November 12, 2019

Multi-Jurisdictional Hazard Mitigation Plan

Rancho Palos Verdes

Rolling Hills Estates

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

Q: Does the plan identify who represented each jurisdiction? (At a minimum, it must identify the jurisdiction represented and the person's position or title and agency within the jurisdiction.) (Requirement §201.6(c)(1))

A: See **Credits** below.

Credits

Special Thanks

Hazard Mitigation Planning Team:

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Emergency Planning Consultants	Carolyn J. Harshman		President

Acknowledgements

City of Rancho Palos Verdes

- ✓ Jerry V. Duhovic, Mayor
- ✓ John Cruikshank, Mayor Pro Tem
- ✓ Eric Alegria, Councilman
- ✓ Susan M. Brooks, Councilwoman
- ✓ Ken Dyda, Councilman

City of Rolling Hills Estates

- ✓ Judy Mitchell, Mayor
- ✓ Velveth Schmitz, Mayor Pro Tem
- ✓ Britt Huff, Council Member
- ✓ Frank Zerunyan, Council Member
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- ✓ Planning Assistant: Megan Fritzler, BA
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Mapping

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

Mandated Content

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

EXAMPLE

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

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

A:

Table of Contents

Part I: PLANNING PROCESS

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

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

A: See **Introduction** below.

Introduction

The Hazard Mitigation Plan (Mitigation Plan) was prepared in response to Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 (also known as Public Law 106-390) requires state and local governments to prepare mitigation plans to document their mitigation planning process, and identify hazards, potential losses, mitigation needs, goals, and strategies. This type of planning supplements the City's comprehensive land use planning and emergency management planning programs. This document is a federally mandated update to the Cities of Rancho Palos Verdes and Rolling Hills Estates 2014 Multi-Jurisdictional Hazard Mitigation Plan and ensures continuing eligibility for Hazard Mitigation Grant Program (HMGP) funding.

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

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

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

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

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

Planning Approach

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

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

Hazard Land Use Policy in California

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

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

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

State and Federal Partners in Hazard Mitigation

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

Some of the key agencies include:

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

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

Q&A | ELEMENT A: PLANNING PROCESS | A3

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

A: See **Stakeholders** below.

Stakeholders

A Hazard Mitigation Planning Team (Planning Team) consisting of department representatives from Rancho Palos Verdes and Rolling Hills Estates worked with Emergency Planning Consultants to create the updated Plan. ***The Planning Team served as the primary stakeholders throughout the planning process. The general public and external agencies served as secondary stakeholders with an opportunity to contribute to the plan during the Plan Writing Phase of the planning process.***

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.

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)

"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,
Former FEMA
Administrator

Flood Mitigation Assistance Program

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

Three types of grants are available under FMA: planning, project, and technical assistance. Planning grants are available to states and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for project grants to implement measures to reduce flood losses. Technical assistance grants in the amount of 10 percent of the project grant are available to the state for program administration. Communities that receive planning and/or project grants must participate in the NFIP. Examples of eligible projects include elevation, acquisition, and relocation of NFIP-insured structures. (Source: http://www.fema.gov/fima/fma.shtm)

Q&A | ELEMENT C. MITIGATION STRATEGY | C2

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

A: See **NFIP Participation** below.

National Flood Insurance Program

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 Director of the Community Development Department is the floodplain administrator for RPV.

In 2006, the City of Rancho Palos Verdes the City's Building Code (Title 15 of the RPVMC) included a Chapter on floodplain management (Chapter 15.42). Support of the NFIP takes place when a prospective developer submits a permit request or building plans and the department staff looks up the zoning on the property. If the property is located in or near a designated floodplain, the applicant is provided with a NFIP brochure. Although the City of Rolling Hills Estates is designated a No Special Flood Hazard Area, it does still participate in the NFIP by distributing the NFIP brochure with prospective land developers and builders.

NFIP Participation

Both cities participate in NFIP. The FEMA FIRM maps were last updated in September 26, 2008. 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, Rolling Hills Estates 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). Specifically, RHE is designated Zone x and RPV is designated Zone D.

The NSFHA is not in any immediate danger from flooding caused by overflowing rivers or hard rains. However, it's important to note that structures within a NSFHA are still at risk. In fact, over 20% 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: Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))

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

Repetitive Loss Properties

Repetitive Loss Properties (RLPs) are most susceptible to flood damages; therefore, they have been the focus of flood hazard mitigation programs. Unlike a countywide program, the Floodplain Management Plan (FMP) for repetitive loss properties involves highly diversified property profiles, drainage issues, and property owner's interest. It also requires public involvement processes unique to each RLP area. The objective of an FMP is to provide specific potential mitigation measures and activities to best address the problems and needs of communities with repetitive

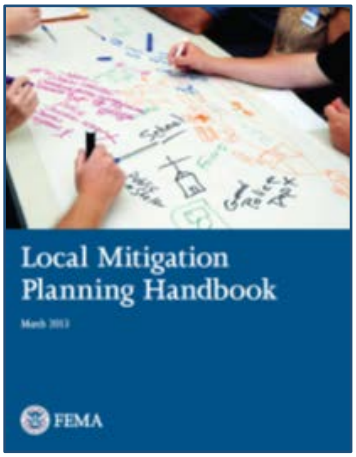
loss properties. A repetitive loss property is one for which two or more claims of $1,000 or more have been paid by the National Flood Insurance Program (NFIP) within any given ten-year period. According to FEMA resources, there are no Repetitive Loss Properties (RLPs) within the project area.

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 Cities 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 Planning Area.

Risk Assessment

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

City-Specific Hazard Analysis

Describes the hazards posing a significant threat to Planning Area including:

Earthquake | Wildfire | Earth Movement | Tsunami | Hazardous Materials | Human-Caused Events | Utility-Related Events

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

Part III: Mitigation Strategies

Mitigation Strategies

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

Plan Maintenance

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

Part IV: Appendix

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

General Hazard Overviews

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

Attachments

FEMA Letter of Approval
City Council Staff Reports
City Council Resolutions
Planning Team sign-in sheets
Web Postings and Notices

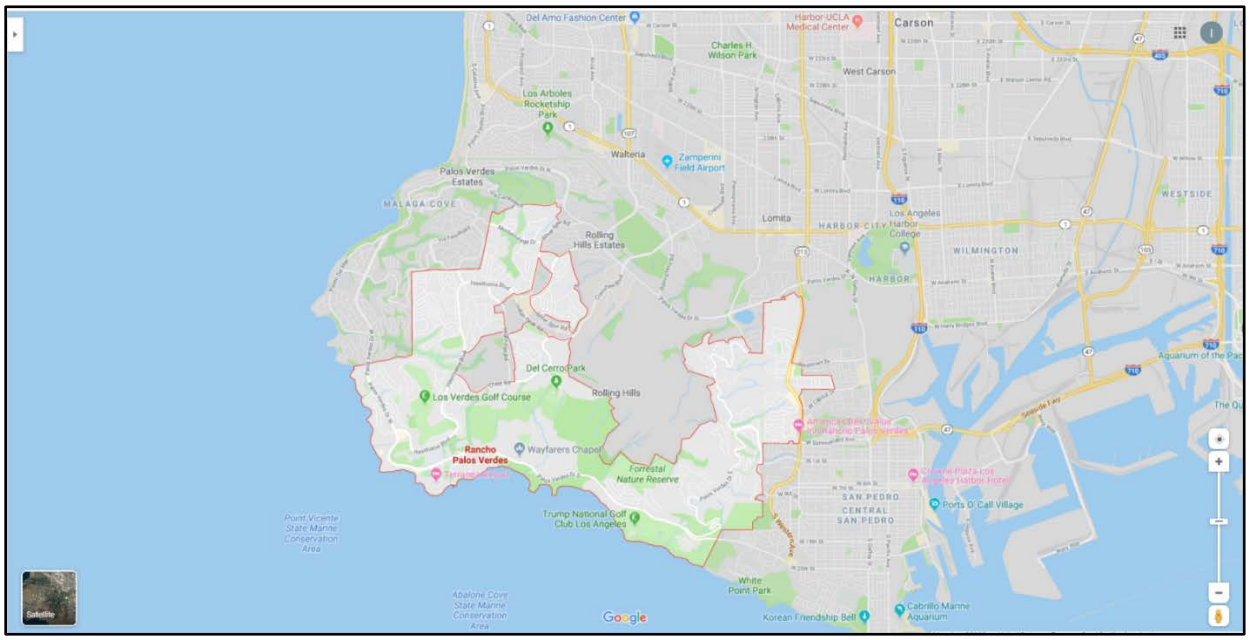
Plan Adoption and Approval

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.

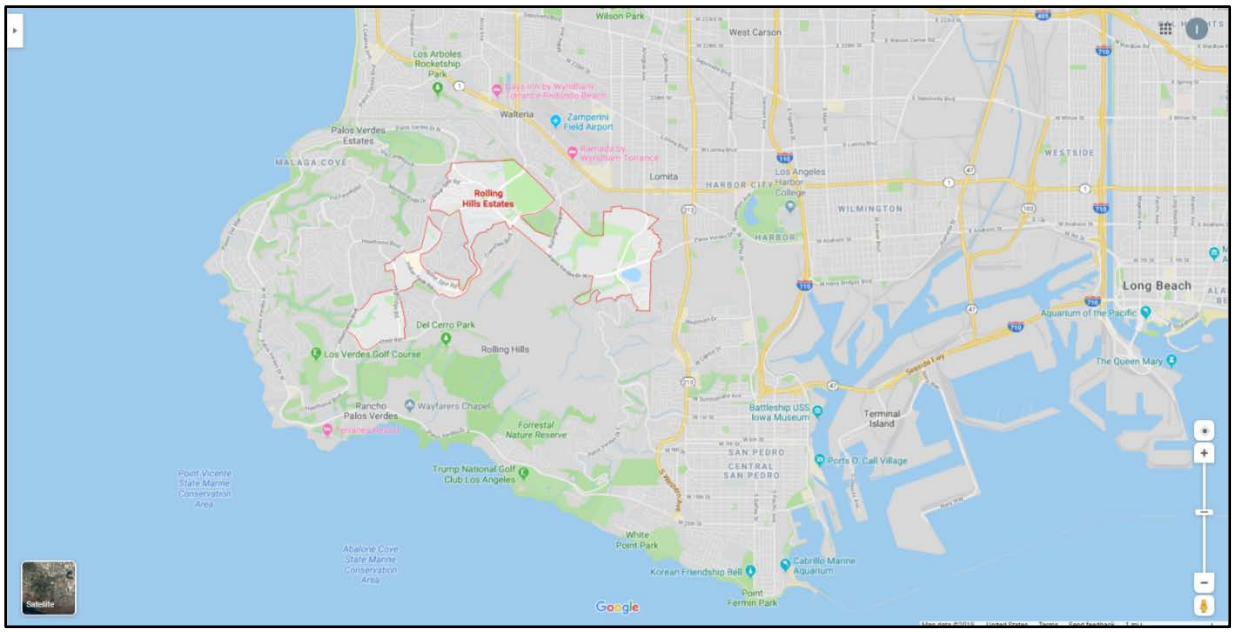
Who Does the Mitigation Plan Affect?

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, and the goals and recommendations provide groundwork for local mitigation plans and partnerships, for each City respectively. **Maps: Rancho Palos Verdes and Rolling Hills Estates** shows the regional proximity of the project area to their adjoining communities.

Map: City of Rancho Palos Verdes
(Source: Google Maps)



Map: City of Rolling Hills Estates
(Source: Google Maps)



Planning Process

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

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

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

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)?
A: See **Planning Phases Timeline** and **Plan Methodology** below.

Q&A | ELEMENT A: PLANNING PROCESS | A3

Q: Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))
A: See **Planning Phases Timeline** below.

