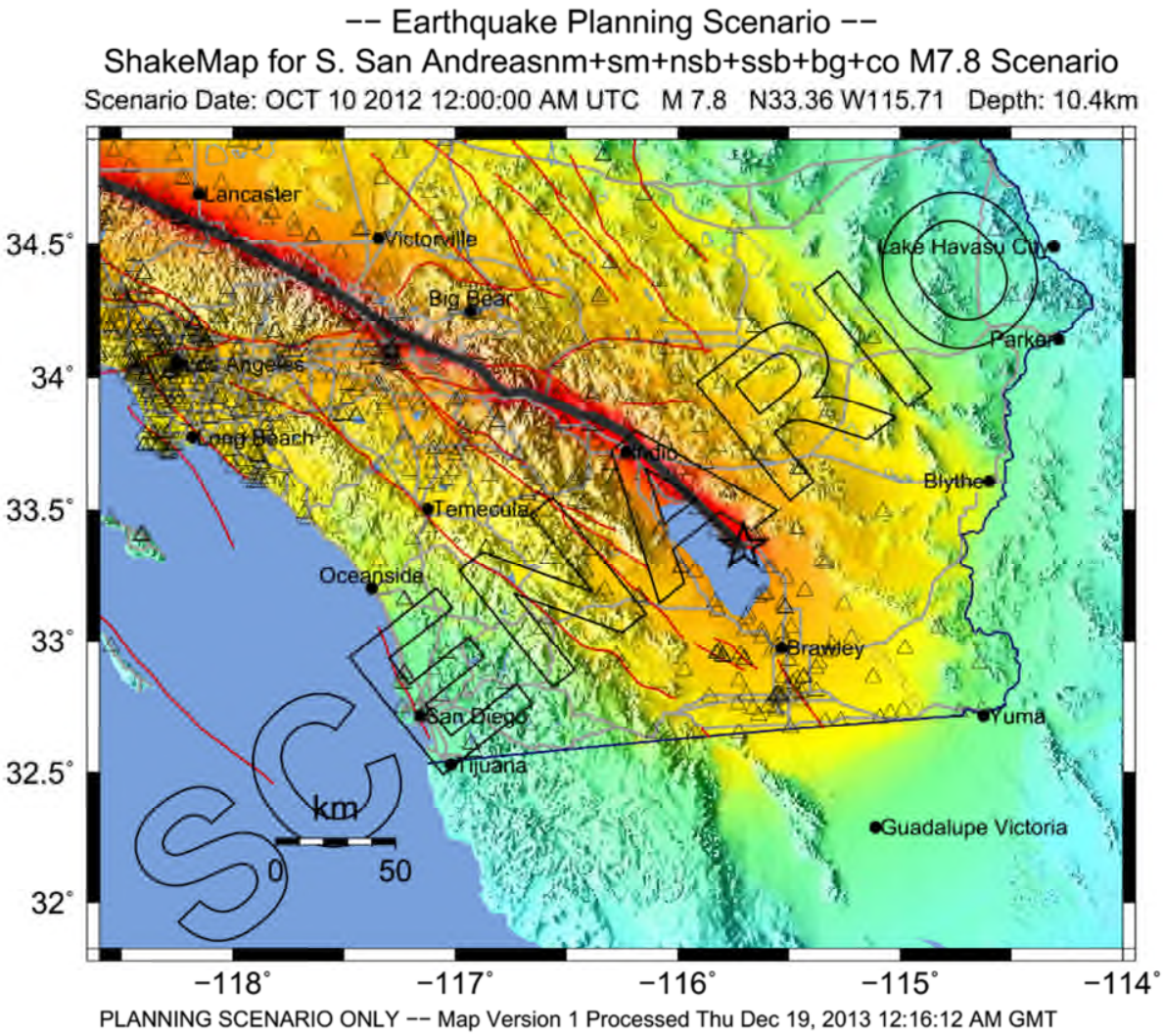
Table: Utility System Economic Losses ($ Dollars) – San Andreas M8.0

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Potable Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$51,096,200	$241,908,300	0%
Waste Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$30,657,700	$173,367,600	0%
Natural Gas	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$20,438,500	$49,725,600	0%
Oil Systems	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
Electrical Power	Facilities	$0	$0	0%
Communication	Facilities	$0	$0	0%
	TOTAL	**$102,192,400**	**$465,001,500**	

Map: Shake Intensity Map – San Andreas M8.0
(Source: Emergency Planning Consultants)



Map: Seismic Shaking Intensities for the San Andrea Fault M7.8
(Source: State of California Department of Conservation)



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<0.1*	*0.5*	*2.4*	*6.7*	*13*	24	44	83	>156
PEAK VEL.(cm/s)	<0.07	0.4	1.9	5.8	*11*	*22*	*43*	*83*	*>160*
INSTRUMENTAL INTENSITY	I	II–III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Wald, et al.; 1999

Whittier M6.8 Earthquake Scenario

Building Damage

Table: Expected Building Damage by Occupancy – Whittier M6.8

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Agriculture	6	4	2	0	0
Commercial	532	368	175	16	0
Education	20	11	3	0	0
Government	8	4	2	0	0
Industrial	100	76	44	5	0
Other Residential	725	493	187	26	1
Religion	46	28	11	1	0
Single Family	7,219	4,276	248	1	0
Total	**8,656**	**5,259**	**672**	**49**	**1**

Table: Expected Building Damage by Building Type – Whittier M6.8

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Wood	7,870	4,700	276	1	1
Steel	153	106	71	7	0
Concrete	157	113	48	5	0
Precast	115	104	67	6	0
RM	313	123	59	5	0
URM	32	40	26	3	0
MH	16	72	124	21	0
Total	**8,656**	**5,259**	**672**	**49**	**1**

Transportation and Utility Lifeline Damage

Table: Expected Utility System Pipeline Damage – Whittier M6.8

System	Total Pipelines (Length km)	Number of Leaks	Number of Breaks
Potable Water	2,555	53,757	13,439
Waste Water	1,533	38,526	9,632
Natural Gas	1,022	11,050	2,763
Oil	0	0	0

Table: Potable Water and Electric Power System Performance – Whittier M6.8

	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	**19,552**	19,552	19,552	19,552	19,552	19,552
Electric Power		0	0	0	0	0

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 35 households to be displaced due to the earthquake. Of these, 33 people (out of a total population of 64,394) will seek temporary shelter in public shelters.

Casualties

The table below represents a summary of casualties estimated for Whittier M6.8 earthquake scenario.

Table: Casualty Estimates – Whittier M6.8

Time	Sector	Level 1	Level 2	Level 3	Level 4
2AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	9	1	0	0
	Single-Family	10	0	0	0
	TOTAL	**19**	**1**	**0**	**0**
2PM	Commercial	16	2	0	0
	Commuting	0	0	0	0
	Educational	5	0	0	0
	Hotels	0	0	0	0
	Industrial	3	0	0	0
	Other-Residential	2	0	0	0
	Single-Family	2	0	0	0
	TOTAL	**28**	**2**	**0**	**0**
5PM	Commercial	11	1	0	0
	Commuting	0	0	0	0
	Educational	1	0	0	0
	Hotels	0	0	0	0
	Industrial	2	0	0	0
	Other-Residential	3	0	0	0
	Single-Family	4	0	0	0
	TOTAL	**21**	**1**	**0**	**0**

Economic Losses

The total economic loss estimated for the Whittier M6.8 earthquake scenario is **$646.75 million dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Building-Related Economic Losses ($ Dollars) – Whittier M6.8

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	$0	$151,300	$3,893,300	$344,200	$194,000	$4,582,800
	Capital-Related	$0	$64,400	$3,059,000	$209,000	$49,600	$3,382,000
	Rental	$421,700	$1,302,400	$2,635,400	$148,200	$65,800	$4,573,500
	Relocation	$1,074,800	$974,800	$3,847,200	$588,100	$592,500	$7,077,400
	Subtotal	**$1,496,500**	**$2,492,900**	**$13,434,900**	**$1,289,500**	**$901,900**	**$19,615,700**
Capital Stock Losses	Structural	$5,995,200	$2,934,200	$6,432,600	$1,984,500	$808,600	$18,155,100
	Non-Structural	$38,585,400	$25,007,600	$21,457,100	$8,815,400	$3,904,600	$97,770,100
	Content	$15,115,900	$7,394,100	$12,396,300	$6,431,800	$2,225,000	$43,563,100
	Inventory	$0	$0	$471,600	$1,226,900	$4,600	$1,703,100
	Subtotal	**$59,696,500**	**$35,335,900**	**$40,757,600**	**$18,458,600**	**$6,942,800**	**$161,191,400**
	TOTAL	**$61,193,000**	**$37,828,800**	**$54,192,500**	**$19,748,100**	**$7,844,700**	**$180,807,100**

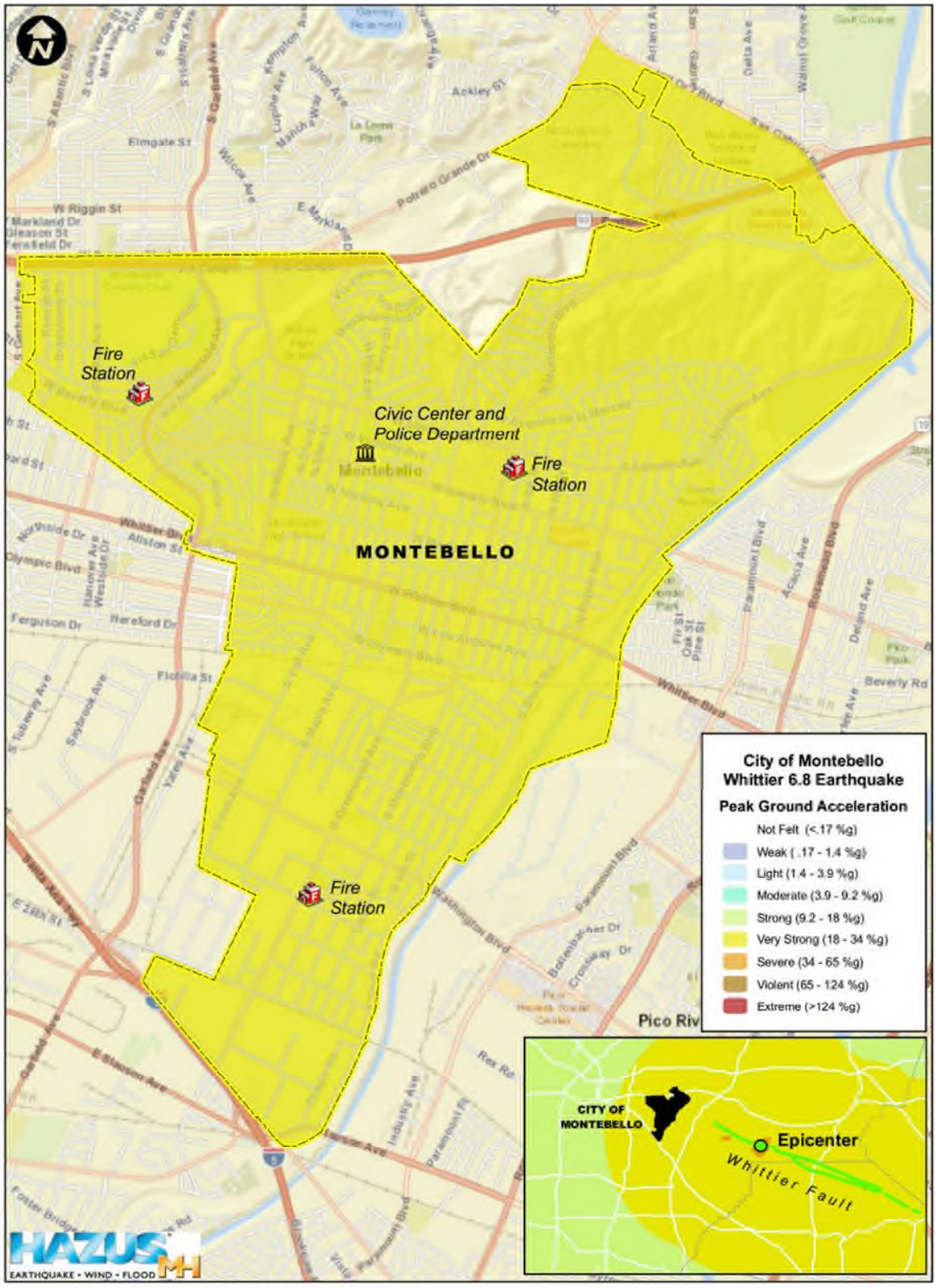
Table: Transportation System Economic Losses ($ Dollars) – Whittier M6.8

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Highway	Segments	$389,155,800	$0	0%
	Bridges	$37,540,300	$442,900	1%
	Tunnels	$0	$0	0%
Railways	Segments	$7,156,200	$0	0%
	Bridges	$102,600	$200	1%
	Tunnels	$0	$0	0%
	Facilities	$2,663,000	$497,000	19%
Light Rail	Segments	$36,013,100	$0	0%
	Bridges	$0	$0	0%
	Tunnels	$0	$0	0%
	Facilities	$0	$0	0%
Bus	Facilities	$0	$0	0%
Ferry	Facilities	$0	$0	0%
Port	Facilities	$0	$0	0%
Airport	Facilities	$0	$0	0%
	TOTAL	**$472,631,000**	**$940,100**	

Table: Utility System Economic Losses ($ Dollars) – Whittier M6.8

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Potable Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$51,096,200	$241,908,300	473%
Waste Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$30,657,700	$173,367,600	565%
Natural Gas	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$20,438,500	$49,725,600	243%
Oil Systems	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
Electrical Power	Facilities	$0	$0	0%
Communication	Facilities	$0	$0	0%
	TOTAL	**$102,192,400**	**$465,001,500**	

Map: Shake Intensity Map – Whittier M6.8
(Source: Emergency Planning Consultants)



Puente Hills M7.1 Earthquake Scenario

Building Damage

Table: Expected Building Damage by Occupancy – Puente Hills M7.1

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Agriculture	4	3	3	1	0
Commercial	310	289	323	136	33
Education	14	10	8	3	0
Government	5	4	3	1	0
Industrial	53	54	72	35	10
Other Residential	469	492	320	120	29
Religion	28	24	22	9	2
Single Family	4,903	4,796	1,863	144	36
Total	**5,786**	**5,674**	**2,615**	**449**	**112**

Table: Expected Building Damage by Building Type – Puente Hills M7.1

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Wood	5,326	5,265	2,057	156	41
Steel	85	75	111	53	13
Concrete	92	92	88	42	9
Precast	65	68	101	48	11
RM	186	112	134	60	8
URM	18	23	32	18	10
MH	15	40	91	71	18
Total	**5,786**	**5,674**	**2,615**	**449**	**112**

Transportation and Utility Lifeline Damage

Table: Expected Utility System Pipeline Damage – Puente Hills M7.1

System	Total Pipelines (Length km)	Number of Leaks	Number of Breaks
Potable Water	2,555	506	126
Waste Water	1,533	362	91
Natural Gas	1,022	104	26
Oil	0	0	0

Table: Potable Water and Electric Power System Performance – Puente Hills M7.1

	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	**19,552**	2,711	582	0	0	0
Electric Power		7,390	4,102	1,435	237	11

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 521 households to be displaced due to the earthquake. Of these, 507 people (out of a total population of 64,394) will seek temporary shelter in public shelters.

Casualties

The table below represents a summary of casualties estimated for the Puente Hills M7.1 earthquake scenario.

Table: Casualty Estimates – Puente Hills M7.1

Time	Sector	Level 1	Level 2	Level 3	Level 4
2AM	Commercial	2	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	3	1	0	0
	Other-Residential	47	10	1	2
	Single-Family	39	5	0	0
	TOTAL	**90**	**16**	**1**	**2**
2PM	Commercial	108	26	4	7
	Commuting	0	0	0	0
	Educational	35	8	1	2
	Hotels	0	0	0	0
	Industrial	21	5	1	1
	Other-Residential	11	2	0	0
	Single-Family	9	1	0	0
	TOTAL	**184**	**42**	**6**	**10**
5PM	Commercial	76	18	3	5
	Commuting	3	3	6	1
	Educational	3	1	0	0
	Hotels	0	0	0	0
	Industrial	13	3	0	1
	Other-Residential	18	4	0	1
	Single-Family	15	2	0	0
	TOTAL	**128**	**31**	**9**	**8**

Economic Losses

The total economic loss estimated for the Puente Hills M7.1 scenario earthquake is **$604.81 million dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Building-Related Economic Losses ($ Dollars) – Puente Hills M7.1

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	$0	$787,500	$15,432,600	$1,511,100	$596,100	$18,327,300
	Capital-Related	$0	$335,100	$11,732,200	$917,600	$159,400	$13,144,300
	Rental	$2,641,000	$5,782,700	$8,934,500	$578,600	$263,200	$18,200,000
	Relocation	$10,054,800	$4,396,800	$13,834,800	$2,201,100	$2,425,300	$32,912,800
	Subtotal	**$12,695,800**	**$11,302,100**	**$49,934,100**	**$5,208,400**	**$3,444,000**	**$82,584,400**
Capital Stock Losses	Structural	$19,848,500	$10,664,600	$28,837,300	$9,887,900	$3,154,000	$72,392,300
	Non-Structural	$108,807,200	$74,593,400	$75,802,400	$35,396,100	$11,454,300	$306,053,400
	Content	$37,941,800	$20,092,200	$39,163,800	$25,487,100	$5,815,300	$128,500,200
	Inventory	$0	$0	$1,569,100	$4,925,400	$12,400	$6,506,900
	Subtotal	**$166,597,500**	**$105,350,200**	**$145,372,600**	**$75,696,500**	**$20,436,000**	**$513,452,800**
	TOTAL	**$179,293,300**	**$116,652,300**	**$195,306,700**	**$80,904,900**	**$23,880,000**	**$596,037,200**

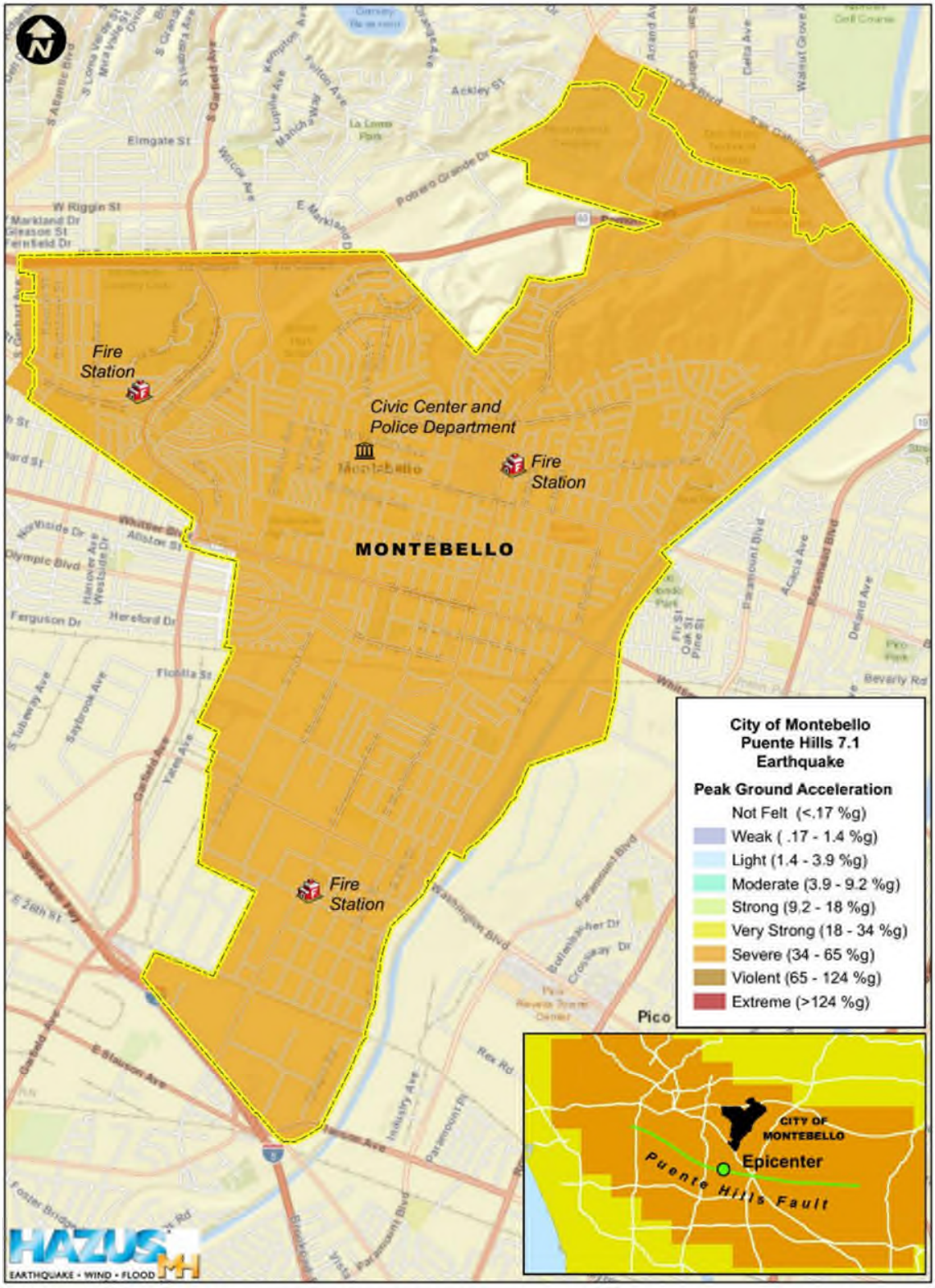
Table: Transportation System Economic Losses ($ Dollars) – Puente Hills M7.1

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Highway	Segments	$389,155,800	$0	0%
	Bridges	$37,540,300	$3,214,900	9%
	Tunnels	$0	$0	0%
Railways	Segments	$7,156,200	$0	0%
	Bridges	$102,600	$9,700	10%
	Tunnels	$0	$0	0%
	Facilities	$2,663,000	$1,170,100	44%
Light Rail	Segments	$36,013,100	$0	0%
	Bridges	$0	$0	0%
	Tunnels	$0	$0	0%
	Facilities	$0	$0	0%
Bus	Facilities	$0	$0	0%
Ferry	Facilities	$0	$0	0%
Port	Facilities	$0	$0	0%
Airport	Facilities	$0	$0	0%
	TOTAL	**$472,631,000**	**$4,394,700**	

Table: Utility System Economic Losses ($ Dollars) – Puente Hills M7.1

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Potable Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$51,096,200	$2,276,000	4%
Waste Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$30,657,700	$1,631,200	5%
Natural Gas	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$20,438,500	$467,900	2%
Oil Systems	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
Electrical Power	Facilities	$0	$0	0%
Communication	Facilities	$0	$0	0%
	TOTAL	**$102,192,400**	**$4,375,100**	

Map: Shake Intensity Map – Puente Hills M7.1
(Source: Emergency Planning Consultants)



Sierra Madre M7.2 Earthquake Scenario

Building Damage

Table: Expected Building Damage by Occupancy – Sierra Madre M7.2

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Agriculture	7	3	1	0	0
Commercial	691	228	140	29	3
Education	23	7	4	1	0
Government	9	3	2	0	0
Industrial	140	46	31	7	1
Other Residential	917	345	140	27	2
Religion	56	18	9	2	0
Single Family	8,179	2,971	566	22	5
Total	**10,021**	**3,621**	**894**	**89**	**11**

Table: Expected Building Damage by Building Type – Sierra Madre M7.2

	None	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count	Count
Wood	8,491	3,258	618	22	6
Steel	209	67	51	10	1
Concrete	204	71	39	9	1
Precast	172	60	49	12	1
RM	355	76	55	13	0
URM	55	24	17	5	1
MH	86	64	65	18	1
Total	**10,021**	**3,621**	**894**	**89**	**11**

Transportation and Utility Lifeline Damage

Table: Expected Utility System Pipeline Damage – Sierra Madre M7.2

System	Total Pipelines (Length km)	Number of Leaks	Number of Breaks
Potable Water	2,555	10	35
Waste Water	1,553	100	25
Natural Gas	1,022	29	7
Oil	0	0	0

Table: Potable Water and Electric Power System Performance – Sierra Madre M7.2

	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	**19,552**	3	0	0	0	0
Electric Power		0	0	0	0	0

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 92 households to be displaced due to the earthquake. Of these, 83 people (out of a total population of 64,394) will seek temporary shelter in public shelters.

Casualties

The table below represents a summary of casualties estimated for Sierra Madre M7.2 earthquake scenario.

Table: Casualty Estimates – Sierra Madre M7.2

Time	Sector	Level 1	Level 2	Level 3	Level 4
2AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	10	1	0	0
	Single-Family	12	1	0	0
	TOTAL	**23**	**2**	**0**	**0**
2PM	Commercial	21	3	0	1
	Commuting	0	0	0	0
	Educational	7	1	0	0
	Hotels	0	0	0	0
	Industrial	4	1	0	0
	Other-Residential	2	0	0	0
	Single-Family	2	0	0	0
	TOTAL	**36**	**5**	**0**	**1**
5PM	Commercial	15	2	0	0
	Commuting	0	0	1	0
	Educational	1	0	0	0
	Hotels	0	0	0	0
	Industrial	2	0	0	0
	Other-Residential	4	0	0	0
	Single-Family	4	0	0	0
	TOTAL	**26**	**2**	**1**	**0**

Economic Losses

The total economic loss estimated for the Sierra Madre M7.2 earthquake scenario is **$182.31 million dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Building-Related Economic Losses ($ Dollars) – Sierra Madre M7.2

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	$0	$229,300	$4,141,800	$294,700	$207,100	$4,872,900
	Capital-Related	$0	$97,500	$3,269,300	$178,900	$56,500	$3,602,200
	Rental	$782,400	$1,604,300	$2,551,700	$121,700	$77,100	$5,137,200
	Relocation	$2,785,300	$1,199,400	$3,848,800	$485,200	$762,400	$9,081,100
	Subtotal	**$3,567,700**	**$3,130,500**	**$13,811,600**	**$1,080,500**	**$1,103,100**	**$22,693,400**
Capital Stock Losses	Structural	$7,119,600	$3,152,200	$6,707,200	$1,778,500	$1,004,700	$19,762,200
	Non-Structural	$40,018,100	$23,751,700	$21,049,100	$7,713,400	$4,219,200	$96,751,500
	Content	$13,232,900	$6,340,300	$11,712,700	$5,594,000	$2,254,700	$39,134,600
	Inventory	$0	$0	$427,100	$1,070,200	$4,600	$1,501,900
	Subtotal	**$60,370,600**	**$33,244,200**	**$39,896,100**	**$16,156,100**	**$7,483,200**	**$157,150,200**
	TOTAL	**$63,938,300**	**$36,374,700**	**$53,707,700**	**$17,236,600**	**$8,586,300**	**$179,843,600**

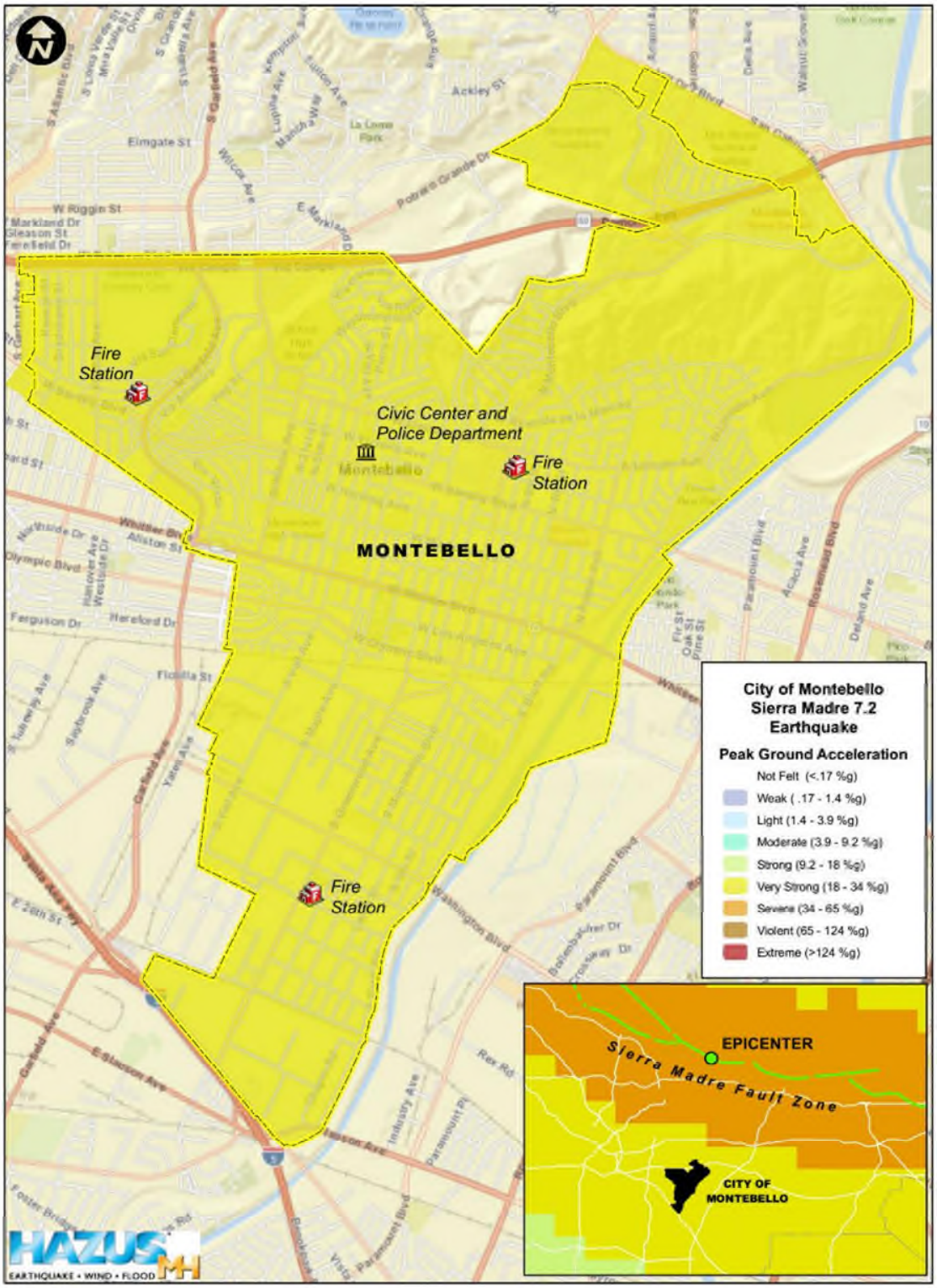
Table: Transportation System Economic Losses ($ Dollars) – Sierra Madre M7.2