Table: Planning Phases Timeline

PLANNING PHASES TIMELINE				
Plan Writing Phase (First & Second Draft Plan)	Plan Review Phase (Third & Final Draft Plan)	Plan Adoption Phase (Final Draft Plan)	Plan Approval Phase (Final Plan)	Plan Implementation Phase
• Planning Team input – research, meetings, writing, review of First Draft Plan • Incorporate input from the Planning Team into Second Draft Plan • Invite general public and external agencies to comment and contribute to the Second Draft Plan • Incorporate and document gathered input into the Third Draft Plan	• Third Draft Plan sent to Cal OES and FEMA for "Approval Pending Adoption" • Address any mandated revisions identified by Cal OES and FEMA into Final Draft Plan	• Post public notice of both City Council meetings along with posting of Final Draft Plan • Present Final Draft Plan to both of the City Councils • City Councils Adopted Plan • Submit Proof of Adoptions to FEMA with request for final approval	• Receive FEMA final approval • Incorporate FEMA approval into the Final Plan	• Conduct annual Planning Team meetings • Integrate mitigation action items into budget, CIP and other funding and strategic documents

Plan Methodology

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

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

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

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

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

Planning Team Involvement

The Planning Team consisted of representatives from Rancho Palos Verdes and Rolling Hills Estates departments related to hazard mitigation processes. The Co-Chairs of the Planning Team sent emails to the department heads requesting names of representatives to serve on the Planning Team. The Planning Team members served as primary stakeholders throughout the planning process. Next the Co-Chairs sent emails to the identified representatives describing the nature of the Mitigation Plan and the need for their participation and attendance at four Planning Team Meetings. The Planning Team was responsible for the following tasks:

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

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

Table: Planning Team Meeting Dates and Content

	Meeting #1 April 11, 2019	Meeting #2 May 30, 2019	Meeting #3 June 26, 2019	Meeting #4 September 30, 2019
Hazard Identification and Ranking	X			
Review status of existing mitigation action items		X		
Develop New Mitigation Action Items			X	
Review First Draft Plan				X

Table: Planning Team Level of Participation

Name	Research and Writing of Plan	Planning Team Meeting 4/11/19	Planning Team Meeting 5/30/19	Planning Team Meeting 6/26/19	Planning Team Meeting 9/30/19	Planning Team Comment on First Draft Plan	Review and input from general public and external agencies of the Second Draft Plan	Submit Third Draft Plan to Cal OES/FEMA for Approval Pending Adoption	Post Final Draft Plan in advance of City Council Public Meetings	Present Final Draft Plan to City Councils at Public Meeting for Plan Adoption	Submit Proof of Adoption and Request for FEMA for Final Approval	Receive FEMA Final Approval. Issue Final Plan
City of Rancho Palos Verdes												
Jackie Ruiz		X	X	X								
Katie Lozano		X	X	X	X							
Gabriella Yap, Co-Chair					X							
Vina Ramos		X		X	X							
Natalie Chan		X	X	X								
So Kim		X	X									
Lukeaz Buchwald			X									
Octavio Silva			X	X	X							
Megan Barnes					X							
City of Rolling Hills Estates												
Jessica Slawson, Planning Team Co-Chair		X	X	X	X							
Jeannie Naughton		X	X	X	X							
Alexa Dans					X							
Emergency Planning Consultants												
Carolyn J. Harshman	X	X	X	X								
Israel Estrada	X	X										

Table: Planning Team Timeline

	March 2019	April	May	June	July	August	September	October	November	December	January 2020	February	March	April
Research and Writing of First Draft Plan	X	X	X											
Planning Team Meetings		X	X	X			X							
Planning Team Review and Comment on First Draft Plan							X							
Second Draft Plan review and comment by public, local community groups, and external agencies									X					
Third Draft Plan submitted to Cal OES/FEMA for Approval Pending Adoption									X					
Incorporate mandated amendments into Final Draft Plan									X	X	X	X	X	X
Post Final Draft Plan in advance of City Council meetings.														X
Present Final Draft Plan to City Councils at Public Meeting														X
Submit Proof of Adoptions to FEMA with Request for Final Approval														X
Receive FEMA Final Approval														X
Incorporate FEMA Approval into Final Plan														X

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

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

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

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

Q: Does the plan identify how the stakeholders were invited to participate in the process? (Requirement §201.6(b)(2))

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

Q&A | ELEMENT A: PLANNING PROCESS | A3

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

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

General Public and External Agency Input

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

Following review and input by the Planning Team of the First Draft Plan, a Second Draft Plan incorporating any revisions was made available to the secondary stakeholders as identified above. The gathered input from the secondary stakeholders was directed to the Chair of the Planning Team who reviewed the input and incorporated it as appropriate into the Third Draft Plan. Following is a specific accounting of comments received from the review of the Second Draft Plan by the secondary stakeholders:

Table: General Public and External Agency Input

Date Informed	Agency, Name, Title	Date & Information Gathered	How Information was Addressed

Local community group members and external agencies listed below were invited via email and provided with an electronic link to each city's website. Following is the email distributed along with the invitation to comments:

Figure: Email Invitation to External Agencies

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

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

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

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

Capability Assessment – Existing Processes and Programs

Both cities 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 each 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 – City of Rancho Palos Verdes (Sources: City of Rancho Palos Verdes website; Los Angeles County Fire Department website)

Resource Type	Resource Name	Ability to Support Mitigation
Personnel	City Manager's Office	*Under the aegis of the City Council, the City Manager proposes policies and programs, carries out directives voted by the City Council, and develops a long rage view of City problems, needs, goals, and objectives for consideration by the City Council. The City Manager also prepares general rules and regulations necessary for the conduct of the administrative offices and departments of the City and supervises the preparation of the City's budget and financial reports each fiscal year.*
Personnel	Hazard Mitigation Planning Team	*Hazard Mitigation Planning Team is made up of representatives from each of the departments assigned mitigation action items in the Hazard Mitigation Plan. In addition to assisting with 5-year plan updates as required by FEMA, the Planning Team is responsible for implementing, monitoring, and evaluating the plan during its quarterly meetings.*
Personnel	Community Development	*The purpose of the Community Development Department is to ensure the orderly physical development of the community by upholding the goals and policies of the city's General Plan through the issuance of land use entitlements and permits for improvements and development of private property.*
Personnel	Public Works	*The Public Works Department is responsible for a wide variety of activities, including leadership of the City's infrastructure and environmental programs and the planning, development and maintenance of public buildings, parks, trails, roads, street trees, storm drains and sanitary sewers.*
Personnel	Building & Safety	*The Building and Safety Division's focus is on building construction safety through the implementation and enforcement of construction standards and codes. The Division's functions include checking plans for compliance with all of the applicable codes, issuing building permits, and conducting inspections of the construction projects as they progress to ensure that the conde standards are met and that the project is constructed in accordance with the approved plans.*
Personnel	Planning & Zoning	*The mission of the Planning Division is to protect the City's natural resources; to ensure quality and sustainable community development and affordable housing; and to protect the public health, safety and welfare of our community through the application and enforcement of the City's Development Codes and land use policies.*

Resource Type	Resource Name	Ability to Support Mitigation
Personnel	LACoFD	*The Los Angeles County Fire Department provides firefighting and emergency medical services for the unincorporated parts of Los Angeles County as well as 59 cities through contracting.*
Personnel	Information Technology	*Using contracted IT Services Providers, the IT department supports a variety of programs in support of citywide initiatives. These include website and eGovernment technologies, computer and server support, networking equipment and connectivity, telephone and voice services, enterprise system support / data management, GIS and land management system integration, audio / visual and broadcast equipment, network security and compliance.*
Plans	Emergency Operations Plan	*Emergency Operations Plan is a reference and guidebook to operations during a major emergency impacting Rancho Palos Verdes. The Plan includes a discussion on a wide range of hazards, organization and staffing of the Emergency Operations Center, and connectivity with field responders and external agencies. The Emergency Operations Plan is an excellent source of hazard information for the Hazard Mitigation Plan.*
Plans	Hazard Mitigation Plan	*The Hazard Mitigation Plan identifies the risks and hazards present in the community and includes strategies to reduce these risks. Updates to the Plan are coordinated with the hazard information and mitigation activities identified in the County of Los Angeles HMP as well as the HMP for the State of California in order to ensure a more consistent and unified approach to hazard mitigation.*
Plans	General Plan	*General Plan outlines long-term direction for development and policy in a community. There are opportunities to coordinate local hazard mitigation actions with policies governed by the General Plan. Next update to General Plan Safety Element should include integration with the Hazard Mitigation Plan. Also, General Plan is an excellent resource to assist with implementing many of the mitigation action items identified in the Hazard Mitigation Plan.*
Plans	Capital Improvement Program	*The Capital Improvement Program directs construction activities for City-owned facilities and infrastructure for the next five years. Mitigation actions may involve construction of new or upgraded facilities and infrastructure.*
Plans	Storm Water Management Plan	*Storm Water Management Plan provides long-range planning of water supplies and water use to ensure a stable water supply and compliance with water*

Resource Type	Resource Name	Ability to Support Mitigation
		conservation efforts. Mitigation actions that involve reducing water use may be incorporated into the next update to the Storm Water Management Plan.
Policy	Zoning Ordinance	*Zoning Ordinance implements the City's General Plan by establishing specific regulations for development. It includes standards for where development can be located, how buildings must be sized, shaped, and positioned, and what types of activities can occur in an area. Hazard mitigation actions that pertain to new or substantially redeveloped buildings can be adopted into the Zoning Ordinance.*
Policy	Building Code	*Building Code specifies how new structures can be built. It includes the California Building Code, in addition to any amendments made by the City. Mitigation actions may involve amending the Building Code to improve a building's safety or structural stability.*
Policy	Natural Community Conservation Planning Act	*The Natural Community Conservation Planning Act of 1991, as amended (NCCP Act, California Fish and Game Code Section 2800, et seq.) provides for the preparation and implementation of large-scale natural resource conservation plans. A Natural Community Conservation Plan (NCCP) must identify and provide for the regional or area-wide protection and management of natural wildlife diversity while allowing for compatible and appropriate development and growth. An NCCP is intended to provide comprehensive management and conservation of multiple species, including but not limited to species listed under the California Endangered Species Act (CESA) or Federal Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). The NCCP Act is intended to promote cooperation and coordination among public agencies, landowners, and other interested organizations or individuals.*

Table: Capability Assessment - Existing Processes and Programs – City of Rolling Hills Estates (Sources: City of Rolling Hills Estates website; Los Angeles County Fire Department)

Resource Type	Resource Name	Ability to Support Mitigation
Personnel	City Manager's Office	*The day-to-day municipal activities are directed by the City Manager, who is a professional administrator appointed by the City Council. The City Manager keeps the City Council advised of the City's financial condition and future needs and makes recommendations for consideration and action by the City Council.*
Personnel	Hazard Mitigation Planning Team	*Hazard Mitigation Planning Team is made up of representatives from each of the departments assigned mitigation action items in the Hazard Mitigation Plan. In addition to assisting with 5-year plan updates as required by FEMA, the Planning Team is responsible for implementing, monitoring, and evaluating the plan during its quarterly meetings.*
Personnel	Community Services	*The Community Services Division includes the City maintenance program for facilities and properties and all recreation services. Specifically, the Department's maintenance division is responsible for the upkeep of public parks, parkways and equestrian trails, flood control and other public facilities.*
Personnel	Public Works	*The Public Works Department plans and maintains all phases of street operations including street sweeping and the maintenance of lighting, traffic signs and signals.*
Personnel	Planning	*The Community Development Department reviews and approves plans for development within the City, enforces subdivision and building regulations in residential and commercial areas and processes amendments to the Zoning Ordinance.*
Personnel	LACoFD	*The Los Angeles County Fire Department provides firefighting and emergency medical services for the unincorporated parts of Los Angeles County as well as 59 cities through contracting.*
Personnel	Finance Division	*The Finance Division administers the cash management, accounts payable, accounts receivable, payroll, and acts as the City's license collector and purchasing agent.*
Personnel	IT Division	*The Information Technology Division manages the City's computer servers, email, data backup and recovery, WiFi at City facilities, workstations, spam filtering, firewall protection, notebooks, weather station, alarm system, and phone system.*
Plans	Emergency Operations Plan	*Emergency Operations Plan is a reference and guidebook to operations during a major emergency impacting Rolling Hills Estates. The Plan includes a discussion on a wide range of hazards, organization and staffing of the Emergency Operations Center, and connectivity with field responders and external agencies. The Emergency Operations Plan is*