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Highway	Segments	$389,155,800	$0	0%
	Bridges	$37,540,300	$788,800	2%
	Tunnels	$0	$0	0%
Railways	Segments	$7,156,200	$0	0%
	Bridges	$102,600	$400	1%
	Tunnels	$0	$0	0%
	Facilities	$2,663,000	$471,700	17%
Light Rail	Segments	$36,013,100	$0	0%
	Bridges	$0	$0	0%
	Tunnels	$0	$0	0%
	Facilities	$0	$0	0%
Bus	Facilities	$0	$0	0%
Ferry	Facilities	$0	$0	0%
Port	Facilities	$0	$0	0%
Airport	Facilities	$0	$0	0%
	TOTAL	**$472,631,000**	**$1,260,900**	

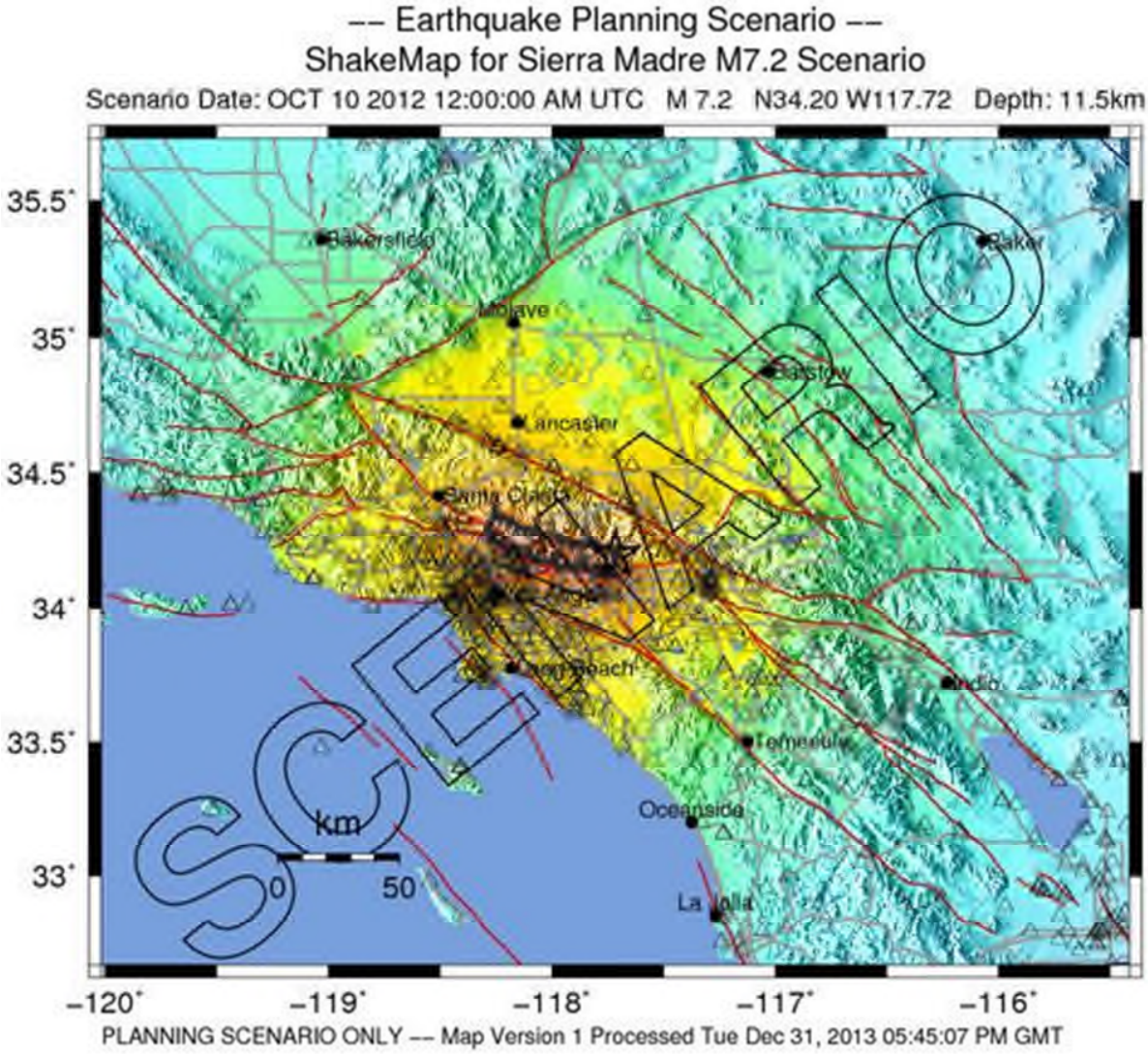
Table: Utility System Economic Losses ($ Dollars) – Sierra Madre M7.2

System	Component	Total Inventory Value	Economic Loss	Loss Ratio %
Potable Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$51,096,200	$627,900	1%
Waste Water	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$30,657,700	$450,000	2%
Natural Gas	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
	Distribution Lines	$20,438,500	$129,100	1%
Oil Systems	Pipelines	$0	$0	0%
	Facilities	$0	$0	0%
Electrical Power	Facilities	$0	$0	0%
Communication	Facilities	$0	$0	0%
	TOTAL	**$102,192,400**	**$1,207,000**	

Map: Shake Intensity Map – Sierra Madre M7.2
(Source: Emergency Planning Consultants)



Map: Seismic Shaking Intensities for the Sierra Madre M7.2
(Source: State of California Department of Conservation)



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.1	0.5	2.4	6.7	13	24	44	83	>156
PEAK VEL.(cm/s)	<0.07	0.4	1.9	5.8	11	22	43	83	>160
INSTRUMENTAL INTENSITY	I	II–III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Wald, et al.; 1999

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. In most California communities, including the City of Montebello, many buildings were built before 1993 when building codes were not as strict. In addition, retrofitting is not required except under certain conditions and can be expensive. Therefore, the number of buildings at risk remains high. The California Seismic Safety Commission makes annual reports on the progress of the retrofitting of unreinforced masonry buildings. According to the City of Montebello General Plan, All URM buildings within the City have been identified and upgraded to meet current requirements.

Implementation of earthquake mitigation policy most often takes place at the local government level. The City of Montebello Planning and Community Development Department 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 Montebello 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.

Wildfire Hazards

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

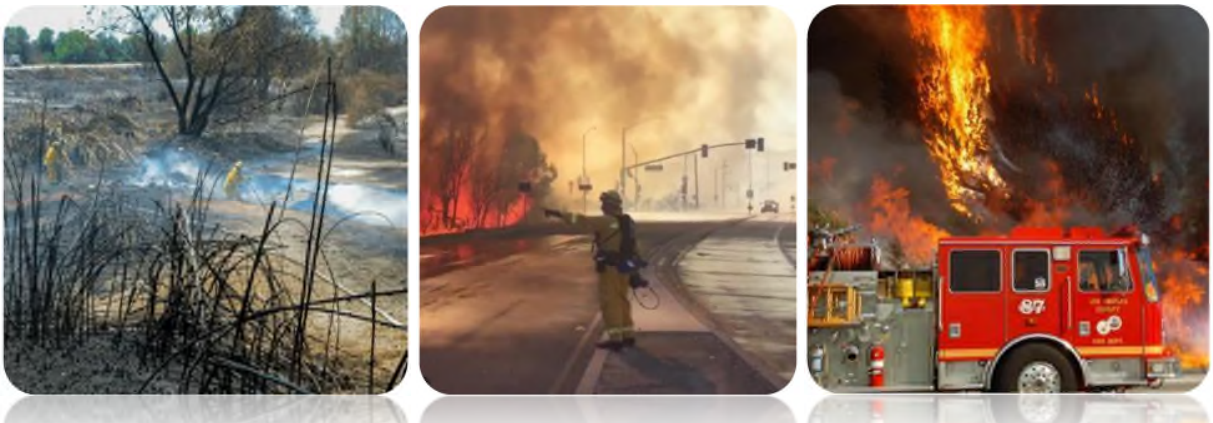
Q: B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

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

Previous Occurrences of Wildfire in the City of Montebello

Fortunately, there have been no wildfire outbreaks within the City. However, bordering areas are highly prone to wildfires and, therefore, the City is exposed to a threat from wildfires originating outside the City specifically from the east toward the Hacienda Hills.

Although no wildfires have impacted the City, the most recent fire event to impact the City was a brush fire in August 2015. A homeless man sparked a 384-acre wildfire in the Rio Hondo Riverbed while cooking food in the brush. Although no structures were damaged, four firefighters suffered minor injuries while fighting the fire.



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.

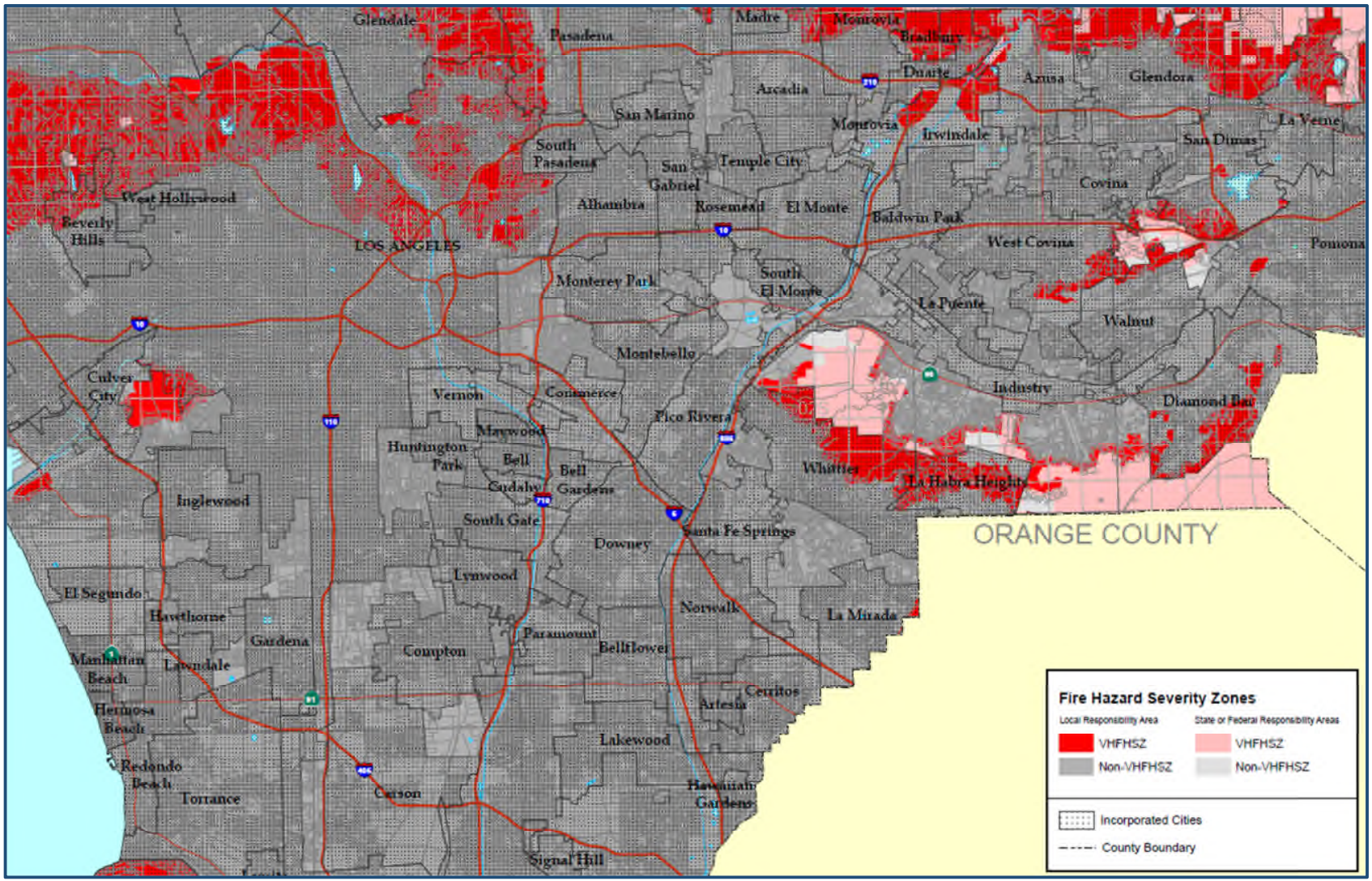
The most recent significant wildfire event to impact the County of Los Angeles was the Station Fire in 2009. The Station Fire destroyed 209 structures and burned a total of 160,577 acres within Los Angeles County. According to the United States Forest Service, the Station Fire was the 10th largest in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

Local Conditions

According to **Map: Local, State, and Federal Responsibility Areas - Very High Fire Hazard Severity Zones** the City of Montebello is not designated a very high fire hazard severity zone (VHFHSZ). However, the immediate areas due east of Montebello including the City of Whittier and the unincorporated community of Hacienda Heights are at severe risk to wildfires. These areas are at significant risk during the summer months, extended periods of heat, and long periods of no rain. Strong, easterly Santa Ana winds have the potential to direct wildfires from the west into the City of Montebello.

Although unlikely, the northeastern portion of the City is at greatest risk of wildfire impact due to the wildland/urban interface and primarily chaparral fuel source.

Map: Local, State, and Federal Responsibility Areas - Very High Fire Hazard Severity Zones (Source: CAL FIRE)



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

Q: B3. 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 Wildfire in the City of Montebello** below.

Impact of Wildfire in the City of Montebello

Wildfires and their impact varies 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.

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
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

Flood Hazards

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

Q: B2. 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 Flooding in the City of Montebello** below.

Previous Occurrences of Flooding in the City of Montebello

Flooding has not been a serious hazard to Montebello in several decades, and the risk of disastrous flooding in the City is considered minimal. The vast majority of Montebello – despite notable areas identified below – does not lie within a 100- or 500- year floodplain, as delineated by the Federal Emergency Management Agency (FEMA). However, the potential for a localized flood event still exists within Montebello, and it is an important hazard to be addressed in the City's Hazard Mitigation Plan.

Since the writing of the 2004 Mitigation Plan, there have been no significant flooding events impacting the City of Montebello.

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.

Local Conditions

According to the National Flood Insurance Program, the City is designated as Zone "X" or minimal flood hazard. However, the City contains four specific areas considered to be at special risk of flooding:

1. West side of Grant Rea Park along the Rio Hondo Channel
2. Garfield Avenue between Via Paseo and Beverly Boulevard
3. East side of Rio Hondo Channel from Beverly Terrace to Mines Avenue
4. Mines Avenue from Maple Avenue to Greenwood

Map: Rio Hondo 100-Year Flood Scenario shows the 100-year Rio Hondo flood impact scenario on the eastern portion of the City.

Urban Flooding

Portions of the City of Montebello are prone to urban flooding, also sometimes referred to as ponding, due to debris accumulation on storm drains and in flood control channels and basins, overburdened pumping stations and aged drainage systems. Low-lying areas of the City are particularly susceptible to urban flooding.

Flood control channels and basins are at risk of overflowing their banks during times of heavy rainfall and reservoir water release, specifically the Rio Hondo Flood Control Channel which runs north to south through the length of City and the San Gabriel River basin, which runs along the east side of the City. The Los Angeles County Department of Public Works and the Army Corp of Engineers are responsible for notifying the jurisdiction at the onset of planned water releases.

Q&A | ELEMENT C. MITIGATION STRATEGY | C2

Q: C2. 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 **National Flood Insurance Program** below.

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.

According to **Map: Flood Insurance Rate Map**, the built areas of the City are in "Flood Zone X" and "Flood Zone D". Zone X is defined as the area outside the 500-year flood and protected by levee from 100-year flood. Zone D is defined as areas in which flood hazards are undetermined (no analysis of flood hazards has been conducted), but possible.