Resource Type	Resource Name	Ability to Support Mitigation
		an excellent source of hazard information for the Hazard Mitigation Plan. The City desires to update its EOP in the near future.
Plans	Hazard Mitigation Plan	*The Hazard Mitigation Plan identifies the risks and hazards present in the community and includes strategies to reduce these risks. Updates to the Plan are coordinated with the hazard information and mitigation activities identified in the County of Los Angeles HMP as well as the HMP for the State of California in order to ensure a more consistent and unified approach to hazard mitigation.*
Plans	General Plan	*General Plan outlines long-term direction for development and policy in a community. There are opportunities to coordinate local hazard mitigation actions with policies governed by the General Plan. Next update to General Plan Safety Element should include integration with the Hazard Mitigation Plan. Also, General Plan is an excellent resource to assist with implementing many of the mitigation action items identified in the Hazard Mitigation Plan.*
Plans	Capital Improvement Program	*The Capital Improvement Program directs construction activities for City-owned facilities and infrastructure for the next five years. Mitigation actions may involve construction of new or upgraded facilities and infrastructure.*
Plans	Storm Water Management Plan	*Storm Water Management Plan provides long-range planning of water supplies and water use to ensure a stable water supply and compliance with water conservation efforts. Mitigation actions that involve reducing water use may be incorporated into the next update to the Storm Water Management Plan.*
Policy	Zoning Ordinance	*Zoning Ordinance implements the City's General Plan by establishing specific regulations for development. It includes standards for where development can be located, how buildings must be sized, shaped, and positioned, and what types of activities can occur in an area. Hazard mitigation actions that pertain to new or substantially redeveloped buildings can be adopted into the Zoning Ordinance.*
Policy	Building Code	*Building Code specifies how new structures can be built. It includes the California Building Code, in addition to any amendments made by the City. Mitigation actions may involve amending the Building Code to improve a building's safety or structural stability.*

Q&A | ELEMENT A: PLANNING PROCESS | A4

Q: Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))
A: See **Use of Existing Data** below.

Use of Existing Data

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

City of Rancho Palos Verdes General Plan
www.rpvca.gov/356/General-Plan-Update
Applicable Incorporation: Land Use map, Community Profile section – geography, environmental, population, housing, transportation and demographic data

City of Rolling Hills Estates General Plan
www.ci.rolling-hills-estates.ca.us/government/planning/general-plan
Applicable Incorporation: Land Use map, Community Profile section – geography, environmental, population, housing, transportation and demographic data

County of Los Angeles All-Hazards Mitigation Plan (2014)
www.ceo.lacounty.gov/wp-content/uploads/OEM/hazmitgplan.pdf
Applicable Incorporation: Information about hazards in the County contributed to the hazard-specific sections in the City's Mitigation Plan.

California State Hazard Mitigation Plan (2018)
www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/hazard-mitigation-planning/state-hazard-mitigation-plan
Applicable Incorporation: Used to identify hazards posing greatest hazard to State.

HAZUS Maps and Reports
Created by Emergency Planning Consultants
Applicable Incorporation: Numerous HAZUS results have been included for earthquake scenarios to determine specific risk to Cities of Rancho Palos Verdes and Rolling Hills Estates.

California Department of Finance
www.dof.ca.gov/
Applicable Incorporation: Community Profile section – demographic and population data

FEMA "How To" Mitigation Series (386-1 to 386-9)
www.fema.gov/media
Applicable Incorporation: Mitigation Measures Categories and 4-Step Planning Process are quoted in the Executive Summary.

National Flood Insurance Program
www.fema.gov/national-flood-insurance-program
Applicable Incorporation: Used to confirm there are no repetitive loss properties within the City

Flood Insurance Rate Maps
msc.fema.gov
Applicable Incorporation: Provided by FEMA and included in Flood Hazard section.

California Department of Forestry and Fire Protection (CAL FIRE)
www.fire.ca.gov
Applicable Incorporation: Wildland fire hazard mapping

California Department of Conservation
www.conservation.ca.gov/cgs
Applicable Incorporation: Seismic hazards mapping

U.S. Geological Survey (USGS)
www.usgs.gov
Applicable Incorporation: Earthquake records and statistics

Q&A | ELEMENT E: PLAN ADOPTION | E1

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

Plan Adoption Process

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

Both City Councils must adopt the Mitigation Plan before the Plan can be approved by FEMA.

In preparation for the public meeting with each City Council, the Planning Team prepared a staff report including an overview of the Planning Process, Risk Assessment, Mitigation Goals, and Mitigation Actions.

The Rancho Palos Verdes City Council heard the item on ___. The City Council voted _____ to adopt the updated Mitigation Plan. The Resolution of adoption by the City Council is in the **Appendix**.

The Rolling Hills Estates City Council heard the item on _____. 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 approved the Plan on _____. A copy of the FEMA Letter of Approval is in the **Appendix**.

Part II: RISK ASSESSMENT

Community Profile

Geography and the Environment

The planning area is located on the Palos Verdes Peninsula, approximately 20 miles south of Central Los Angeles. The total size of the planning area is 17.78 square miles. The City of Rancho Palos Verdes has an area of 13.6 square miles, while the City of Rolling Hills Estates has an area of 4.18 square miles.

The Palos Verdes Peninsula has a unique physiography, formed over millions of years of submerging and lifting from the Pacific Ocean. Once an island, the Peninsula is nine miles wide by four miles deep, now rises above the Los Angeles Basin, with the highest elevation at 1480 feet. The terrain of much of the planning area is rolling hills, steep slopes, canyons and coastal bluffs.

The planning area is bounded on the north by Torrance, Rolling Hills, and Palos Verdes Estates; on the south and west by the Pacific Ocean; and on the east by Lomita and San Pedro (Los Angeles).

Climate

The planning area has one of the most ideal climates of the world. Its average maximum and minimum temperatures range approximately between 67-68°F and 50-54°F and the average annual precipitation is approximately 13 inches.

The sea breeze, which is the predominant wind, is a primary factor in creating this climate and typically flows from the west-southwest in a day-night cycle with speeds generally ranging from 5 to 15 mph. The sea breeze maintains the cool temperatures and clean air circulation and generally prevents warmer inland temperatures and air pollution from permeating into the peninsula, except under certain seasonal conditions such as the offshore Santa Ana winds.

Population and Demographics

The planning area has a total population of about 50,692 (RPV 42,463 and RHE 8,229). The planning area includes an area of approximately 17.78 square miles (RPV 13.6 square miles and RHE 4.18 square miles). The population of the planning area has increased by 2.0% (adding 982 residents) since the 2010 U.S. Census. (Source: 2010 U.S. Census and 2017 American Community Survey)

According to the Rolling Hills Estate General Plan (1992), the City is almost fully developed with lower density residential neighborhoods and scattered concentrations of commercial land uses. Vacant parcels are mostly steep slope areas and canyons. A network of equestrian trails and other equestrian facilities provide a major recreational resource for residents. Growth in the City has been very slow, with the limited increase in single-family dwelling units accompanied by a decrease in household sizes.

The Rancho Palos Verdes General Plan states that the City is almost entirely built-out with predominately single-family residential development with scattered concentrations of multi-family residential and commercial development. The remaining vacant parcels are mostly steep slopes, canyons and areas impacted by land movement. Several active park sites and an extensive amount of preserved natural open space and passive parkland, particularly along the City's coastline, provide the majority of recreational resources for residents. Since the City's incorporation, growth has proceeded at a slow pace.

Table: City of Rancho Palos Verdes Demographics
(Source: U.S. Census - 2017 American Community Survey)

City of Rancho Palos Verdes				
Racial/Ethnic Group	2010	2017	Change	Change %
White	25,698	25,600	(98)	-0.4
Black	1,015	834	(181)	-17.8
American Indian or Alaska Native	80	63	(17)	-21.3
Asian	12,077	12,170	93	0.8
Native Hawaiian or Pacific Islander	41	294	253	617.1
Other	748	935	187	25.0
Two or more races	1,840	2,567	583	29.4
Hispanic	3,556	4,541	985	27.7
Total	45,055	42,463	820	2.0

Table: City of Rolling Hills Estates
(Source: U.S. Census - 2017 American Community Survey)

City of Rolling Hills Estates				
Racial/Ethnic Group	2010	2017	Change	Change %
White	5,463	4,794	(669)	-12.2
Black	109	199	90	82.6
American Indian or Alaska Native	19	-	(19)	-100.0
Asian	2,007	2,521	514	25.6
Native Hawaiian or Pacific Islander	8	-	(8)	-100.0
Other	120	300	180	150.0
Two or more races	341	415	74	21.7
Hispanic	499	814	315	63.1
Total	8,067	8,229	162	2.0

Housing and Community Development

Table: City of Rancho Palos Verdes Housing
(Source: U.S. Census - 2017 American Community Survey)

City of Rancho Palos Verdes		
2017	Number	Percent %
Housing Type:		
1-unit, detached	12,729	75.7
1-unit, attached	1,126	6.7
2-4 Units	358	2.1
5+ Units	2,582	15.4
Mobile homes/Other	20	0.1
Total Housing	16,815	100
Occupancy:		
Owner-Occupied Housing	12,553	74.7
Renter-Occupied	3,227	19.2
Vacant	1,035	6.2
Total Occupied Housing Units	16,815	100
Average Household Size – Owner-Occupied:		2.65
Average Household Size – Renter-Occupied		2.69

Table: City of Rolling Hills Estates Housing
(Source: U.S. Census - 2017 American Community Survey)

City of Rolling Hills Estates		
2017	Number	Percent %
Housing Type:		
1-unit, detached	2,516	78.3
1-unit, attached	584	18.2
2-4 Units	29	0.9
5+ Units	83	2.6
Mobile homes/Other	0	0.0
Total Housing	3,212	100
Occupancy:		
Owner-Occupied Housing	2,813	87.6
Renter-Occupied	213	6.6
Vacant	186	5.8
Total Occupied Housing Units	3,212	100
Average Household Size – Owner-Occupied:		2,74
Average Household Size – Renter-Occupied		2.38

Employment

Between 2014 and 2017, overall employment rose in Rancho Palos Verdes by approximately 2.0 percent and in Rolling Hills Estates by approximately 1.4 percent. Information of occupations is also included below.