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

Rio Hondo 100-Year Flood Scenario

Building Damage

Table: Expected Building Damage by Occupancy – Rio Hondo 100-Year Flood

	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count
Agriculture	0	0	0	0
Commercial	0	0	0	0
Education	0	0	0	0
Government	0	0	0	0
Industrial	1	0	0	0
Other Residential	0	0	0	0
Religion	0	0	0	0
Single Family	8	54	38	19
Total	**9**	**54**	**38**	**19**

Table: Expected Building Damage by Building Type – Rio Hondo 100-Year Flood

	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count
Concrete	0	0	0	0
MH	0	0	0	0
Masonry	0	0	0	0
Steel	1	0	0	0
Wood	8	54	38	19
Total	**9**	**54**	**38**	**19**

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 304 households to be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 877 people (out of a total population of 62,453) will seek temporary shelter in public shelters.

Economic Losses

The total economic loss estimated for the Rio Hondo 100-Year Flood scenario is **$31.38 million dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Building-Related Economic Losses ($ Dollars) – Rio Hondo 100-Year Flood

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	$13,429,000	$1,004,000	$1,260,000	$62,000	$15,755,000
	Content	$8,530,000	$2,438,000	$3,643,000	$314,000	$14,925,000
	Inventory	$0	$54,000	$610,000	$2,000	$666,000
	Subtotal	**$21,959,000**	**$3,496,000**	**$0**	**$378,000**	**$31,346,000**
Business Interruption	Income	$1,000	$4,000	$0	$0	$5,000
	Relocation	$19,000	$0	$0	$0	$19,000
	Rental Income	$4,000	$0	$0	$0	$4,000
	Wage	$3,000	$3,000	$0	$1,000	$7,000
	Subtotal	**$27,000**	**$7,000**	**$0**	**$1,000**	**$35,000**
	TOTAL	**$21,986,000**	**$3,503,000**	**$0**	**$379,000**	**$31,381,000**

Map: Rio Hondo 100-Year Flood Scenario
Source: Emergency Planning Consultants

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

Q: B3. 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 Flooding in the City of Montebello** below.

Impact of Flooding in the City of Montebello

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.

Dam Failure Hazards

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

Q: B2. 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 Dam Failure in the City of Montebello** below.

Previous Occurrences of Dam Failure in the City of Montebello

The City of Montebello has not been recently affected by a release/failure of any of the dam facilities identified in **Table: Dams Near City of Montebello**.

Since the writing of the 2004 Mitigation Plan, there have been no dam failure events in the City of Montebello.

Previous Occurrences of Dam Failure in Montebello County

There are a total of 103 dams in Los Angeles County, owned by 23 agencies or organizations, ranging from the Federal government to Home Owner Associations. These dams hold billions of gallons of water in reservoirs. Releases of water from the major reservoirs are designed to protect Southern California from flood waters and to store domestic water. Seismic activity can compromise the dam structures, and the resultant flooding could cause catastrophic flooding. Following the 1971 Sylmar earthquake the Lower Van Norman Dam showed signs of structural compromise, and tens of thousands of persons had to be evacuated until the dam could be drained. The dam has never been refilled.

Local Conditions

Loss of life and damage to structures, roads, and utilities may result from a dam failure. Economic losses also result from a lowered tax base and lack of utility profits. These effects would certainly accompany the failure of one of the major dams located near the City of Montebello. Because dam failure has severe consequences, FEMA requires that all dam owners develop Emergency Action Plans (EAP) for warning, evacuation, and post-flood actions. Although there may be coordination with county officials in the development of the EAP, the responsibility for developing potential flood inundation maps and facilitation of emergency response is the responsibility of the dam owner.

Whittier Narrows Dam

According to the U.S. Army Corps of Engineers, Whittier Narrows Dam is a flood risk management and water conservation project constructed in 1957 and operated by the U.S. Army Corps of Engineers, Los Angeles District. The project is located, as its name implies, at the "Whittier Narrows," a natural gap in the hills that form the southern boundary of the San Gabriel Valley. The Rio Hondo and the San Gabriel rivers flow through this gap and are impounded by the reservoir. The communities of Montebello and Pico Rivera are located immediately downstream.

Whittier Narrows Dam, a typically dry flood risk management structure located 11 miles east of downtown Los Angeles, has been reclassified from Dam Safety Action Classification (DSAC) 2 to DSAC 1.

The DSAC 1 rating indicates that the U.S. Army Corps of Engineers considers the incremental risk – the combination of life or economic consequences with the likelihood of failure – to be very high. The reclassification as DSAC 1 identifies the dam as one of the highest priority dam safety projects in the Corps' portfolio of dams.

In a May 25, 2016, memorandum to Col. Kirk Gibbs, commander of the Corps' Los Angeles District, Mr. James Dalton, chief of Engineering and Construction at Corps headquarters, emphasized that new findings with respect to the anticipated performance of the spillway gates drove the reclassification.

The Los Angeles District is currently working with a nationwide team of experts to develop a plan to reduce the risk associated with the spillway. The Corps anticipates that some of the potential solutions will be in operation prior to the 2016-2017 winter rains; other measures will likely be installed before the end of 2017.

Map: Dam Failure Inundation – Whittier Narrows Dam (HAZUS) below shows the potential water depth inundation from a failure of the Whittier Narrows Dam.

Garvey Reservoir

Garvey Reservoir, owned by the Metropolitan Water District of Southern California (MWD), stores municipal water supplies for MWD customers. The reservoir lies impounded behind a north dam and a south dam. MWD completed a substantial overhaul of the facility in 1999 to address seepage and ensure overall reservoir integrity. The state Department of Conservation, Division of Dam Safety conducts periodic dam inspections to verify the dams' ability to withstand seismic stresses. A major seismic event has the potential to cause significant damage and potential failure at this facility.

According to the City of Monterey Park's website, in the unlikely event of a conjectured catastrophic failure at Garvey Reservoir, properties to the north and south of the reservoir could be flooded. If the south dam failed, flood waters of average depth six to seven feet would cascade down the slope bank and into the residential neighborhoods below. At the Pomona Freeway, the water would spread laterally along the north side of the freeway before flowing through freeway under crossings into the City of Montebello.

Table: Dams near City of Montebello

Name of Facility	Owner	Primary Purpose
Whittier Narrows	U.S. Army Corps of Engineers (ACOE)	Flood Control
Garvey Reservoir	Metropolitan Water District	Water Supply Storage

Whittier Narrows Dam

Garvey Reservoir

Whittier Narrows Dam Failure Scenario

Building Damage

Table: Expected Building Damage by Occupancy – Whittier Narrows Dam Failure Scenario

	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count
Agriculture	0	0	0	0
Commercial	0	0	0	0
Education	0	0	0	0
Government	0	0	0	0
Industrial	0	0	0	0
Other Residential	0	0	0	0
Religion	0	0	0	0
Single Family	9	56	48	36
Total	**9**	**56**	**48**	**36**

Table: Expected Building Damage by Building Type – Whittier Narrows Dam Failure Scenario

	Slight	Moderate	Extensive	Complete
	Count	Count	Count	Count
Concrete	0	0	0	0
MH	0	0	0	0
Masonry	0	0	0	0
Steel	0	0	0	0
Wood	9	56	48	36
Total	**9**	**56**	**48**	**36**

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 335 households to be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 950 people (out of a total population of 62,453) will seek temporary shelter in public shelters.

Economic Losses

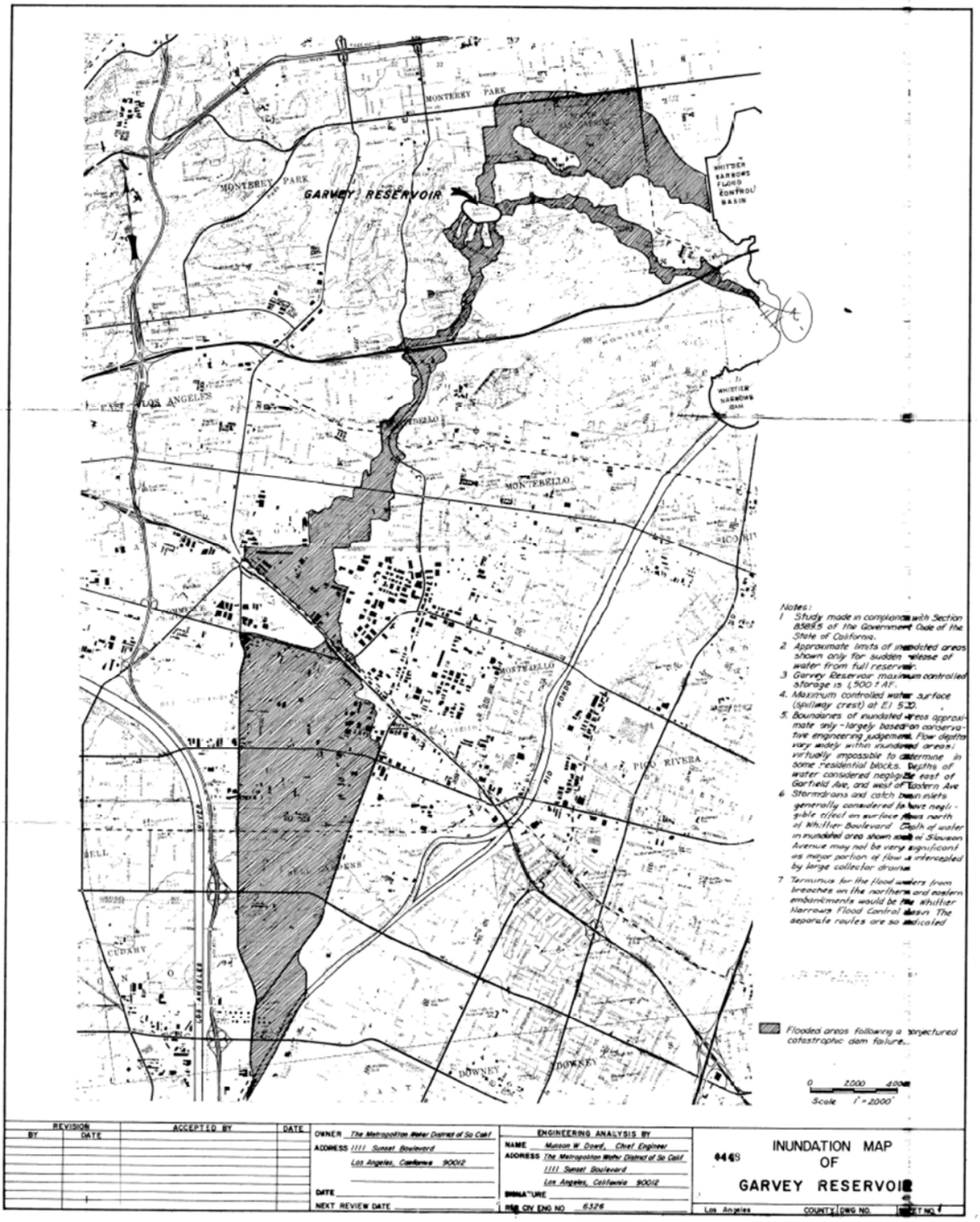
The total economic loss estimated for the Whittier Narrows Dam failure scenario is **$39.19 million dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Building-Related Economic Losses ($ Dollars) – Whittier Narrows Dam Failure Scenario

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	$17,379,000	$1,319,000	$1,314,000	$96,000	$20,108,000
	Content	$10,859,000	$3,106,000	$3,849,000	$498,000	$18,312,000
	Inventory	$0	$70,000	$642,000	$4,000	$716,000
	Subtotal	**$28,238,000**	**$4,495,000**	**$0**	**$598,000**	**$39,136,000**
Business Interruption	Income	$1,000	$7,000	$0	$0	$8,000
	Relocation	$25,000	$0	$0	$0	$25,000
	Rental Income	$6,000	$0	$0	$0	$6,000
	Wage	$4,000	$5,000	$0	$1,000	$10,000
	Subtotal	**$36,000**	**$12,000**	**$0**	**$1,000**	**$49,000**
	TOTAL	**$28,274,000**	**$4,507,000**	**$0**	**$599,000**	**$39,185,000**

Map: Dam Failure Inundation – Whittier Narrows Dam (HAZUS)
Source: Emergency Planning Consultants

Map: Dam Failure Inundation – Garvey Reservoir
(Source: Cal OES Dam Safety Program)



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

Q: B3. 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 **Impacts of Dam Failure in the City of Montebello** below.

Impacts of Dam Failure in the City of Montebello

Based on the risk assessment, it is evident that dam failures 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
- ✓ Significant disruption to students and teachers as temporary facilities and relocations are needed

Drought Hazards

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

Q: B2. 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 Drought in the City of Montebello** below.

Previous Occurrences of Drought in the City of Montebello

Fortunately, there is no severe history of drought within the City of Montebello. Although there is no evidence of a drought having a significant impact on the City at the current time, California as a whole has experienced a serious drought since 2012.

Since the writing of the 2004 Mitigation Plan, there have been no significant damages to the City from a drought.

Previous Occurrences of Drought in Los Angeles County

The region's Mediterranean climate makes it especially susceptible to variations in rainfall. Though the potential risk to the City of Montebello is in no way unique, severe water shortages could have a bearing on the economic well-being of the community. Comparison of climate (rainfall) records from Los Angeles with water well records beginning in 1930 from the San Gabriel Valley indicates the existence of wet and dry cycles on a 10-year scale as well as for much longer periods. The climate record for the Los Angeles region beginning in 1890 suggests drying conditions over the last century. With respect to the present day, climate data also suggests that the last significant wet period was the 1940s. Well level data and other sources seem to indicate the historic high groundwater levels (reflecting recharge from rainfall) occurred in the same decade. Since that time, rainfall (and groundwater level trends) appears to be in decline. This slight declining trend, however, is not believed to be significant. Climatologists compiled rainfall data from 96 stations in the State that spanned a 100-year period between 1890 and 1990. An interesting note is that during the first 50 years of the reporting period, there was only one year (1890) that had more than 35 inches of rainfall, whereas the second 50-year period recording of 5 year intervals (1941, 1958, 1978, 1982, and 1983) that exceeded 35 inches of rainfall in a single year. The year of maximum rainfall was 1890 when the average annual rainfall was 43.11 inches. The second wettest year on record occurred in 1983 when the State's average was 42.75 inches.

The driest year of the 100-year reported in the study was 1924 when the State's average rainfall was only 10.50 inches. The region with the most stations reporting the driest year in 1924 was the San Francisco Bay area. The second driest year was 1977 when the average was 11.57 inches. The most recent major drought (1987 to 1990) occurred at the end of a sequence of very wet years (1978 to 1983). The debate continues whether "global warming" is occurring, and the degree to which global climate change will have an effect on local micro-climates. The semi-arid southwest is particularly susceptible to variations in rainfall. A study that documented annual precipitation for California since 1600 from reconstructed tree ring data indicates that there was a prolonged dry spell from about 1755 to 1820 in California. Fluctuations in precipitation could contribute indirectly to a number of hazards including wildfire and the availability of water supplies.

Local Conditions

According to the City of Montebello General Plan, water service for the City is provided by five service providers in five different districts: California Water Service Company, Central Basin/Metropolitan Water District (MWD), Montebello Land and Water, San Gabriel Valley Water Company, and the South Montebello Irrigation District.