Table: City of Rolling Hills Estates Industry
(Source: U.S. Census - 2017 American Community Survey)

City of Rancho Palos Verdes		
Industry	2017	
	Number	Percent %
Management, business, science, and arts	11,257	61.1
Service	1,461	7.9
Sales and office	4,305	23.4
Natural resources, construction, and maintenance	469	2.5
Production, transportation, and material moving	929	5.0
Civilian employed population 16 years or over	18,421	100.0

Table: City of Rancho Palos Verdes Industry
(Source: U.S. Census - 2017 American Community Survey)

City of Rolling Hills Estates		
Industry	2017	
	Number	Percent %
Agriculture, forestry, fishing and hunting, and mining	40	0.2
Construction	203	1.1
Manufacturing	476	2.6
Wholesale Trade	114	0.6
Retail Trade	299	1.6
Transportation and Warehousing, and Utilities	115	0.6
Information	80	0.4
Finance and insurance, and real estate and rental and leasing	220	1.2
Professional, scientific, and management, and administrative and waste management services	490	2.7
Educational services, and health care and social assistance	768	4.2
Arts, entertainment, and recreation, and accommodation and food services	290	1.6
Other services, except public administration	170	0.9
Public administration	93	0.5
Civilian employed population 16 years or over	3,358	100.0

Transportation and Commuting Patterns

According to the project area General Plans, there are no freeways on the Peninsula now and it is not likely there ever will be in the future. Peninsula residents, however, have access to and use the extensive freeway network that is such an important part of travel in Southern California. The Harbor Freeway (I-110) and San Diego Freeway (I-405) act as principal lines for commuters as well as to distant points. The I-110 is the major North-South roadways within the project area and the I-405 is the major East-West roadway to and from the project area.

Additionally, the project area is served by a basic network of regional transit lines and local shuttles including PV Transit and Dial-A-Ride. Fixed route transit is provided by the Los Angeles County Metropolitan Transit Authority.

Risk Assessment

What is a Risk Assessment?

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

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

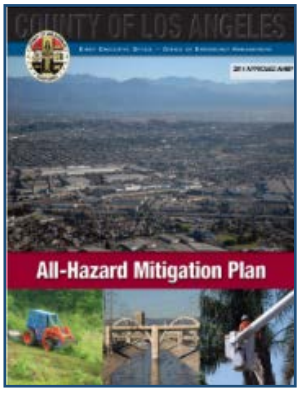
Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

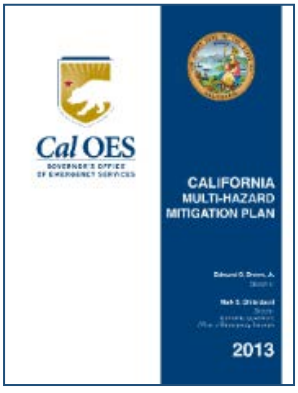
Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Hazard Identification** below.

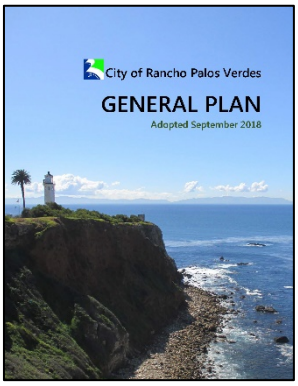
1) Hazard Identification

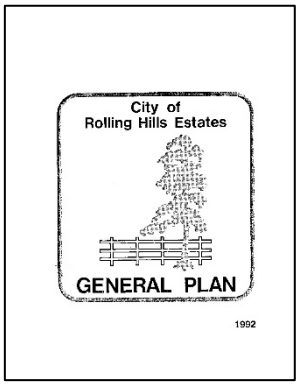
This section is the description of the geographic extent, potential intensity, and the probability of occurrence of a given hazard. Maps are used in this plan to display hazard identification data. ***The Planning Team initially utilized the categorization of hazards as identified in California's State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

Next, the Planning Team reviewed the 2014 Multijurisdictional Hazard Mitigation and the project area General Plans to determine which hazards pose the most significant threat - in other words, which hazard would likely result in a local declaration of emergency.









The geographic extent of each of the identified hazards was identified by the Planning Team utilizing maps and data contained in the Cities' General Plans. 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 planning area:

Earthquake | Wildfire | Earth Movement | Tsunami | Hazardous Materials | Human-Caused Events | Utility-Related Events

The hazard ranking system is described in **Table: Calculated Priority Risk Index**, while the actual ranking is shown in **Tables: Calculated Priority Risk Index Ranking**.

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 Rancho Palos Verdes

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Total
Earthquake – Palos Verdes M7.3	3	1.35	4	1.2	4	0.6	1	0.1	2.98
Earthquake – San Andreas M7.8	3	1.35	3	0.9	4	0.6	1	0.1	2.95
Earthquake – Newport-Inglewood M7.2	3	1.35	3	0.9	4	0.6	1	0.1	2.95
Utility-Related Events	3	1.35	2	0.6	4	0.6	2	0.2	2.75
Earth Movement	3	1.35	1	0.3	4	0.6	4	0.4	2.65
Wildfire	3	1.35	2	0.6	1	0.15	2	0.2	2.30
Hazardous Materials	2	0.9	2	0.6	4	0.6	2	0.2	2.30
Human-Caused Events	2	0.9	2	0.6	4	0.6	2	0.2	2.30
Tsunami	1	.45	3	0.9	4	0.6	2	0.2	2.15

Table: Calculated Priority Risk Index Ranking for City of Rolling Hills Estates

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Total
Earthquake – Palos Verdes M7.3	3	1.35	4	1.2	4	0.6	1	0.1	2.98
Earthquake – San Andreas M7.8	3	1.35	3	0.9	4	0.6	1	0.1	2.95
Earthquake – Newport-Inglewood M7.2	3	1.35	3	0.9	4	0.6	1	0.1	2.95
Utility-Related Events	3	1.35	2	0.6	4	0.6	2	0.2	2.75
Earth Movement	3	1.35	1	0.3	4	0.6	4	0.4	2.65
Wildfire	3	1.35	2	0.6	1	0.15	2	0.2	2.30
Hazardous Materials	2	0.9	2	0.6	4	0.6	2	0.2	2.30
Human-Caused Events	2	0.9	2	0.6	4	0.6	2	0.2	2.30

2) Profiling Hazard Events

This process describes the causes and characteristics of each hazard and what part of the planning area'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** indicates a generalized perspective of the community's vulnerability of the various hazards according to extent (or degree), location, and probability.

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

Q: Does the plan provide rationale for the omission of any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability** below.

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

Q: Does the plan include a description of the **location** for all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability** below.

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

Q: Does the plan include a description of the **extent** for all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability** below.

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

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability** below.

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

Q: Does the plan include information on the **probability** of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability** below.

Table: Vulnerability: Location, Extent, and Probability - Rancho Palos Verdes

Hazard	Location (Where)	Extent (How Big an Event)	Probability (Frequency of an Event of Disaster Proportions) *	Most Recent Occurrence
Earthquake	Entire Project Area	The Southern California Earthquake Center (SCEC) in 2007 concluded that there is a 99.7% probability that an earthquake of M6.7 or greater will hit California within 30 years.[1]	Likely	1987 – Whitter Narrows
Wildfire	Entire Project Area	CAL FIRE has identified the entire project area to be within a Very High Fire Hazard Severity Zone (VHFHSZ)	Likely	1973 fire in nearby Rolling Hills
Earth Movement	Entire Project Area	Earthquake-induced and rain-induced landslide events possibly impacting dozens of structures.	Likely	Ongoing - 2019
Tsunami	Coastline	Los Angeles County identifies the entire project area as being outside of the Tsunami Risk Zone, with the exception of the coastline.	Possibly	2013 (very small displacement)
Hazardous Materials	Entire Project Area	Scope and scale very difficult to predict ranging for isolated to regional, minor to severe medical consequences, limited to extended exposure times.	Possibly	Not Known
Human-Caused Events	Entire Project Area	Extent varies based on range of weapons and proximity.	Possibly	Not Known
Utility-Related Events	Entire Project Area	Depending on the season, a utility emergency could be limited to inconvenience or range as high as life-threatening. Outages and spills could be isolated locations or entire sections of the project area.	Likely	Recent regional events started by downed electrical lines. Now, PSPS poses threat of power stoppage.

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

[1] Uniform California Earthquake Rupture Forecast

Table: Vulnerability: Location, Extent, and Probability – Rolling Hills Estates

Hazard	Location (Where)	Extent (How Big an Event)	Probability (Frequency of an Event of Disaster Proportions) *	Most Recent Occurrence
Earthquake	Entire Project Area	The Southern California Earthquake Center (SCEC) in 2007 concluded that there is a 99.7% probability that an earthquake of M6.7 or greater will hit California within 30 years.[1]	Likely	1987 – Whitter Narrows
Wildfire	Entire Project Area	CAL FIRE has identified the entire project area to be within a Very High Fire Hazard Severity Zone (VHFHSZ)	Likely	1973 fire in nearby Rolling Hills
Earth Movement	Entire Project Area	Earthquake-induced and rain-induced landslide events possibly impacting dozens of structures.	Likely	1999 event in Deep Valley
Hazardous Materials	Entire Project Area	Scope and scale very difficult to predict ranging for isolated to regional, minor to severe medical consequences, limited to extended exposure times.	Possibly	Not Known
Human-Caused Events	Entire Project Area	Extent varies based on range of weapons and proximity.	Possibly	Not Known
Utility-Related Events	Entire Project Area	Depending on the season, a utility emergency could be limited to inconvenience or range as high as life-threatening. Outages and spills could be isolated locations or entire sections of the project area.	Possibly	Recent regional events started by downed electrical lines. Now, PSPS poses threat of power stoppage.

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

[1] Uniform California Earthquake Rupture Forecast

3) Vulnerability Assessment/Inventory of Existing Assets

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

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

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

A: See **Critical Facilities** below.

Critical Facilities

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

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

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

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

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

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

Table: Impacts to Critical Facilities in Project Area illustrates the hazards with potential to impact critical facilities owned by or providing services to the project area.

Table: Impacts to Critical Facilities in Project Area
(Sources: Hazards Maps in the Mitigation Plan)

Name of Facility	Earthquake	Wildfire	Earth Movement	Tsunami	Hazardous Materials	Human-Caused Events	Utility-Caused Events
Rancho Palos Verdes							
California Water Service Reservoir 3960 East Crest Road	X	X	X		X	X	X
California Water Service Reservoir 5837 West Crest Road	X	X	X		X	X	X
California Water Service Reservoir 4405 Palos Verdes Drive East	X	X			X	X	X
FAA Radar Domes East Crest Road	X	X	X		X	X	X
Los Angeles County Communications Tower 5741 Crestridge Road	X	X			X	X	X
Los Angeles County Fire Station No. 53 6124 Palos Verdes Drive South	X	X	X	X	X	X	X
Los Angeles County Fire Station No. 83 83 Miraleste Plaza	X	X			X	X	X
RPV City Hall/EOC and Public Works 30940 Hawthorne Boulevard	X	X			X	X	X
Southern California Edison Substation Crestridge Road	X	X			X	X	X
Southern California Edison Substation Tarragon Road	X	X	X	X	X	X	X

Rolling Hills Estates							
Cal Water Pump Station 27591 Crenshaw Blvd.	X	X	X		X	X	X
Metro Water District Palos Verdes Drive North/Palos Verdes Drive East (SW corner)	X	X			X	X	X
Cox Communications 43 Peninsula Center	X	X			X	X	X
Los Angeles County Fire Station No. 106 27413 Indian Peak Road	X	X			X	X	X
RHE City Hall and Council Chambers/EOC 4045 Palos Verdes Drive North	X	X			X	X	X
RHE Maintenance Yard 25851 Hawthorne Boulevard	X	X			X	X	X
Outside Planning Area							
Los Angeles County Sheriff's Station 26123 Narbonne Avenue, Lomita	X	X			X	X	X

4) Risk Analysis

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

5) Assessing Vulnerability/ Analyzing Development Trends

This step provides a general description of City facilities and contents in relation to the identified hazards so that mitigation options can be considered in land use planning and future land use decisions. This Mitigation Plan provides comprehensive description of the character of Rancho Palos Verdes and Rolling Hills Estates 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 Rancho Palos Verdes

and Rolling Hills Estates 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 each 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

Rancho Palos Verdes and Rolling Hills Estates General Plans provide the framework for the growth and development of the Cities. These Plans are the most important tools in addressing environmental challenges including transportation and air quality; growth management; conservation of natural resources; clean water and open spaces.

City of Rancho Palos Verdes is designated into two broad classifications – Natural Environment/Hazard Areas and Urban Activity Areas. The Natural Environment/Hazard Areas include areas that possess extreme physical constraints due to the impacts of features such as active landslides, sea cliff erosion, and extreme slopes. They also represent areas designated as Open Space Preserve, which make up the City's Palos Verdes Nature Preserve. The Urban Activity Areas include different designations. They are (1) Residential, (2) Commercial, (3) Institutional, (4) Recreational, (5) Agricultural, and (6) Infrastructure land use designations.

City of Rolling Hills Estates, there are ten distinct land use designations. These include (1) Commercial General, (2) Commercial/Office, (3) Neighborhood Commercial, (4) Commercial Recreation, (5) Very Low Density Residential, (6) Low Density Residential, (7) Medium Density Residential, (8) High Density Residential, (9) Institutional, and (10) Open Space.

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

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

Impact of Hazards to Types of Land Uses

As discussed above, the project area General Plans identify primarily land uses categories. Following is a table that plots land uses by hazard category.

Table: Impacts to Existing and Future Land Uses
(Source: Rancho Palos Verdes 2018 General Plan, Land Use Element)

City of Rancho Palos Verdes								
Category of Land Use Designation	Acres (Area)	Earthquake	Wildfire	Earth Movement	Tsunami	Hazardous Materials	Human-Caused Events	Utility-Related Events
Residential	5,111	X	X	X	X	X	X	X
Commercial	273	X	X	X	X	X	X	X
Institutional	338	X	X	X	X	X	X	X
Recreational	396	X	X	X	X	X	X	X
Open Space	1,367	X	X	X	X	X	X	X

Table: Impacts to Existing and Future Land Uses
(Source: Rolling Hills Estates 1992 General Plan, Land Use Element)

City of Rolling Hills Estates							
Category of Land Use Designation	Acres (Area)	Earthquake	Wildfire	Earth Movement	Hazardous Materials	Human-Caused Events	Utility-Related Events
Commercial General	98	X	X	X	X	X	X
Commercial/Office	15	X	X	X	X	X	X
Neighborhood Commercial	7	X	X		X	X	X
Commercial Recreation	264	X	X		X	X	X
Residential	1,290	X	X	X	X	X	X
Institutional	342	X	X		X	X	X
Open Space	1,402	X	X	X	X	X	X

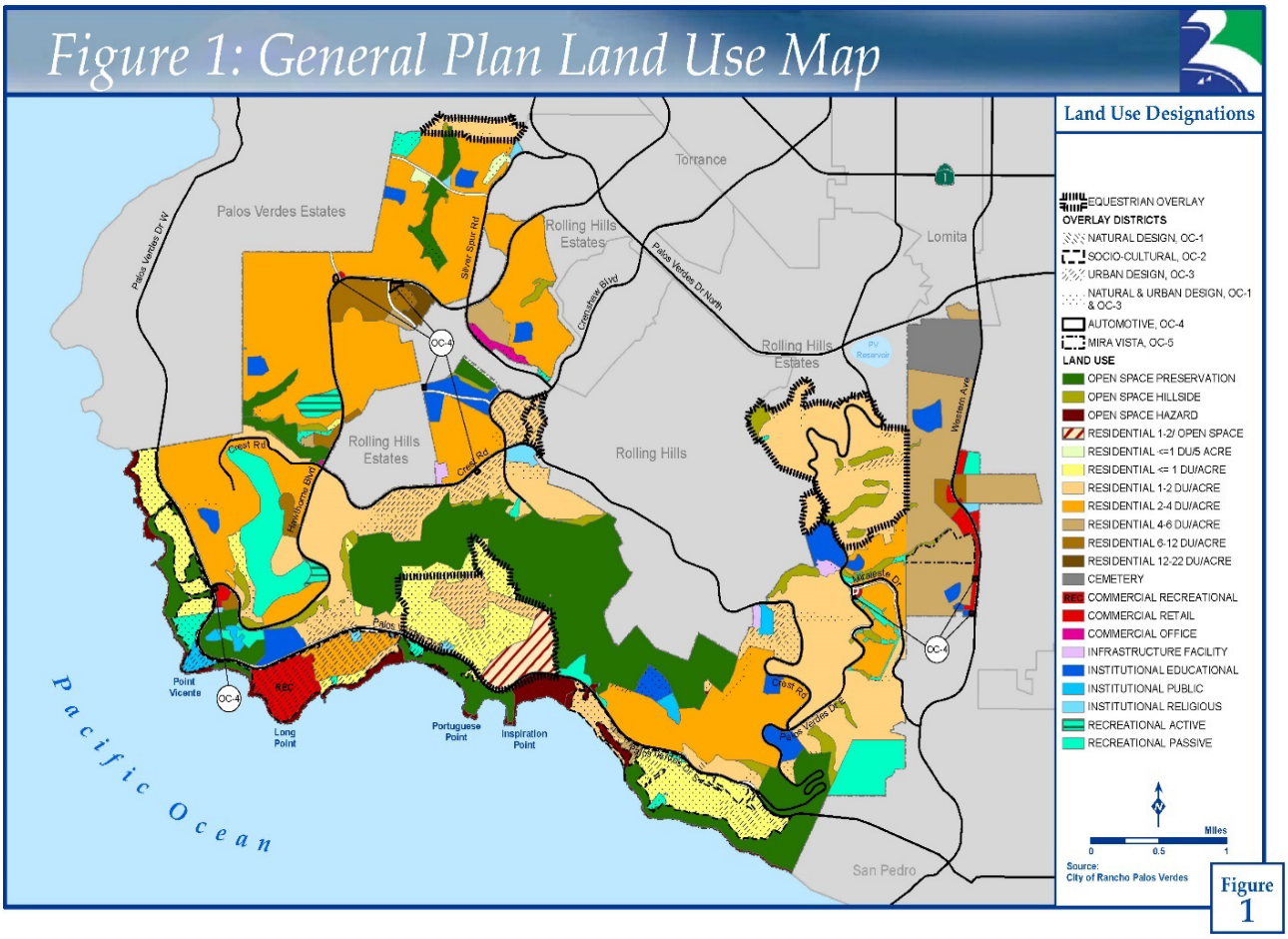
Q&A | ELEMENT D: MITIGATION STRATEGY | D1

Q: Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))
A: See **Changes in Development** below

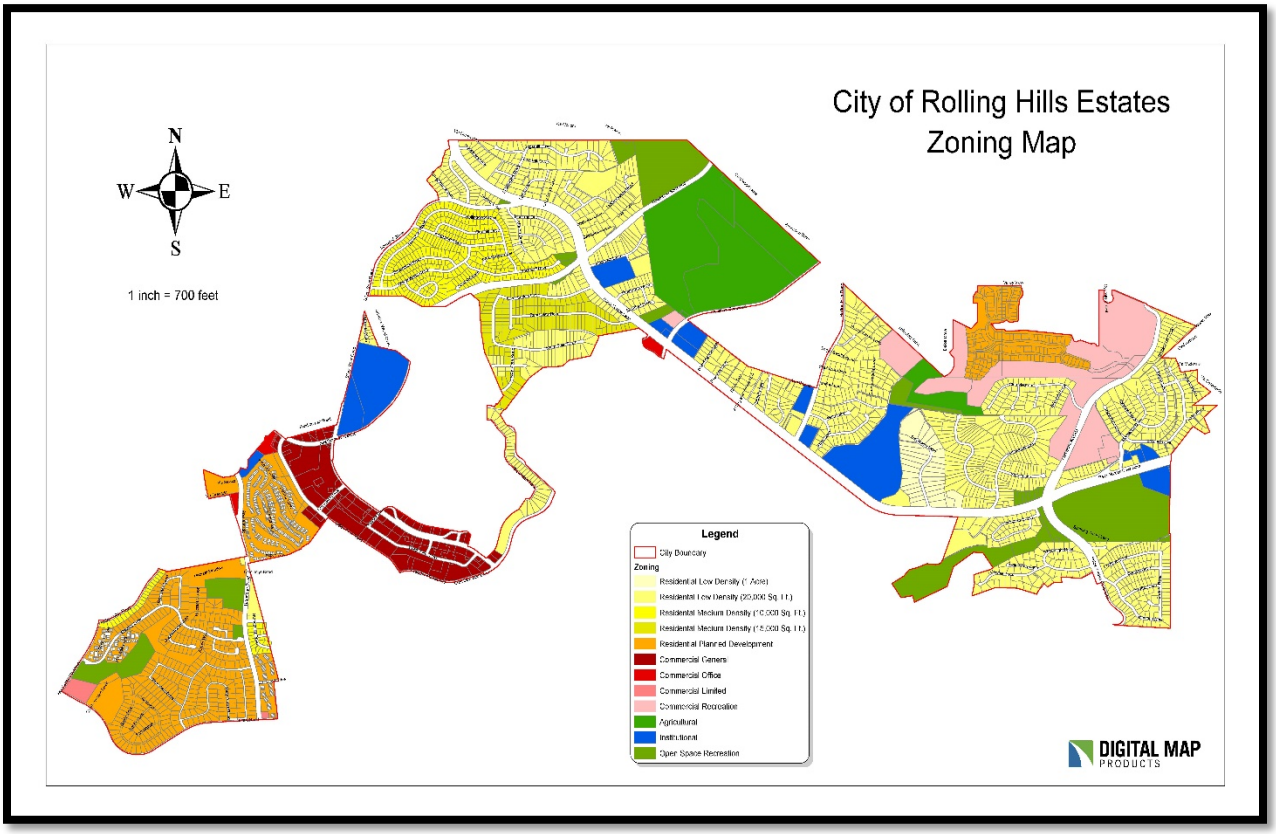
Changes in Development

Since the adoption of the 2014 Plan, there have been no significant alterations to the development pattern of the project area in the hazard prone areas. This conclusion was reached after a thorough review of both General Plans and discussions with the Planning Team. Furthermore, the Planning Team concluded the overall vulnerability to identified hazards remained approximately the same.

Map: Land Use Map City of Rancho Palos Verdes
(Source: Rancho Palos Verdes General Plan, Land Use Element)



Map: Zoning Map City of Rolling Hills Estates



(Source: Rolling Hills Estates, Community Development Department)

Earthquake Hazards

Previous Occurrences of Earthquakes in the Project Area

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

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

A: See **Previous Occurrences of Earthquakes in the Project Area** below.

A shallow magnitude 2.9 earthquake was reported on Friday, June 7, 2013. The temblor occurred six miles from Rancho Palos Verdes at 4:19 a.m. Pacific Time at a depth of 0 miles. According to the USGS, the epicenter was nine miles from San Pedro, 10 miles from Palos Verdes estates, and 11 miles from Lomita. Since the writing of the 2014 Mitigation Plan, there have been no significant earthquake events impacting the project area.

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.

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

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

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

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

A: See **Local Conditions** below.

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

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

A: See **Local Conditions** below.

Local Conditions

The project area lies within a metropolitan area that has historically been seismically active. Faults are prevalent throughout California and are commonly classified as either "active" or "potentially active." An active fault is a break that has moved in recent geologic time (the last 11,000 years) and that is likely to move within the next approximately 100 years. Active faults are the primary focus of concern in attempting to prevent earthquake hazards. A potentially active fault is one that has shifted but not in the recent geologic period (or, between 11,000 and 3,000,000 years ago) and is therefore considered dormant or unlikely to move in the future.

Several active faults have been identified within close proximity or within the project area boundaries which, most importantly, indicates that the community falls under the State Earthquake Fault Zoning Act and the State Hazards Mapping Act. These Acts require that local governments, in the general plan update process, adopt policies and criteria to ensure the structural adequacy of buildings erected across active faults for human occupancy. In some cases, the development of structures must be prohibited.