A significant drought has hit the state of California since 2012. The drought has depleted reservoir levels all across the state. In January of 2014, Governor Brown declared a state of emergency and directed state officials to take all necessary actions to prepare for water shortages. As the drought prolonged into 2015, to help cope with the drought, Governor Brown gave an executive order in April 2015 which mandated a statewide 25 percent reduction in water use. In January of 2016, the Department of Water Resources and the United States. Bureau of Reclamation have finalized the 2016 Drought Contingency Plan that outlines State Water Project and Central Valley Project operations for February 2016 to November 2016. The plan was developed in coordination with staff from State and federal agencies. Although the drought has more significantly impacted surfaces waters and other agencies that use water for agriculture, the City of Montebello is still affected by the drought, primarily due to reduced reliability of imported water.

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

Q: B3. 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 **Impacts of Drought in the City of Montebello** below.

Impacts of Drought in the City of Montebello

Based on the risk assessment, it is evident that drought events 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
- ✓ Disruption of and damage to public infrastructure
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Uncontrolled fires and associated injuries and damage

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 Montebello 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 Montebello;
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 Montebello 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: C3. 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

The Planning Team developed mitigation goals to avoid or reduce long-term vulnerabilities to hazards. These general principles clarify desired outcomes.

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.

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.

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, human-caused, and technological hazards.

Improve hazard assessment information to make recommendations for avoiding new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural, human-caused, and technological hazards.

Enhance Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with natural, human-caused, and technological hazards.

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

Preserve Natural Systems

Support management and land use planning practices with hazard mitigation to protect life.

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

Encourage Partnerships and Implementation

Strengthen communication and coordinate participation with public agencies, citizens, non-profit organizations, business, and industry to support implementation.

Encourage leadership within the City and public 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 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 for each of the action items. The hierarchies of the assignments vary – some are positions, others departments, and other committees. The primary responsibility for implementing the action items falls to the entity shown as the "Coordinating Organization". The coordinating organization is the 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. Coordinating organizations may include local, County, or regional agencies that are capable of or responsible for implementing activities and programs.

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

Q&A | ELEMENT C. MITIGATION STRATEGY | C5

Q: C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

A: See **Priority Ratings** 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", 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 LHMP?
- ☐ 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 | C1

Q: C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))

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

Q&A | ELEMENT C. MITIGATION STRATEGY | C4

Q: C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))

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

Q&A | ELEMENT C. MITIGATION STRATEGY | C5

Q: C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

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

Q&A | ELEMENT D. MITIGATION STRATEGY | D2

Q: D2. 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: D3. 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

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
MULTI-HAZARD ACTION ITEMS													
MH-1 Educate the general public on all-hazards mitigation & response (through phone directory, website and billing inserts) in English and Spanish.	Administration, Fire	Ongoing		X				AB	AB	H	L	L	Status - Website, Nixle
MH-2 Develop and promote relationships and interagency partnership to identify deficiencies of early warning systems.	Administration, Fire	Ongoing	X	X		X	X	AB	AB	H	L	M	
MH-3 Build Montebello Community Training Room for City and MMPC use.	South Montebello Irrigation District	Complete	X	X				AB					Completed 2010
MH-4 Educate the public about the importance of implementing the hazard mitigation plan.	Fire, Building, Public Works, and all related City Departments	Ongoing	X	X	X	X	X	AB	AB	H	L	M	
~~MH-5 Educate public on importance of their participation of mitigation plan.~~	~~All City Departments~~	~~2005~~		~~X~~				~~AB~~					Deleted - redundant
MH-6 Educate the public about how to prepare for	Planning	Ongoing	X	X	X	X	X	AB	AB	M	L	M	

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
natural hazards relevant to location.													
MH-7 Educate public about evacuation procedures.	Fire, Police	Ongoing	X	X	X	X	X	AB	AB	H	L	M	
MH-8 Promote business mitigation awareness of hazards and opportunities for mitigation.	Fire, Police	Ongoing	X	X	X	X	X	AB	AB	H	L	M	
~~MH-9 Engage the private sector to contribute.~~	~~All City Departments~~	~~2004~~											Deleted
MH-10 Provide schools with seasonal disaster preparedness literature for students to take home to their families.	Fire, Police	Ongoing	X	X	X	X	X	AB	AB	H	L	M	
MH-11 Design and post disaster preparedness and related links on Fire Department web site.	Fire	Ongoing	X	X	X	X	X	AB	AB	H	H	M	
~~MH-12 Propagate wide spread mitigation with both public and private sectors.~~	~~All City Departments~~	~~2006~~	~~X~~					~~AB~~					Deleted - redundant
MH-13 Improve interagency response methods and procedures.	All Departments	Ongoing	X	X	X	X	X	AB, GR	AB	H	L	M	
MH-14 Develop disaster response drill pre-plans and procedures improved annually.	All Departments	Ongoing	X	X	X	X	X	AB, GR	AB	M	L	M	
~~MH-15 Improve ability and preparedness of emergency responders and the public.~~	~~Fire, Police and Affiliated Agencies/Departments~~	~~2006~~		~~X~~			~~X~~	~~AB~~					Deleted - redundant
MH-16 Increase training, personnel and	Fire	Ongoing	X	X	X	X	X	AB	AB	H	L	M	Utilized AFG Grants in the

Mitigation Action Item	Coordinating Agency	Timeline	**Goal**: Protect Life and Property	**Goal**: Public Awareness	**Goal**: Natural Systems	**Goal**: Emergency Services	**Goal**: Partnerships and Implementation	**Funding Source: AB-Annual Budget, GR-Grant, P-Private**	**Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant**	**Benefit: L-Low, M-Medium, H-High**	**Cost: L-Low, M-Medium, H-High**	**Priority: L-Low, M-Medium, H-High**	**2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes**
equipment through alternative funding sources.													past
~~MH-18 Evaluate/identify and provide shelter resource needs and growth development.~~	~~Fire, Red Cross and Shelter Locations~~	~~2007~~											Deleted – not the job of the City
MH-19 Maximize financial reimbursement following disaster declaration by updating knowledge of Disaster Cost Recovery regulations.	Fire, Finance	Ongoing		X		X		AB	AB	H	L	H	Revised action item and moved from EQ
MH-20 Develop Continuity of Operations Plans (COOP) for each department. COOP planning ensures that the critical functions can continue to operate during and after an emergency incident which may prevent access to normally operating systems, such as physical plant, data or communication networks, or transportation.	Fire	1-5 years						GR	AB	H	L	L	New, Status – Transit and Finance COOPs completed in 2012
MH-21 Based on hazard information in the Mitigation Plan and General Plan Safety Element, update the Land Use Element to: ✓ Guide development away from hazardous areas; ✓ Reduce density in the hazardous areas; or ✓ Encourage greater development restrictions on the property.	Planning	1-5 years	X	X	X	X	X	GR	AB	H	M	M	New
MH-22 Encourage development and testing of site	Fire	Ongoing	X	X		X	X	AB	AB	H	L	H	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other similar facilities.													
MH-23 Train emergency response personnel for various contingencies and response activities, such as evacuation, traffic control, search, and rescue.	Fire	Ongoing	X	X	X	X	X	AB, GR	AB	H	M	H	New
MH-24 Encourage participation by community members in Community Emergency Response Team (CERT). CERT is a volunteer group of citizens who are trained and equipped to respond if emergency services are unable to meet all of the immediate needs of the community following a major disaster.	Fire	Ongoing	X	X	X	X	X	AB	AB	H	M	H	New
MH-25 Educate the public on how insurance should not be considered an alternative to reducing damages for any type of hazard. Instead, insurance does have the value of protecting oneself from financial devastation if damage were to occur.	Planning	Ongoing	X	X	X	X	X	AB	AB	H	L	H	New
MH-26 Encourage residents to prepare themselves by understanding their local hazards,	Fire	Ongoing	X	X	X	X	X	AB	AB	H	L	H	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
stocking up with necessary items, and planning for how family members should respond if any of a number of possible emergency or disaster events strike.													
MH-27 City to pursue funding to purchase back-up generators for pumping and lift stations in sanitary sewer systems, along with other measures (e.g., alarms, meters, remote controls, and switchgear upgrades).	Fire, Planning, Public Works	1-5 years	X	X	X	X	X	AB, GR	AB	H	M	H	New
MH-28 Utilize new Digital Billboards along Interstate 5 to broadcast emergency notices.	Fire	Ongoing	X	X	X	X	X	AB	AB	H	L	H	New
MH-29 Replace Police Dispatch consoles to be P25 compliant.	Police, Fire	ASAP	X	X	X	X	X	GR	AB	H	M	H	New
MH-30 Seek funding and write a Grading Ordinance.	Planning, Public Works	1 year	X	X	X	X	X	GR	AB	H	M	H	New
MH-31 Pursue funding and prepare Technical Background Report in time for next update to the General Plan Safety Element.													
MH-31 Prepare a post-disaster recovery ordinance that regulates repair activity. It prepares a community to respond to a disaster event in an orderly fashion by requiring citizens to: 1) obtain permits for repairs, 2) refrain from making repairs,	Planning, Building, Public Works, Fire	1-5 years	X	X	X	X	X	GR	AB	H	M	H	New

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or 3) make repairs using standard methods.													
MH-32 Maintain the update the Disaster Movement and Evacuation Route Map.	Planning, Fire	Ongoing	X	X	X	X	X	AB	AB	H	L	H	New
MH-33 Upgrade and improve Greenwood Avenue and Montebello Boulevard as the community's major north-south connector.	Public Works, Planning	1-5 years	X	X	X	X	X	AB, GR	AB	H	H	H	New. Drawn from General Plan Circulation Element
MH-34 Improvements to Greenwood Avenue and Montebello Boulevard should include widening, grade separation structures and signalization.	Public Works, Planning	1-5 years	X	X	X	X	X	AB, GR	AB	H	H	H	New. Drawn from General Plan Circulation Element
MH-35 City should seek to provide an adequate circulation system in the hills which services major regional traffic generators, yet preserves areas which are attractive for residential, open space, and recreational development.	Public Works, Planning	1-5 years	X	X	X	X	X	AB, GR	AB	H	L	H	New. Drawn from General Plan Circulation Element
MH-36 City of Montebello should not be bisected by a new freeway route.	Public Works, Planning	1-5 years	X	X	X	X	X	AB	AB	H	L	H	New. Drawn from General Plan Circulation Element
MH-37 Improve north-south circulation in Montebello by providing at least one major street with a grade-separated railroad crossing.	Public Works, Planning	1-5 years	X	X	X	X	X	AB, GR	AB	H	M	H	New. Drawn from General Plan Circulation Element
MH-38 Provide a circulation system for the Montebello Hills which services the various types of residential and commercial development but at	Public Works, Planning	1-5 years	X	X	X	X	X	AB, GR	AB	H	H	H	New. Drawn from General Plan Circulation Element

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the same time preserves the unique environmental and aesthetic qualities of the hill area.													
EARTHQUAKE ACTION ITEMS													
EQ-1 Interdepartmental personnel training for earthquake seismic construction and retrofit.	Building, Fire	2005	X					AB					Completed
EQ-2 As projects are submitted, conduct seismic inspections for residential (and eventually commercial buildings) with pre-1960 foundations.	Building, Fire	Ongoing	X	X				AB					Revised action item
~~EQ-3 Identify Residential Structures not in compliance with Post-1993 building codes (through systematic inspections and surveys).~~	~~Building, Fire~~	~~2006~~	~~X~~					~~AB, GR~~					Deleted – cost prohibitive
EQ-4 Adopt Municipal Code to enforce seismic upgrades for existing buildings receiving inspections or permits and to ensure seismic codes are implemented in the plans of new buildings & infrastructure.	Building, Fire	Ongoing	X	X	X	X	X	AB	AB	H	L	H	Adopted 2008, 2010, 2013, and 2016 Amendments to the California Building Code
~~EQ-5 Maximize financial reimbursement following disaster declaration by updating knowledge of Disaster Cost Recovery regulations.~~	~~All City Departments~~	~~2006~~		~~X~~									Deleted - moved to Multi-Hazard
~~EQ-6 Prevent structural damage to structures in event of an earthquake.~~	~~Fire, Building~~	~~2004~~	~~X~~					~~AB~~					Deleted
~~EQ-7 Protect life and property in event of a major~~	~~Fire, Building, EOC~~	~~2005~~	~~X~~			~~X~~	~~X~~	~~GF~~					Deleted

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~~earthquake.~~													
EQ-8 Evaluate City facilities that are subject to earthquake damage and design retrofit schedule to mitigate hazard.	Building, Fire	Ongoing	X	X	X	X	X	AB, GR	AB	H	L	H	New
EQ-9 Protect new residential structures built within urban wild land interface development area.	Fire, Building	Ongoing	X	X	X	X	X	AB	AB	H	L	H	Status – fuel modification completed as part of Specific Plan development.
EQ-10 Information gained from seismic hazard mapping can be used to assess risk. The first step is collection of geologic information on seismic sources, soil conditions, and related potential hazards. The second step is to prepare a map showing the approximate locations of various hazards.	Fire, Planning, Building Inspection, Public Works	Ongoing	X	X	X	X	X	AB	AB	H	L	H	New
EQ-11 FEMA's HAZUS is a computer-based tool used to quantitatively estimate losses from an earthquake and other hazards. HAZUS was used in the 2016 Mitigation Plan and should be included in the next update.	Planning	5 years	X	X	X	X	X	AB, GR	AB	H	L	H	New
EQ-12 Prepare a campaign for City facilities, residents, and businesses to utilize non-structural mitigation techniques. Many injuries in	Fire	1-5 years	X	X	X	X	X	AB, GR	AB	H	L	H	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
earthquakes are caused by non-structural hazards, such as attachments to buildings. These include lighting fixtures, windows (glass), pictures, tall bookcases, computers, ornamental decorations on the outside of the buildings (like parapets), gas lines, etc. Activities that can reduce the risk of injury and damage include: anchoring tall bookcases and file cabinets, installing latches on drawers and cabinet doors, restraining desktop computers and appliances, using flexible connections on gas and water lines, mounting framed pictures and mirrors securely, and anchoring and bracing propane tanks and gas cylinders.													
WILDFIRE ACTION ITEMS													
~~WF-1 Prevent the ignition and spread of wild fires within the borders of Montebello.~~	~~Fire~~	~~2004~~	~~X~~					~~GF~~					Deleted – not applicable to properties in the City
~~WF-2 Prevent the buildup of ignitable fire load/brush.~~	~~Fire~~	~~2004~~	~~X~~										Deleted – not applicable to properties in the City
WF-3 Educate the public on importance of the abatement of brush around their homes.	Fire	Ongoing	X	X		X		AB	AB	H	L	H	Revised timeline
~~WF-4 Prevent brush exposure fires to residential~~	~~Fire~~	~~2004~~	~~X~~					~~GF~~					Deleted – not applicable to

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
~~development.~~													properties in the City
WF-5 Prevent fires/additional damage due to earthquakes.	Building, Fire	2004	X		X	X		AB, GR	AB				
~~WF-7 Protect electrical utilities from seismic damage.~~	~~Building, Fire~~	~~2004~~	~~X~~					~~GF~~					Deleted – cost prohibitive
WF-9 Educate the public on the fact that wildfires can be prevented by arson prevention clean-up activities in areas of abandoned or collapsed structures, accumulated junk or debris, and in areas with a history of storing flammable materials where spills or dumping may have occurred.	Fire	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New
WF-10 Roads and driveways should be kept accessible to emergency vehicles and fire equipment. Driveways should be relatively straight and flat, with at least some open spaces to turn. Bridges should be strong enough to support emergency vehicles, with clearance wide and high enough for two-way traffic and emergency vehicle access. Addresses should be visible from the road, and keys to gates around property should be provided to the Fire Department.	Fire	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New
WF-11 Inform the public that hillsides facing south	Fire	Ongoing	X	X	X	X		AB,	AB	H	L	H	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
or west are more vulnerable to increased dryness and heat from sun exposure. Structures should be set back from slopes outside of the "convection cone" of intense heat that is projected up the slope of a hill as a wildfire "climbs" it.								GR					
WF-12 Inform public that in wildfire prone areas, risk may be decreased by enclosing the foundations of homes and other buildings, rather than leaving them open where undersides can be exposed to blown embers or other materials.	Fire	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New
WF-13 Inform public that wildfire risk can be alleviated by safely using and storing necessary flammable materials, including machine fuels. Approved safety cans should be used for storing gasoline, oily rags and other flammable materials. Firewood should be stacked at least 100 feet away and uphill from homes.	Fire	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New
WF-14 Inform public to install and maintain smoke detectors and fire extinguishers on each floor of their homes or other buildings. This equipment should be tested and/or inspected regularly, and smoke detector batteries should be changed twice a year. Everyone in a household or building can	Fire, Building, Planning	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New

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be taught how to use a fire extinguisher. Other valuable fire mitigation systems include interior and exterior sprinkler systems.													
WF-15 Water supplies for emergency firefighting should be maintained in accordance with National Fire Protection Association (NFPA) standards. Residents should identify and maintain any number of outside water sources such as small ponds, cisterns, wells, swimming pools or hydrants. It is a good idea to have a garden hose that is long enough to reach any area of a home or other structures on a property.	Fire	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New
WF-16 Instruct residents on proper evacuation procedures, such as wearing protective clothing (e.g., sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves and a handkerchief to protect the face); taking a Disaster Supplies Kit; and choosing a route away from fire hazards.	Fire	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New
WF-17 Instruct residents on need to keep roads and driveways accessible to emergency vehicles and fire equipment. Driveways should be relatively straight and flat, with at least some open spaces to	Fire	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
turn. Bridges should be strong enough to support emergency vehicles, with clearance wide and high enough for two-way traffic and emergency vehicle access. Addresses should be visible from the road, and keys to gates around property should be provided to the local fire department.													
WF-18 Develop program to encourage residents to plan several escape routes away from their homes, by car and foot. It is a good idea to keep a set of hand tools that can be used as fire tools, such as a rake, axe, hand/chainsaw, bucket and shovel. When wildfire threatens, residents should be instructed to carry and listen to battery-operated radios for reports and evacuation information, and follow instructions from local officials. Cars should be backed into garages or parked in open space facing the direction of escape, with doors and windows closed and the key in the ignition. Garage windows and doors should be closed but left unlocked. If residents have time, they can take steps to protect their homes by closing windows, vent doors, venetian blinds and heavy drapes; removing lightweight	Fire	Ongoing	X	X	X	X		AB, GR	AB	H	L	H	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
curtains; shutting off natural gas at the meter; turning off pilot lights; closing fireplace screens; and moving flammable furniture into the center of the home away from windows and sliding-glass doors. Outside, residents can seal attic and ground vents with precut plywood or commercial seals; turn off propane tanks; place combustible patio furniture inside; connect garden hose to outside taps; set up a portable gasoline-powered pump; place lawn sprinklers on the roof and near aboveground fuel tanks; wet the roof, wet or remove shrubs within 15 feet of the home; and gather fire tools.													
WF-19 Continue to utilize Code Enforcement staff to monitor overgrown vegetation and Palm fronds.	Building, Fire	Ongoing	X	X	X	X		AB	AB	H	L	H	New
FLOODING ACTION ITEMS													
FLD-1 Study urban flood areas and determine if failure of streets are soil or pavement related.	Engineering, Streets	1-5 years	X		X	X		GR	AB	H	H	H	Status – history of street collapses
FLD-2 Distribute information on the National Flood Insurance Program to local businesses in or near flood areas.	Fire, Finance, Economic Development	Ongoing	X	X				AB					
FLD-3 Prevent urban flooding from contamination	Fire, Public Works	2004	X					GF					

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
of city drainage channels.													
FLD-4 Maximize effectiveness of mitigating against flood hazards impacting private properties.	Fire, Police, Building, Public Works, Impacted Property Owners	Ongoing	X	X	X	X	X	AB, GR, P	AB	L	H	L	
FLD-5 Proactive annual clean out storm drains.	Public Works	Ongoing	X		X	X		AB, GR	AB	H	M	H	New
FLD-6 Design and construct pump stations in areas subject to urban flooding.	Public Works	1-5 years	X		X	X		AB, GR	AB	H	M	H	New
FLD-7 Seek funding and develop Storm Drain Management Plan and Waste Water Management Plan.	Public Works	1-5 years	X		X	X		AB, GR	AB	H	H	H	New
FLD-8 Ensure subdivision design standards require elevation data collection during the platting process. Lots may be required to have buildable space above the base flood elevation.	Planning	1-5 years	X		X	X		AB, GR	AB	H	L	H	New
FLD-9 Requirements for building design standards and enforcement for properties in the floodplain include the following: 1) that a residential structure be elevated; and 2) that a nonresidential structure be elevated or floodproofed.	Planning	1-5 years	X		X	X		AB, GR	AB	H	L	H	New
FLD-10 Inform residents that purchasing flood	Planning, Fire	1-5 years	X		X	X		AB,	AB	H	L	H	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
insurance does not prevent a flood from occurring, but it does mitigate a property owner's financial exposure to loss from flood damage. National Flood Insurance Program (NFIP) policies are only available in communities that participate in the program, which is administered by FEMA.								GR					
FLD-11 Use caution in considering alternative uses of wetlands to mitigate flooding. With special soils and hydrology, wetlands serve as natural collection basins for floodwaters. Acting like sponges, wetlands collect water, filter it, and release it slowly into rivers and streams. Protecting and preserving wetlands can go a long way toward preventing flooding in other areas.	Planning, Fire	1-5 years	X		X	X		AB, GR	AB	H	L	H	New
FLD-12 Work with LA County and Army Corps of Engineers to ensure integrity of dams and reservoirs. Although dams and levees may have been constructed properly, failure to maintain them can lead to significant loss of life and property if they are stressed and broken or breached during a flood event. An inspection, maintenance and enforcement program helps to ensure continued structural integrity. Dams or	Planning, Fire, Public Works	1-5 years	X		X	X		AB, GR	AB	H	L	H	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
levees need to be kept in good repair. Unnecessary or old and structurally unsound dams should be removed. Planning for dam breaks can include constructing emergency access roads as well as automating pump and flood gate operation. And it never hurts to regulate development in a dam's hydraulic shadow, where flooding would occur if there were a severe dam failure.													
FLD-13 Ensure Zoning Ordinance prohibits containers of hazardous materials such as petroleum or chemicals to be located in a flood hazard area. If such a location is necessary, hazardous material containers need to be anchored, because the contents can contaminate water and multiply the damaging effects of flooding by causing fires or explosions, or by otherwise making structures unusable.	Planning, Fire	1-5 years	X		X	X		AB, GR	AB	H	L	H	New
FLD-14 Write a Floodplain Ordinance	Planning	1-5 years	X	X	X	X	X	GR	AB	H	M	H	New
DAM FAILURE ACTION ITEMS													
DAM-1 Develop a Dam Inundation Evacuation Plan.	Fire	1 year	X	X	X	X	X	AB	AB	M	L	M	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Funding Source: AB-Annual Budget, GR-Grant, P-Private	Planning Mechanism: GP-General Plan, CIP, AB-Annual Budget, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
DAM-2 Coordinate with LA County about notification system pertaining to the dams/reservoirs in the region.	Fire, Police	1 year	X	X	X	X	X	AB	AB	M	L	M	New
DROUGHT ACTION ITEMS													
DR-1 Enforce Water Conservation Ordinance which prioritizing or controls water use.	Planning	Ongoing						AB	AB	H	H	H	Status – Ordinance effective in 2015
DR-2 Encourage water saving measures by the City, residents, and businesses including installing low-flow water saving showerheads and toilets and washing of cars	Building, Code Enforcement	Ongoing	X	X	X	X	X	AB	AB	H	L	H	New

Plan Maintenance

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

Q&A | ELEMENT A: PLANNING PROCESS | A6

Q: A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (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 Chair of the Planning Team and will be referred to as the Local Mitigation Officer.

	Year 1	Year 2	Year 3	Year 4	Year 5
Monitoring	X	X	X	X	X
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

Adoption of the Mitigation Plan by the City's governing body is one of the prime requirements for approval of the plan. Once the plan is completed, the City Council will be responsible for adopting the Mitigation Plan. The governing body has the responsibility and authority to promote sound public policy regarding hazards. The local agency governing body will have the authority to periodically update the plan as it is revised to meet changes in the hazard risks and exposures in the City. The approved Mitigation Plan will be significant in the future growth and development of the City.

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 Emergency Management Agency (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 Montebello 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 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. 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 | C6

Q: C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))

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

Implementation through Existing Programs

The City of Montebello addresses statewide planning goals and legislative requirements through its General Plan, its Capital Improvement Plan, and City 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 Montebello will implement recommended mitigation action items through existing programs and procedures.

The City of Montebello Planning and Community Development 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 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.

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.

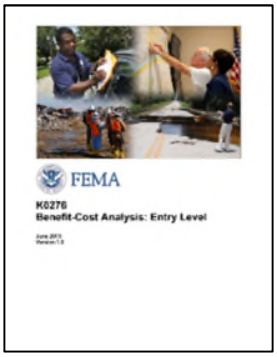
Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating hazards can provide decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to 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 | A6

Q: A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))

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

Evaluating and Updating the Plan

Formal Review Process

The Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation 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 annual meeting. Planning Team members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan.

The Planning Team will review the goals and 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 **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, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised.

The Local Mitigation Officer will assign the duty of updating the Plan to one or more of the Planning Team members. The designated Planning Team members will have three months to make appropriate changes to the Plan before submitting it to the Planning Team members. The Planning Team will also notify all holders of the City plan when changes have been made. Every five years the updated plan will be submitted to the State Hazard Mitigation Officer at the California Office of Emergency Services and the Federal Emergency Management Agency for review.

At each of the quarterly Planning Team meetings, the Local Mitigation Officer will facilitate a discussion on each section of the FEMA-approved Plan:

Planning Process – Update as necessary, including regulatory changes.

Risk Assessment - Determine if this information should be updated or modified, given any new available data.

Mitigation Strategies - Review the goals and 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. Most importantly, is the thorough review of the Mitigation Action Matrix. The coordinating organizations responsible for the various action items will report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised.

Item Identifier	Action Item and Ideas for Implementation	Coordinating Agency	Timeline	Plan Goals Addressed						Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR-Grant	Benefit: (Low | Medium | High)	Cost: (Low | Medium | High)	Priority: (Low | Medium | High)	2016 Comments and Status - Completed, Revised, Deleted, New, Deferred, and Notes
				Protect Life and Property	Public Awareness	Natural Systems	Emergency Services	Partnerships and Implementation	Funding Source: GF- General Fund, GR-Grant					
MULTI-HAZARD ACTION ITEMS														
EARTHQUAKE ACTION ITEMS														

The Local Mitigation Officer will assign the duty of updating the Plan to one or more of the Planning Team members. The designated Planning Team members will have three months to make appropriate changes to the Plan before submitting it to the Planning Team members. The Planning Team will also notify all holders of the City plan when changes have been made. Every five years the updated plan will be submitted to the State Hazard Mitigation Officer at the California Office of Emergency Services and the Federal Emergency Management Agency for review and approval.

Q&A | ELEMENT A: PLANNING PROCESS | A5

Q: A5. 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 Montebello is dedicated to involving the public and external agencies 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: APPENDIX

General Hazard Overviews

Earthquake Hazards

Measuring and Describing Earthquakes

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can further amplify ground motions. The severity of these effects is dependent on the amount of energy released from the fault or epicenter. One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. The acceleration due to gravity is often called "g". A ground motion with a peak ground acceleration of 100%g is very severe. Peak Ground Acceleration (PGA) is a measure of the strength of ground motion. PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (10%, 5%, or 2%) of being exceeded in 50 years. These ground motion values are used for reference in construction design for earthquake resistance. The ground motion values can also be used to assess relative hazard between sites, when making economic and safety decisions.

When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter.

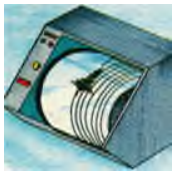
Another tool used to describe earthquake intensity is the Magnitude Scale. The Magnitude Scale is sometimes referred to as the Richter Scale. The two are similar but not exactly the same. The Magnitude Scale was devised as a means of rating earthquake strength and is an indirect measure of seismic energy released. The Scale is logarithmic with each one-point increase corresponding to a 10-fold increase in the amplitude of the seismic shock waves generated by the earthquake. In terms of actual energy released, however, each one-point increase on the Richter scale corresponds to about a 32-fold increase in energy released. Therefore, a Magnitude 7 (M7) earthquake is 100 times (10 X 10) more powerful than a M5 earthquake and releases 1,024 times (32 X 32) the energy.

An earthquake generates different types of seismic shock waves that travel outward from the focus or point of rupture on a fault. Seismic waves that travel through the earth's crust are called body waves and are divided into primary (P) and secondary (S) waves. Because P waves move faster (1.7 times) than S waves, they arrive at the seismograph first. By measuring the time delay between arrival of the P and S waves and knowing the distance to the epicenter, seismologists can compute the magnitude for the earthquake.

The duration of an earthquake is related to its magnitude but not in a perfectly strict sense. There are two ways to think about the duration of an earthquake. The first is the length of time it takes for the fault to rupture and the second is the length of time shaking is felt at any given point (e.g. when someone says "I felt it shake for 10 seconds" they are making a statement about the duration of shaking). (Source: www.usgs.gov)

The Modified Mercalli Scale (MMI) is another means for rating earthquakes, but one that attempts to quantify intensity of ground shaking. Intensity under this scale is a function of distance from the epicenter (the closer to the epicenter the greater the intensity), ground acceleration, duration of ground shaking, and degree of structural damage. The Modified Mercalli Intensity Scale below rates the level of severity of an earthquake by the amount of damage and perceived shaking.

Table: Modified Mercalli Intensity Scale

	MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
	I			Not Felt
	II			Felt by persons at rest, on upper floors, or favorably placed.
	III			Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
	IV			Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. In the upper range of IV, wooden walls and frame creak.
	V	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clock stop, start, change rate.

	MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
	VI	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked.
	VII	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Small slides and caving in along sand or gravel banks. Concrete irrigation ditches damaged.
	VIII	Very Strong	Moderate Damage	Steering of motorcars affected. Damage to masonry C, partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Cracks in wet ground and on steep slopes.
	IX	Violent	Heavy damage	General panic. Damage to masonry buildings ranges from collapse to serious damage unless modern design. Wood-frame structures rack, and, if not bolted, shifted off foundations. Underground pipes broken.
	X	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land.
	XI			Rails bent greatly. Underground pipelines completely out of services.
	XII			Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

Earthquake Related Hazards

Ground shaking, landslides, liquefaction, and amplification are the specific hazards associated with earthquakes. The severity of these hazards depends on several factors, including soil and slope conditions, proximity to the fault, earthquake magnitude, and the type of earthquake.

Ground Shaking

Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by the earthquake. It is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault, and distance from the epicenter (where the earthquake originates). Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock.

Seismic activity along nearby or more distant fault zones are likely to cause ground shaking within the City limits.