Earthquakes that could affect the project area would most likely originate from the Southern San Andreas (M7.8), Newport-Inglewood (M7.2), or Palos Verdes (M7.3) Faults. These faults are close enough in proximity or expected to generate strong enough shaking that could significantly impact the project area.

San Andreas Fault Zone

The San Andreas Fault Zone is located approximately 80 miles east of the project area. This fault zone extends from the Gulf of California northward to the Cape Mendocino area where it continues northward along the ocean floor. The total length of the San Andreas Fault Zone is approximately 750 miles. The activity of the fault has been recorded during historic events, including the 1906 (M8.0) event in San Francisco and the 1857 (M7.9) event between Cholame and San Bernardino, where at least 250 miles of surface rupture occurred. These seismic events are among the most significant earthquakes in California history. Geologic evidence suggests that the San Andreas Fault has a 50 percent chance of producing a magnitude 7.5 to 8.5 quake (comparable to the great San Francisco earthquake of 1906) within the next 30 years.

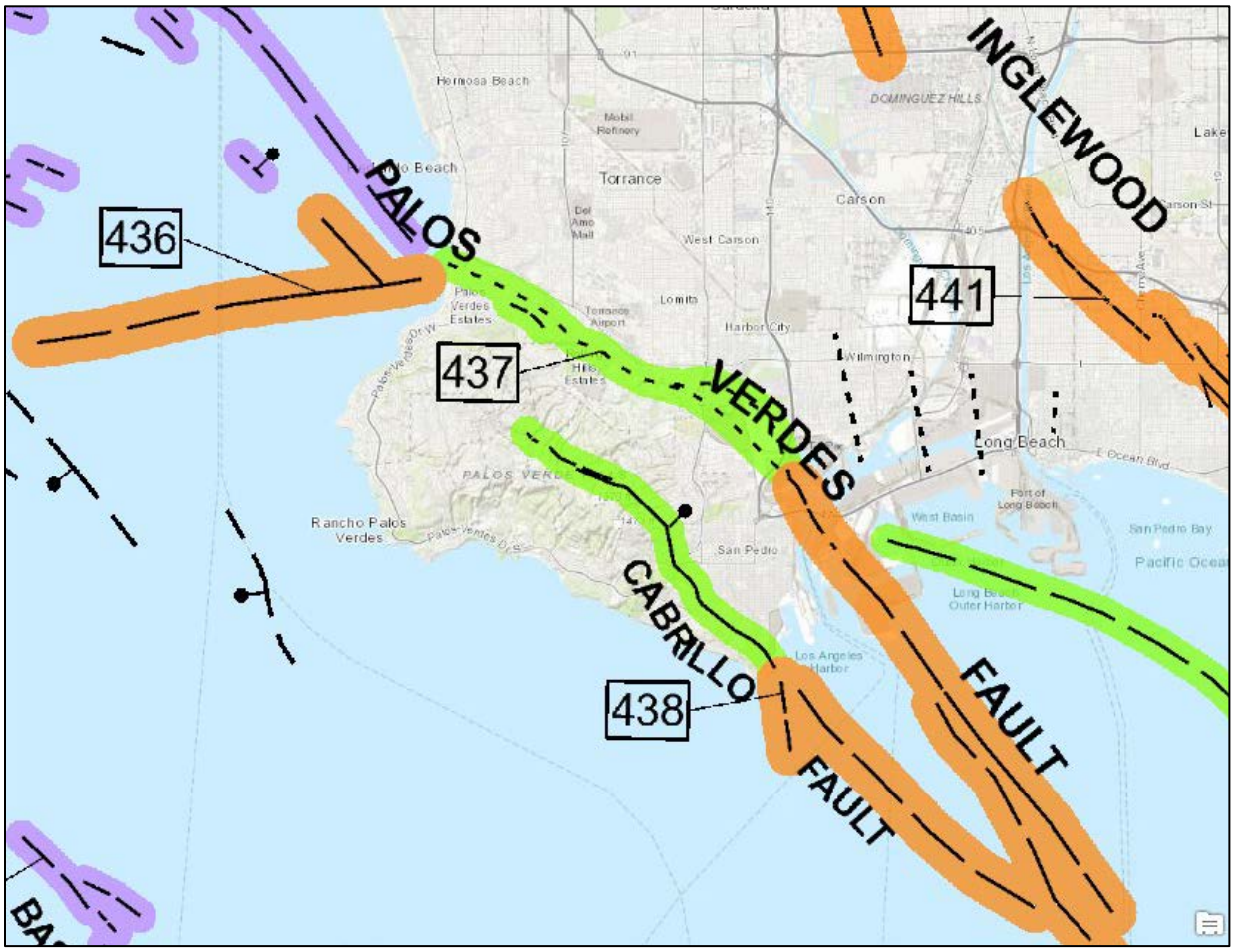
Newport-Inglewood Fault Zone

The Newport-Inglewood Fault Zone's closest point to the project area is approximately 10 miles from it, and its surface trace is a discontinuous 75 km in the Los Angeles Basin, but the fault zone can easily be noted there by the existence of a chain of low hills extending from Culver City to Signal Hill. South of Signal Hill, it roughly parallels the coastline until just south of Newport Bay, where it heads offshore, and becomes the Newport-Inglewood – Rose Canyon fault zone. The most recent rupture was on March 10, 1993 (M6.4) but was not a surface rupture.

Palos Verdes Fault Zone

The Palos Verdes Fault Zone has two main branches, the Cabrillo Fault and the Redondo Canyon Faulty. The Cabrillo Fault runs 20 km, and the Redondo Canyon Faulty 11 km. The Palos Verdes Fault Zone is roughly 80 km. These faults are all in the immediate vicinity of the project area.

Map: Local Faults
(Source: California Geological Survey)



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 project area General Plans, liquefaction presents itself as a threat only in a small portion of the northeast quadrant of the City of Rolling Hills Estates. Liquefaction-related lateral spreads can occur adjacent to stream channels and deep washes that provide a free face toward which the liquefied mass of soil fails. Lateral spreads can cause extensive damage to pipelines, utilities, bridges, roads and other structures.

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

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

A: See **Impact of Earthquakes in the Project Area** below.

Impact of Earthquakes in the Project Area

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

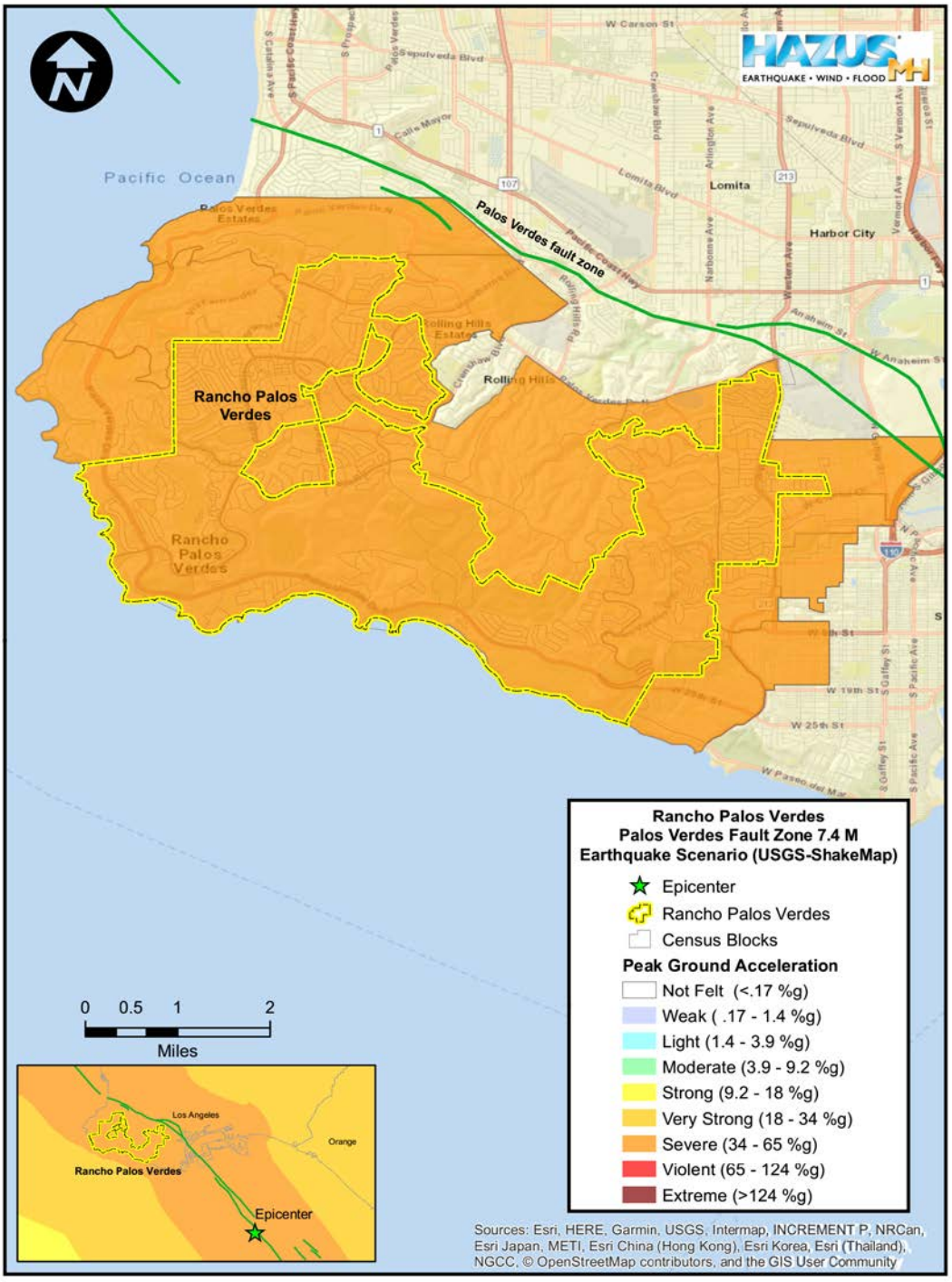
- ✓ Injury and loss of life;
- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Secondary health hazards e.g. mold and mildew;
- ✓ Damage to roads/bridges resulting in loss of mobility;
- ✓ Significant economic impact (jobs, sales, tax revenue) 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.