Earthquake-Induced Landslide Potential

Generally, these types of failures consist of rock falls, disrupted soil slides, rock slides, soil lateral spreads, soil slumps, soil block slides, and soil avalanches. Areas having the potential for earthquake-induced landslides generally occur in areas of previous landslide movement, or where local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements.

Liquefaction

Liquefaction occurs when ground shaking causes wet granular soils to change from a solid state to a liquid state. This results in the loss of soil strength and the soil's ability to support weight. Buildings and their occupants are at risk when the ground can no longer support these structures. Liquefaction generally occurs during significant earthquake activity, and structures located on soils such as silt or sand may experience significant damage during an earthquake due to the instability of structural foundations and the moving earth. Many communities in Southern California are built on ancient river bottoms and have sandy soil. In some cases, the soil may be subject to liquefaction, depending on the depth of the water table.

Wildfire Hazards

Definition

A wildfire is an uncontrolled fire spreading through vegetative fuels and exposing or possibly consuming structures. They often begin unnoticed and spread quickly. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. A wildland/urban interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

People start more than 80 percent of wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components is also a determinant of wildfire potential and behavior. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind (both short and long term) affect the severity and duration of wildfires. Riverside County's topography, consisting of semi-arid plains and rolling highlands, when fueled by shrub overgrowth, occasional Santa Ana winds and high temperatures, creates an ever-present threat of wildland fire. Extreme weather conditions such as high temperature, low humidity, and/or winds of extraordinary force may cause an ordinary fire to expand into one of massive proportions.

For thousands of years, fires have been a natural part of the ecosystem in Southern California. However, wildfires present a substantial hazard to life and property in communities built within or adjacent to hillsides and mountainous areas. There is a huge potential for losses due to wildland/urban interface fires in Southern California.

Wildfire Threat

In urban areas, the effectiveness of fire protection efforts is based upon several factors, including the age of structures, efficiency of circulation routes that ultimately affect response times and availability of water resources to combat fires. In wildland areas, taking the proper precautions, such as the use of fire resistant building materials, a pro-active fire Prevention inspection program, and the development of defensible space around structures where combustible vegetation is controlled, can protect developed lands from fires and, therefore, reduce the potential loss of life and property.

Other factors contribute to the severity of fires including weather and winds. Specifically, winds commonly referred to as Santa Ana winds, which occur during fire season (typically from June to the first significant rain in November) are particularly significant. Such "fire weather" is characterized by several days of hot dry weather and high winds, resulting in low fuel moisture in vegetation.

California experiences large, destructive wildland fires almost every year, and Los Angeles County is no exception. Wildland fires have occurred within the County, particularly in the fall of the year, ranging from small, localized fires to disastrous fires covering thousands of acres. The most severe fire protection problem in the area is wildland fire during Santa Ana wind conditions.

The 2003 Southern California Fires

The fall of 2003 marked the most destructive wildfire season in California history. In a ten-day period, 12 separate fires raged across Southern California in Los Angeles, Riverside, and San Bernardino, San Diego and Ventura counties. The massive "Cedar Fire" in San Diego County alone consumed 2,800 homes and burned over a quarter of a million acres.

In October 2003, Southern California experienced the most devastating wildland fire disaster in state history. According to the Governor's Blue Ribbon Panel Fire Commission Report (2004), over 739,597 acres burned; 3,631 homes, 36 commercial properties, and 1,169 outbuildings were destroyed; 246 people were injured; and 24 people died, including one firefighter. At the height of the siege, 15,631 personnel were assigned to fight the fires.

The 2007 Southern California Fires

In late October 2007, Southern California experienced an unusually severe fire weather event characterized by intense, dry, gusty Santa Ana winds. This weather event drove a series of destructive wildfires that took a devastating toll on people, property, natural resources, and infrastructure. Although some fires burned into early November, the heaviest damage occurred during the first three days of the siege when the winds were the strongest.

According to CAL FIRE, during this siege, 17 people lost their lives, ten were killed by the fires outright, three were killed while evacuating, four died from other fire siege related causes, and 140 firefighters, and an unknown number of civilians were injured. A total of 3,069 homes and other buildings were destroyed, and hundreds more were damaged. Hundreds of thousands of people were evacuated at the height of the siege. The fires burned over half a million acres, including populated areas, wildlife habitat and watershed. Portions of the electrical power distribution network, telecommunications systems, and even some community water sources were destroyed. Transportation was disrupted over a large area for several days, including numerous road closures. Both the Governor of California and the President of the United States personally toured the ongoing fires. Governor Schwarzenegger proclaimed a state of

emergency in seven counties before the end of the first day. President Bush quickly declared a major disaster. While the total impact of the 2007 fire siege was less than the disastrous fires of 2003, it was unquestionably one of the most devastating wildfire events in the history of California.

Wildfire Characteristics

There are three categories of wildland/urban interface fire: The classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas; the mixed wildland/urban interface is characterized by isolated homes, subdivisions, and small communities situated predominantly in wildland settings. The occluded wildland/urban interface exists where islands of wildland vegetation occur inside a largely urbanized area. Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought, and development.

Southern California has two distinct areas of risk for wildland fire. The foothills and lower mountain areas are most often covered with scrub brush or chaparral. The higher elevations of mountains also have heavily forested terrain. The lower elevations covered with chaparral create one type of exposure.

The higher elevations of Southern California's mountains are typically heavily forested. The magnitude of the 2003 fires is the result of three primary factors: (1) severe drought, accompanied by a series of storms that produce thousands of lightning strikes and windy conditions; (2) an infestation of bark beetles that has killed thousands of mature trees; and (3) the effects of wildfire suppression over the past century that has led to buildup of brush and small diameter trees in the forests.

The Interface

One challenge Southern California faces regarding the wildfire hazard is from the increasing number of houses being built on the urban/wildland interface. Every year the growing population expands further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas, and the open spaces created by this expansion, produces a significant increase in threats to life and property from fires, and pushes existing fire protection systems beyond original or current design and capability. Property owners in the interface are not aware of the problems and fire hazards or risks on their own property. Furthermore, human activities increase the incidence of fire ignition and potential damage.

Fuel

Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is classified by volume and by type. Volume is described in terms of "fuel loading," or the amount of available vegetative fuel.

The type of fuel also influences wildfire. Chaparral is a primary fuel of Southern California wildfires. Chaparral habitat ranges in elevation from near sea level to over 5,000 feet in Southern California. Chaparral communities experience long dry summers and receive most of their annual precipitation from winter rains. Although chaparral is often considered as a single

species, there are two distinct types; hard chaparral and soft chaparral. Within these two types are dozens of different plants, each with its own particular characteristics.

An important element in understanding the danger of wildfire is the availability of diverse fuels in the landscape, such as natural vegetation, manmade structures and combustible materials. A house surrounded by brushy growth rather than cleared space allows for greater continuity of fuel and increases the fire's ability to spread. After decades of fire suppression "dog-hair" thickets have accumulated, which enable high intensity fires to flare and spread rapidly.

Topography

Topography influences the movement of air, thereby directing a fire course. For example, if the percentage of uphill slope doubles, the rate of spread in wildfire will likely double. Gulches and canyons can funnel air and act as chimneys, which intensify fire behavior and cause the fire to spread faster. Solar heating of dry, south-facing slopes produces up slope drafts that can complicate fire behavior. Unfortunately, hillsides with hazardous topographic characteristics are also desirable residential areas in many communities. This underscores the need for wildfire hazard mitigation and increased education and outreach to homeowners living in interface areas.

Weather

Weather patterns combined with certain geographic locations can create a favorable climate for wildfire activity. Areas where annual precipitation is less than 30 inches per year are extremely fire susceptible. High-risk areas in Southern California share a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. The so-called "Santa Ana" winds, which are heated by compression as they flow down to Southern California from Utah, create a particularly high risk, as they can rapidly spread what might otherwise be a small fire.

Drought

Recent concerns about the effects of climate change, particularly drought, are contributing to concerns about wildfire vulnerability. The term 'drought' is applied to a period in which an unusual scarcity of rain causes a serious hydrological imbalance. Unusually dry winters, or significantly less rainfall than normal, can lead to relatively drier conditions and leave reservoirs and water tables lower. Drought leads to problems with irrigation and contributes to additional fires, or increased difficulty in fighting fires.

Development

Growth and development in scrubland and forested areas is increasing the number of human-caused structures in Southern California interface areas. Wildfire affects development, yet development can also influence wildfire. Owners often prefer homes that are private with scenic views, nestled in vegetation, and use natural materials. A private setting is usually far from public roads, or hidden behind a narrow, curving driveway. These conditions, however, make evacuation and firefighting difficult. The scenic views found along mountain ridges can also mean areas of dangerous topography. Natural vegetation contributes to scenic beauty, but it may also provide a ready trail of fuel leading a fire directly to the combustible fuels of the home itself.

Flood Hazards

Flood Terminology

Floodplain

A floodplain is a land area adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. This area, if left undisturbed, acts to store excess flood water. The floodplain is made up of two sections: the floodway and the flood fringe.

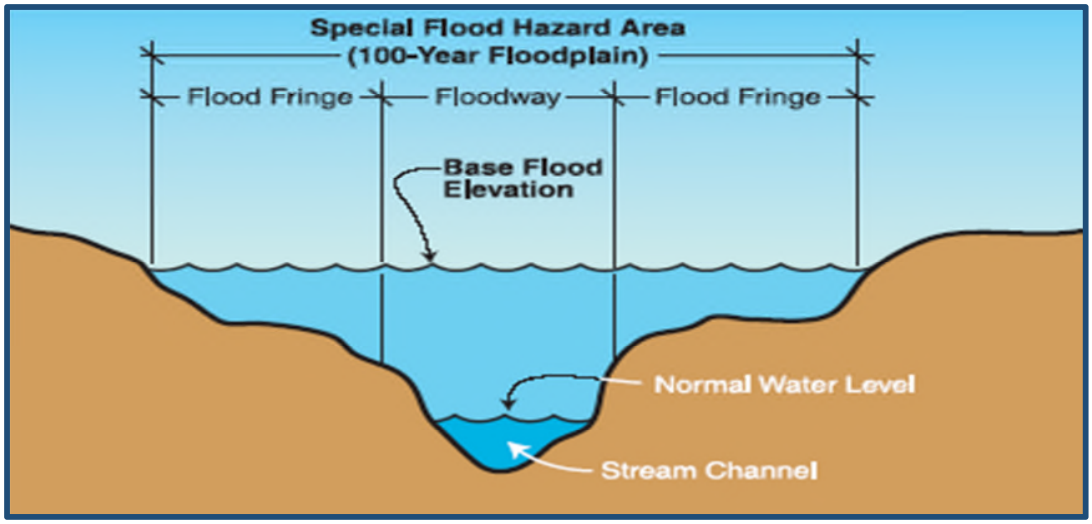
100-Year Flood

The 100-year flooding event is the flood having a one percent chance of being equaled or exceeded in magnitude in any given year. Contrary to popular belief, it is not a flood occurring once every 100 years. The 100-year floodplain is the area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood. Schematic: Floodplain and Floodway shows the relationship of the floodplain and the floodway.

The 100-year flooding event is the flood having a 1% chance of being equaled or exceeded in magnitude in any given year.

Contrary to popular belief, it is not a flood occurring once every 100 years.

Figure: Floodplain and Floodway
(Source: FEMA How-To-Guide Assessing Hazards)



Floodway

The floodway is one of two main sections that make up the floodplain. Floodways are defined for regulatory purposes. Unlike floodplains, floodways do not reflect a recognizable geologic feature. For NFIP purposes, floodways are defined as the channel of a river or stream, and the overbank areas adjacent to the channel. The floodway carries the bulk of the flood water downstream and is usually the area where water velocities and forces are the greatest. NFIP regulations require that the floodway be kept open and free from development or other structures that would obstruct or divert flood flows onto other properties.

Base Flood Elevation (BFE)

The term "Base Flood Elevation" refers to the elevation (normally measured in feet above sea level) that the base flood is expected to reach. Base flood elevations can be set at levels other than the 100-year flood. Some communities use higher frequency flood events as their base flood elevation for certain activities, while using lower frequency events for others. For example, for the purpose of storm water management, a 25-year flood event might serve as the base flood elevation; while the 500-year flood event serves as base flood elevation for the tie down of mobile homes. The regulations of the NFIP focus on development in the 100-year floodplain.

Types of Flooding

Two types of flooding primarily affect the City of Montebello: slow-rise or flash flooding. Slow-rise floods in Montebello may be preceded by a warning period of hours or days. Evacuation and sandbagging for slow-rise floods have often effectively lessened flood related damage. Conversely, flash floods are most difficult to prepare for, due to extremely limited, if any, advance warning and preparation time. Unlike most of California, the areas of Los Angeles County that are subject to slow-rise flooding are not associated with overflowing rivers, aqueducts, canals or lakes. Slow-rise flooding in Montebello is usually the result of one or a combination of the following factors: extremely heavy rainfall, saturated soil, area recently burned in wild fires with inadequate new ground cover growth, or heavy rainfall with runoff from melting mountain snow.

Urban Flooding

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. The water moves from the clouds, to the ground, and into streams at a much faster rate in urban areas. Adding these elements to the hydrological systems can result in flood waters that rise very rapidly and peak with violent force.

The City of Montebello has a high concentration of impermeable surfaces that either collect water, or concentrate the flow of water in unnatural channels. During periods of urban flooding, streets can become swift moving rivers and basements can fill with water. Storm drains often back up with vegetative debris causing additional, localized flooding.

Riverine Flooding

Riverine flooding is the overbank flooding of rivers and streams. The natural processes of riverine flooding add sediment and nutrients to fertile floodplain areas. Flooding in large river systems typically results from large-scale weather systems that generate prolonged rainfall over a wide geographic area, causing flooding in hundreds of smaller streams, which then drain into the major rivers. Shallow area flooding is a special type of riverine flooding. FEMA defines shallow flood hazards as areas that are inundated by the 100-year flood with flood depths of only one to three feet. These areas are generally flooded by low velocity sheet flows of water.

Definitions of FEMA Flood Zone Designations

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

ZONE	DESCRIPTION
B and X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C and X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.

High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.

ZONE	DESCRIPTION
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

Undetermined Risk Areas

ZONE	DESCRIPTION
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

Dam Failure Hazards

Hazard Characteristics

Definition

Dams are man-made structures built for a variety of uses including flood protection, power, agriculture, water supply, and recreation. When dams are constructed for flood protection, they usually are engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If a larger flood occurs, then that structure will be overtopped. Overtopping is the primary cause of earthen dam failure in the United States.

Failed dams can create floods that are catastrophic to life and property as a result of the tremendous energy of the released water. A catastrophic dam failure could easily overwhelm local response capabilities and require mass evacuations to save lives. Dams typically are constructed of earth, rock, concrete, or mine tailings. Two factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream.

Dam failures can result from any one or a combination of the following causes:

- ✓ Prolonged periods of rainfall and flooding, resulting in excess overtopping flows
- ✓ Earthquake
- ✓ Inadequate spillway capacity, resulting in excess overtopping flows
- ✓ Internal erosion caused by embankment or foundation leakage or piping
- ✓ Improper design
- ✓ Improper maintenance
- ✓ Negligent operation
- ✓ Failure of upstream dams on the same waterway

Since 1929, the State of California is responsible for overseeing dams to safeguard life and property (California Department of Resources, 1995). This legislation was prompted by the 1928 failure of St. Francis Dam. In 1965, the law was amended to include off stream storage reservoirs due to the 1963 failure of Baldwin Hill Reservoir. In 1973, Senate Bill 896 was enacted to require dam owners, under the direction of Cal OES, to show the possible inundation path in the event of a dam failure.