HAZUS-MH

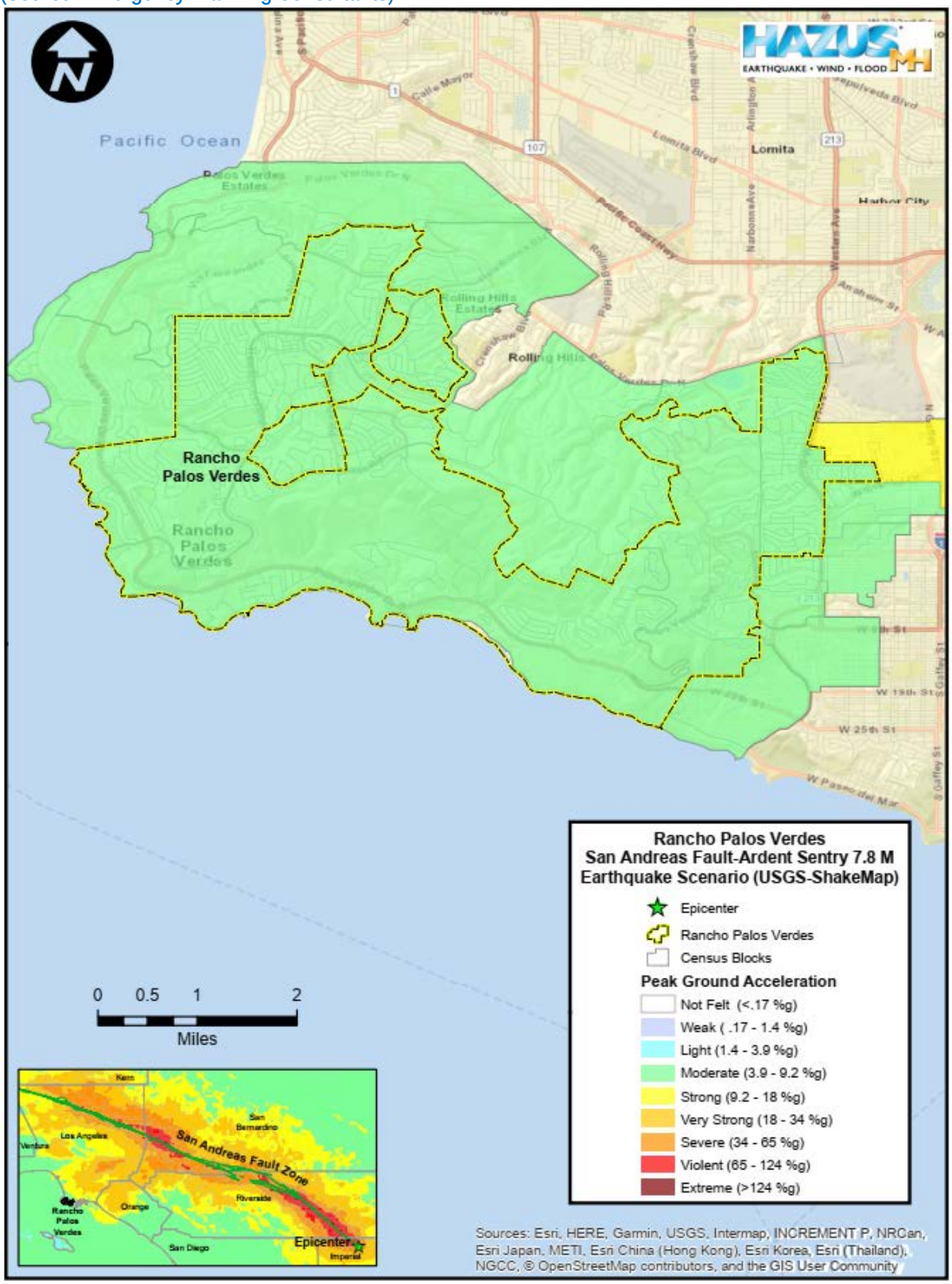
The maps that follow were generated by Emergency Planning Consultants using the Hazards United States – Multi Hazard (HAZUS-MH) software program. Please see **Attachments – HAZUS** for complete reports. Once the location and size of a hypothetical earthquake are identified, HAZUS-MH estimates the intensity 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. It's important to note that the "project are" is based on Census Tracts not jurisdictional boundaries.

City of Rancho Palos Verdes

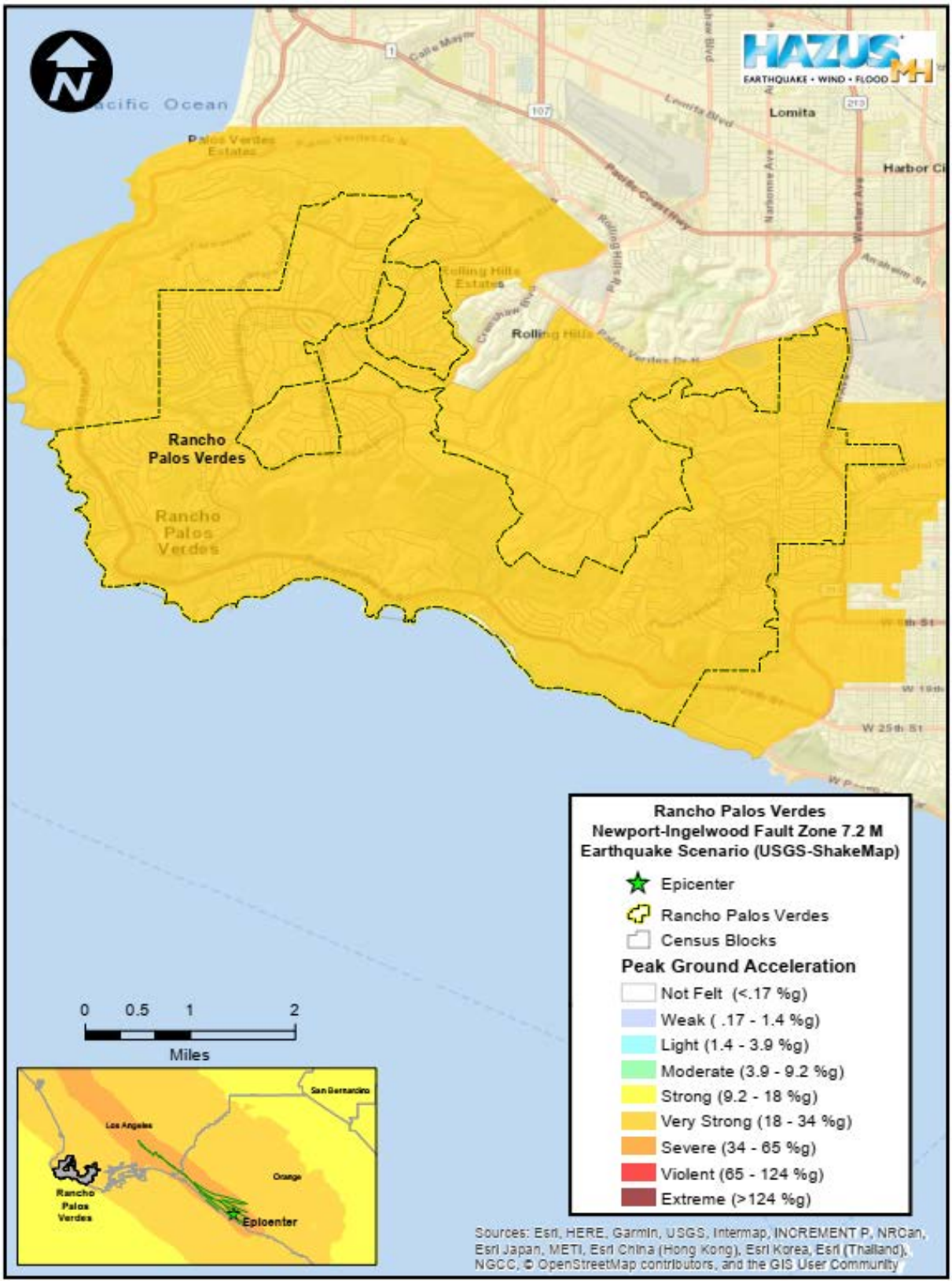
Map: Shake Intensity Map – Palos Verdes Fault M7.4
(Source: Emergency Planning Consultants)



Map: Shake Intensity Map – Southern San Andreas Fault M7.8
(Source: Emergency Planning Consultants)

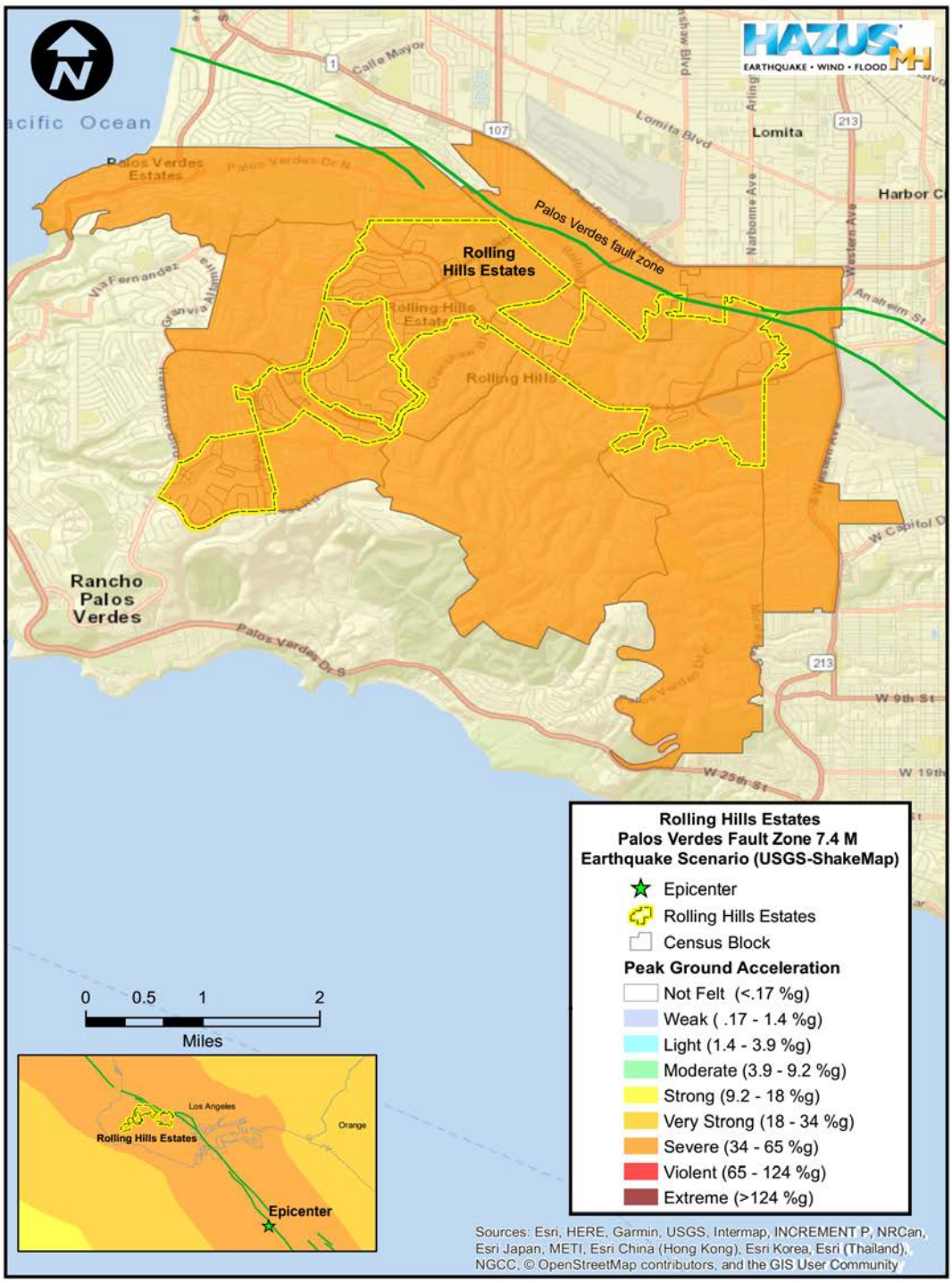


Map: Shake Intensity Map – Newport/Inglewood Fault M7.2
(Source: Emergency Planning Consultants)