Governmental assistance could be required and continued for an extended period. These efforts are required to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities, and provide continuing care and welfare for the affected population including, as required, temporary housing for displaced persons.

Drought Hazards

Hazard Characteristics

Definition

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.

Many governmental utilities, the National Oceanic and Atmospheric Administration (NOAA), and the California Department of Water Resources, as well as academic institutions such as the University of Nebraska-Lincoln's National Drought Mitigation Center and the National Drought Mitigation Center, generally agree that there is no clear definition of drought. Drought is highly variable depending on location.

Drought Threat

The region’s Mediterranean climate makes it especially susceptible to variations in rainfall. Severe water shortages could have a bearing on the economic well-being of the community. Comparison of climate (rainfall) records from Los Angeles with water well records beginning in 1930 from the San Gabriel Valley indicates the existence of wet and dry cycles on a 10-year scale as well as for much longer periods. The climate record for the Los Angeles region beginning in 1890 suggests drying conditions over the last century. With respect to the present day, climate data also suggests that the last significant wet period was the 1940s. Well level data and other sources seem to indicate the historic high groundwater levels (reflecting recharge from rainfall) occurred in the same decade. Since that time, rainfall (and groundwater level trends) appears to be in decline. This slight declining trend, however, is not believed to be significant. Climatologists compiled rainfall data from 96 stations in the State that spanned a

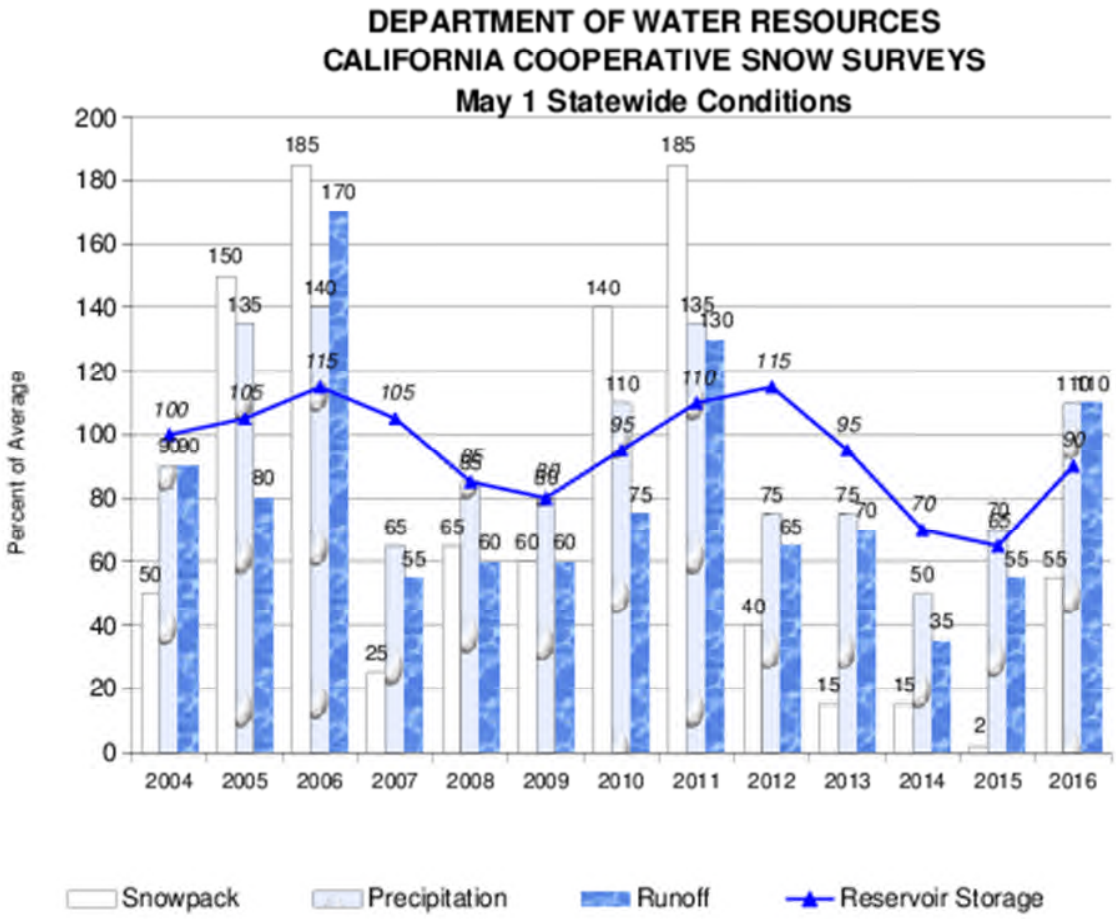
100-year period between 1890 and 1990. An interesting note is that during the first 50 years of the reporting period, there was only one year (1890) that had more than 35 inches of rainfall, whereas the second 50-year period recording of 5 year intervals (1941, 1958, 1978, 1982, and 1983) that exceeded 35 inches of rainfall in a single year. The year of maximum rainfall was 1890 when the average annual rainfall was 43.11 inches. The second wettest year on record occurred in 1983 when the State's average was 42.75 inches.

The driest year of the 100-year reported in the study was 1924 when the State's average rainfall was only 10.50 inches. The region with the most stations reporting the driest year in 1924 was the San Francisco Bay area. The second driest year was 1977 when the average was 11.57 inches. The most recent major drought (1987 to 1990) occurred at the end of a sequence of very wet years (1978 to 1983). The debate continues whether "global warming" is occurring, and the degree to which global climate change will have an effect on local micro-climates. The semi-arid southwest is particularly susceptible to variations in rainfall. A study that documented annual precipitation for California since 1600 from reconstructed tree ring data indicates that there was a prolonged dry spell from about 1755 to 1820 in California. Fluctuations in precipitation could contribute indirectly to a number of hazards including wildfire and the availability of water supplies.

General Situation

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. Snow pack is an important indicator of runoff from Sierra Nevada watersheds, the source of much of California's developed water supply.

Figure: Water Supply Conditions – 2016
(Source: California Department of Water Resources)



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.

Types of Drought

There are four different ways that drought can be defined:
(1) 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.
(2) Agricultural - refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
(3) Hydrological - occurs when surface and subsurface water supplies are below normal.
(4) Socioeconomic - refers to the situation that occurs when physical water shortage begins to affect people.

Historical California Droughts

A significant drought, reported by many of the ranchers in southern California, occurred in 1860. The great drought of the 1930s, coined the "Dust Bowl," was geographically centered in the Great Plains yet ultimately affected water shortages in California. The drought conditions in the plains resulted in a large influx of people to the west coast. Approximately 350,000 people from Arkansas and Oklahoma immigrated mainly to the Great Valley of California. As more people moved into California, including Los Angeles County increases in intensive agriculture led to overuse of the Santa Ana River watershed and groundwater resulting in regional water shortages. Several bills have been introduced into Congress in an effort to mitigate the effects of drought. In 1998, President Clinton signed into law the National Drought Policy Act, which called for the development of a national drought policy or framework that integrates actions and responsibilities among all levels of government. In addition, it established the National Drought Policy Commission to provide advice and recommendations on the creation of an integrated federal policy. The most recent bill introduced into Congress was the National Drought Preparedness Act of 2003, which established a comprehensive national drought policy and statutorily authorized a lead federal utility for drought assistance. Currently there exists only an ad-hoc response approach to drought unlike other disasters (e.g., hurricanes, floods, and tornadoes) which are under the purview of FEMA.

Droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. The 1929-34 droughts established the criteria commonly used in designing storage capacity and yield of large Northern California reservoirs. The driest single year of California's measured hydrologic record was 1977. According to USGS, California's most recent multi-year droughts occurred between 1987-92, 2006-2010 and 2012-2016.

The Long-term Climatic Viewpoint

The historical record of California hydrology is brief in comparison to geologically modern climatic conditions. The following sampling of changes in climatic conditions over time helps put California's twentieth century droughts into perspective. Most of the dates shown below are necessarily approximations.

Not only must the climatic conditions be inferred from indirect evidence, but the onset or extent of changed conditions may vary with geographic location. Readers interested in the subject of paleo-climatology are encouraged to seek out the extensive body of popular and scientific literature on this subject.

Past California Droughts

The historical record of California hydrology is brief in comparison to the time period of geologically modern climatic conditions. The following samplings of changes in climatic and hydrologic conditions help put California's twentieth century droughts into perspective, by illustrating the variability of possible conditions. Most of the dates shown below are approximations, since the dates must be inferred from indirect sources.

11,000 years before present

Beginning of Holocene Epoch- Recent time, the time since the end of the last major glacial epoch.

6,000 years before present

Approximate time when trees were growing in areas now submerged by Lake Tahoe. Lake levels were lower then, suggesting a drier climate.

900-1300 A.D. (Approximate)

The Medieval Warm Period, a time of warmer global average temperatures. The Arctic ice pack receded, allowing Norse settlement of Greenland and Iceland. The Anasazi civilization in the Southwest flourished, its irrigation systems supported by monsoonal rains.

1300-1800 A.D. (approximate)

The Little Ice Age, a time of colder average temperatures. Norse colonies in Greenland failed near the start of the time period, as conditions became too cold to support agriculture and livestock grazing. The Anasazi culture began to decline about 1300 and had vanished by 1600, attributed in part to drought conditions that made agriculture infeasible.

Mid - 1500s A.D.

Severe, sustained drought throughout much of the continental U.S., according to dendrochronology. Drought suggested as a contributing factor in the failure of European colonies at Parris Island, South Carolina and Roanoke Island, North Carolina.

1850s A.D.

Sporadic measurements of California precipitation began.

1890s A.D.

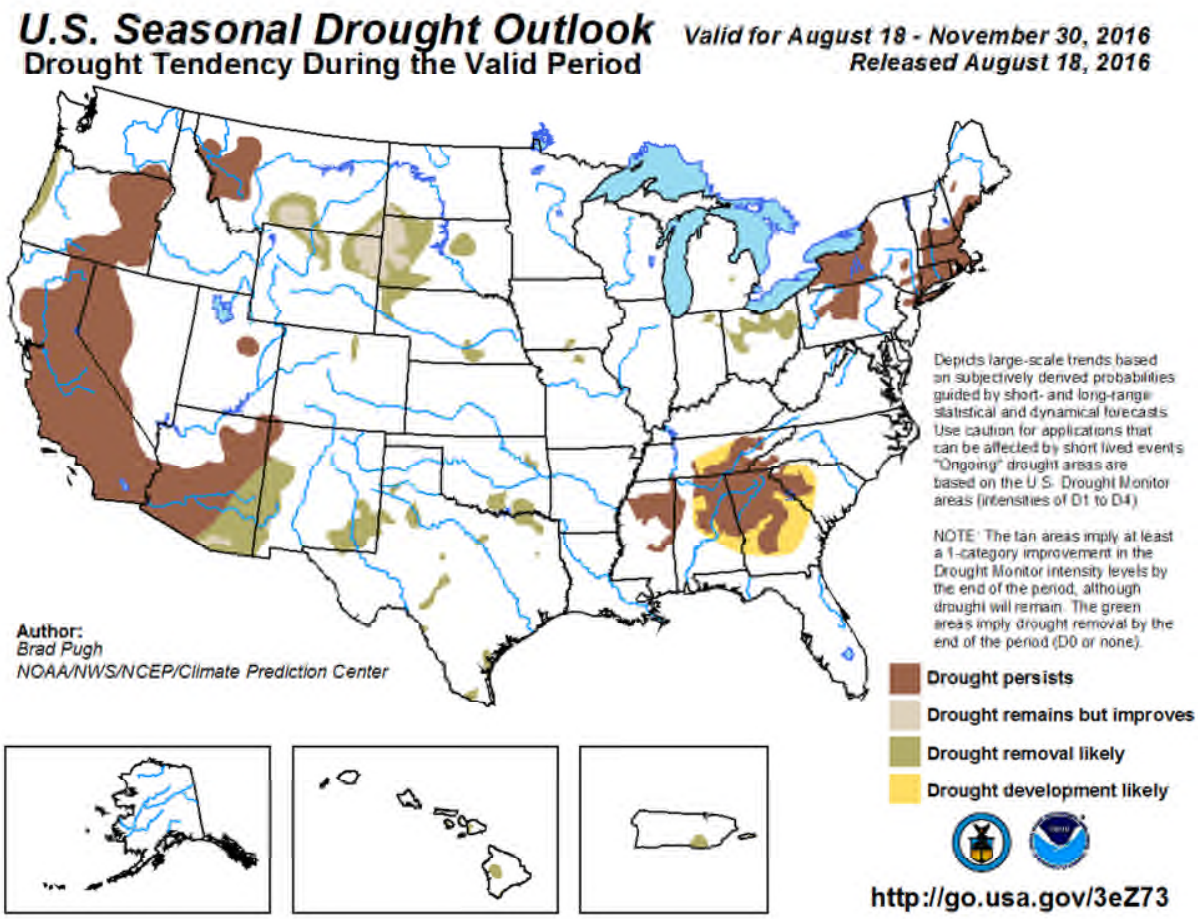
Long-term stream flow measurements began at a few California locations.

Palmer Drought Severity Index

Of the many varied indexes used to measure drought, the "Palmer Drought Severity Index" (PDSI) is the most commonly used drought index in the United States. Developed by meteorologist Wayne Palmer, the PDSI is used to measure dryness based on recent temperature compared to the amount of precipitation. It utilizes a number range, 0 as normal, drought shown in terms of minus numbers, and wetness shown in positive numbers. The PDSI is most effective at analyzing long-range drought forecasts or predications. Thus, the PDSI is very effective at evaluation trends in the severity and frequency of prolonged periods of drought, and conversely wet weather. The National Oceanic and Atmospheric Administration (NOAA) publish weekly Palmer maps, which are also used by other scientists to analyze the long-term trends associated with global warming and how this has affected drought conditions.

The following map is the most current snapshot of drought conditions across the U.S. It is provided by NOAA's Climate Prediction Center.

Map: U.S. Seasonal Drought Outlook
(Source: NOAA Climate Prediction Center)



Attachments

FEMA Letter of Approval

City Council Staff Report

City Council Resolution

Planning Team Sign-In Sheets

City of Montebello
Project Kickoff Meeting
General Plan Safety Element and Hazard Mitigation Plan
September 6, 2016

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
ALLISON RICHARDS	CALIFORNIA CONSULTING
Matthew Fecke	Planning
BEN KIM	CDD.
Kurt Johnson	City of Montebello- Fire Department

City of Montebello
Planning Team Meeting #1
General Plan Safety Element and Hazard Mitigation Plan
September 15, 2016

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Dan Amador	Montebello F.D.
BRAD KELLER	P.D.
RICK ROSAS	PD
BEN KIM	CDD
Danilo Batson	Public Works

City of Montebello
Planning Team Meeting #2
Hazard Mitigation Plan
October 25, 2016

Name	Department
Carolyn Harshman	Emergency Planning Consultants
Kurt Johnson	MFD
Daniel France	MFD dfrance@cityofmontebello.com - please add
Allison Richards	CA Consulting
Larry Jackson	MTB P.D.
David Sarnoski	Parks & Rec.
Danilo Batson	Public Works
~~DAN FRANCE~~	~~FIRE~~

City of Montebello
Planning Team Meeting
General Plan Safety Element & Hazard Mitigation Plan Reviews
November 14, 2016

Name	Department
Carolyn Harshman	Emergency Planning Consultants
Ben Kim	CDD
Matthew Feske	CDD
Kurt Johnson	MFD
David Sarnoski	Recreation

Web Postings and Notices