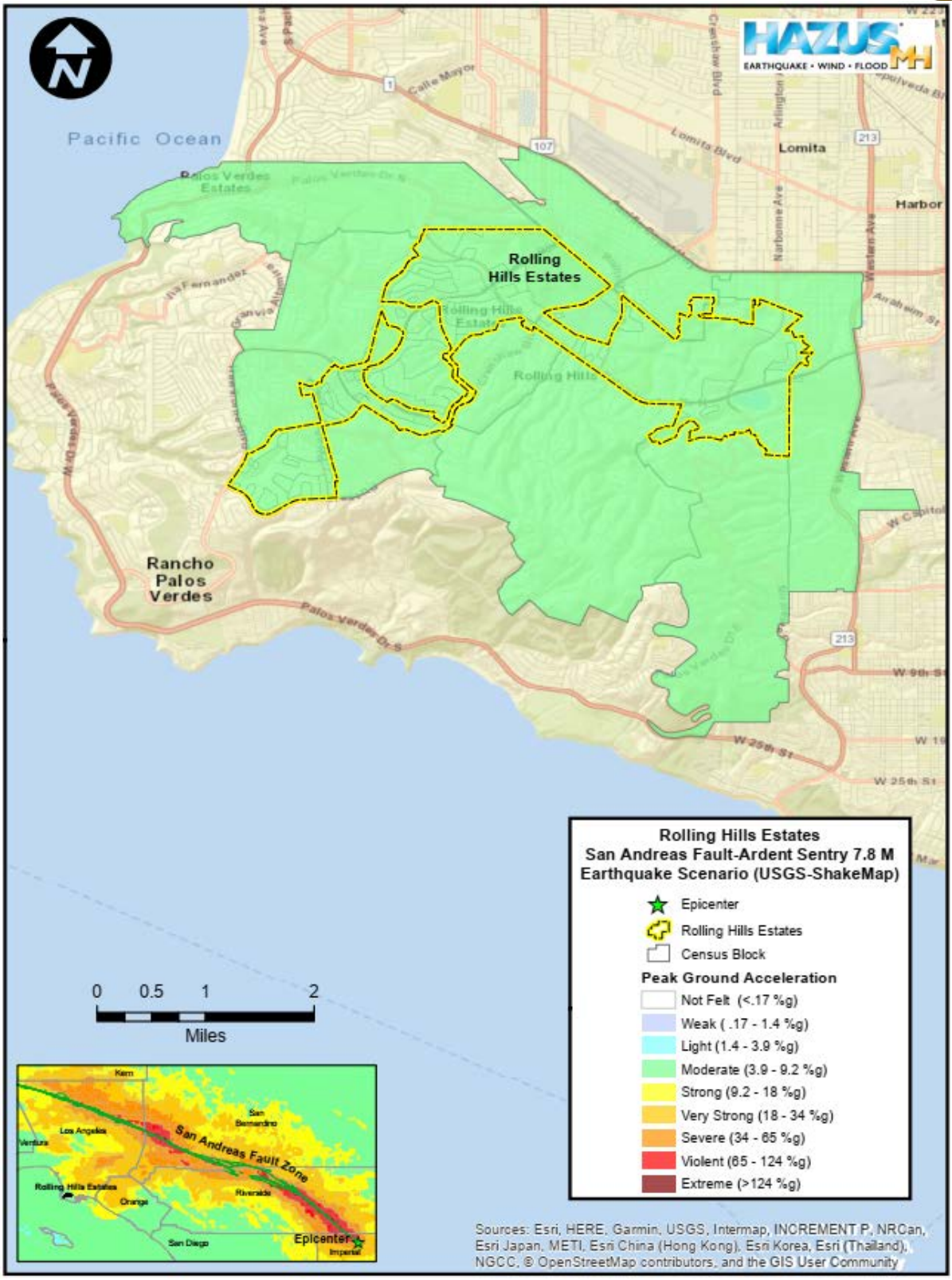


City of Rolling Hills Estates

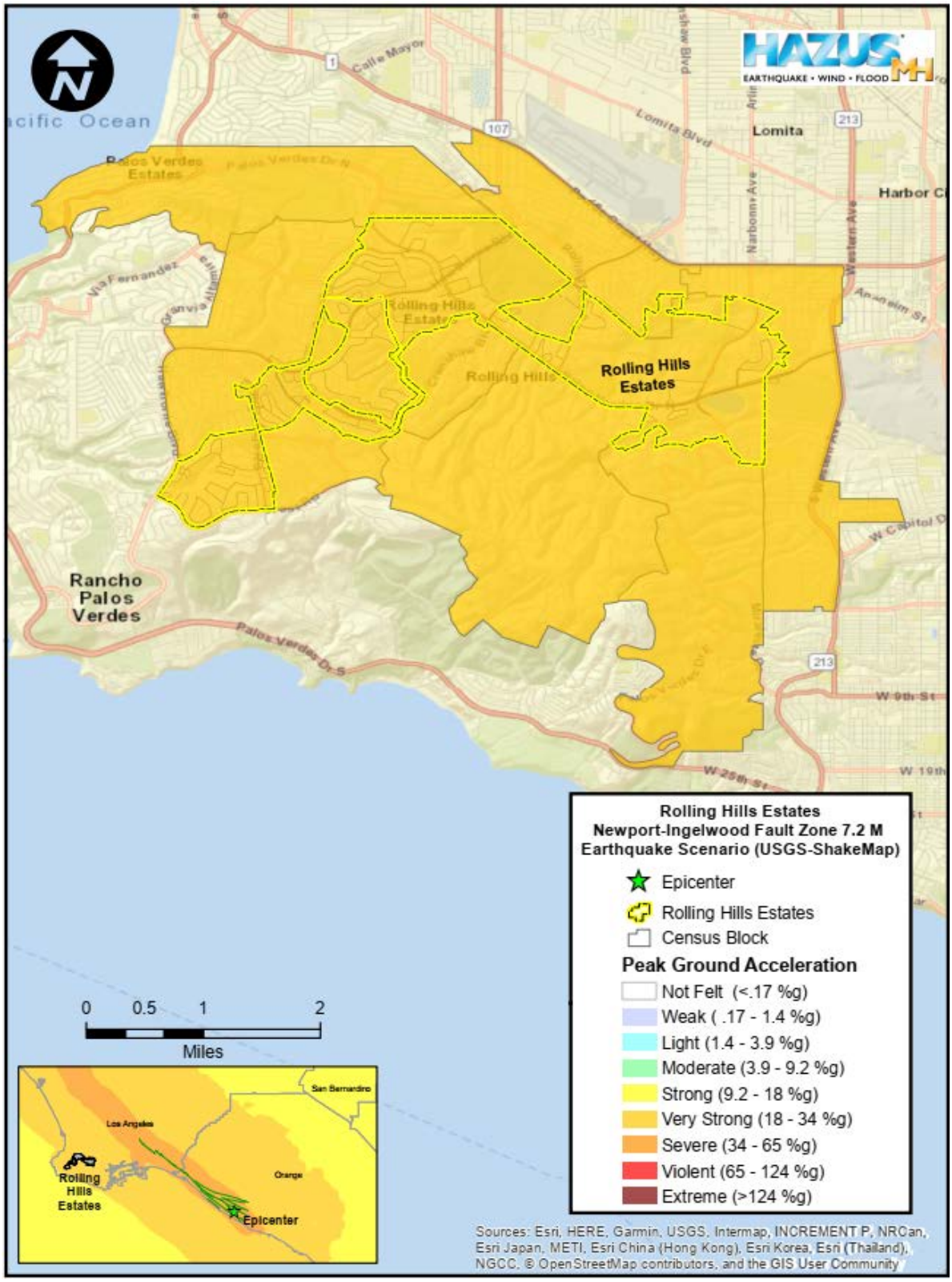
Map: Shake Intensity Map – Palos Verdes Fault M7.4
(Source: Emergency Planning Consultants)



Map: Shake Intensity Map – Southern San Andreas Fault M7.8
(Source: Emergency Planning Consultants)

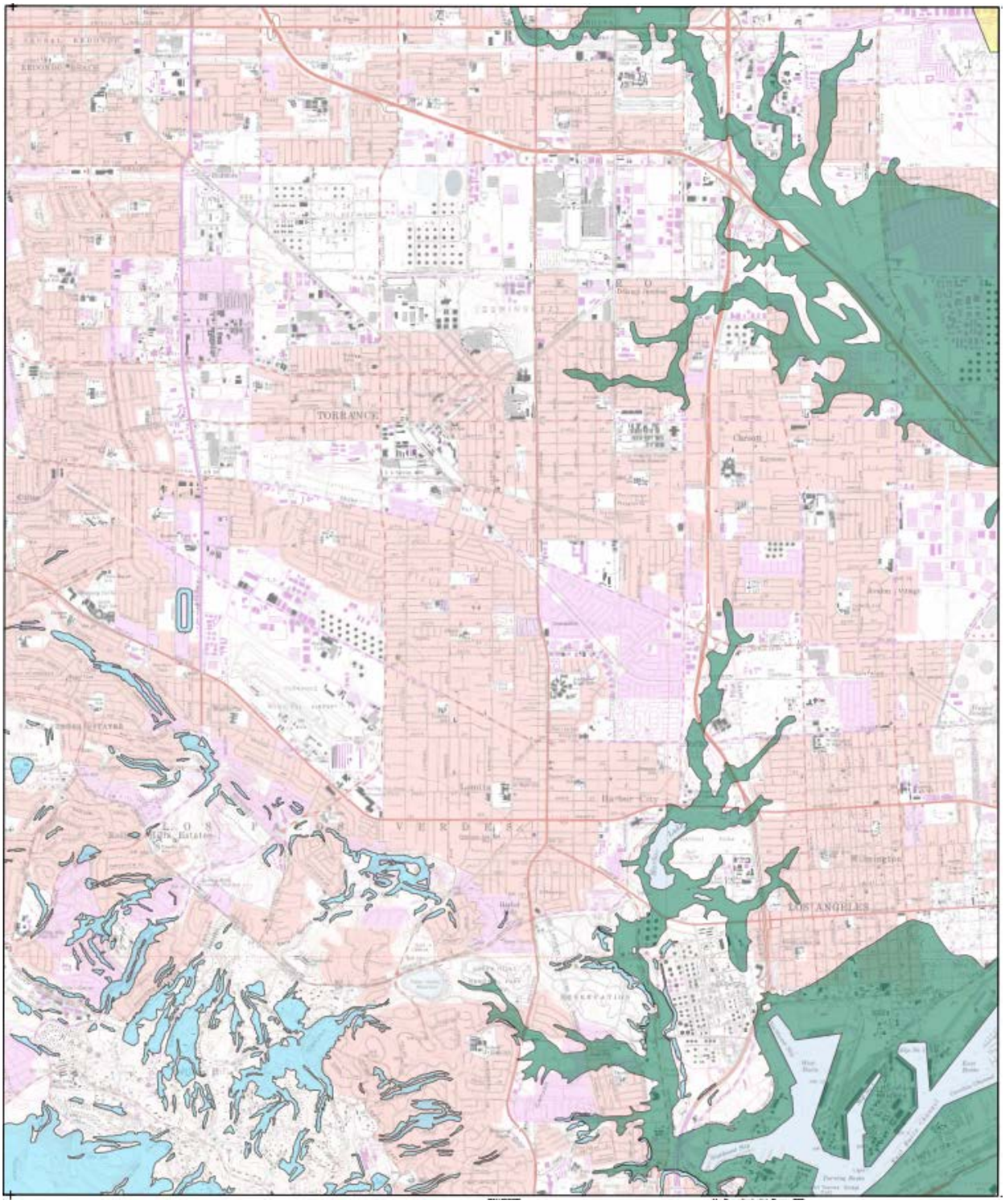


Map: Shake Intensity Map – Newport/Inglewood Fault M7.2
(Source: Emergency Planning Consultants)



Maps: Liquefaction & Earthquake-Induced Landslide Areas
(Source: California Geological Survey)

Torrance Quadrangle (Note: green = liquefaction zones, blue = earthquake-induced landslide zones)



Redondo Beach Quadrangle (Note: green = liquefaction zones, blue = earthquake-induced landslide zones)

Wildfire

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

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

A: See **Previous Occurrences of Wildfire in the Cities of Rancho Palos Verdes and Rolling Hills Estates** below.

Previous Occurrences of Wildfire in the Cities of Rancho Palos Verdes and Rolling Hills Estates

Though wildland fires have not been a major hazard within the Peninsula, there are records of destructive occurrences. The most destructive, as reported by the Daily Breeze, was in 1973, where 925 acres burned 12 homes.

Since the writing of the 2014 Mitigation Plan, there have been no major wildland fires.

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.

According to the United States Forest Service, the largest 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.

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

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

A: See **Local Conditions** below.

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

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

A: See **Local Conditions** below.

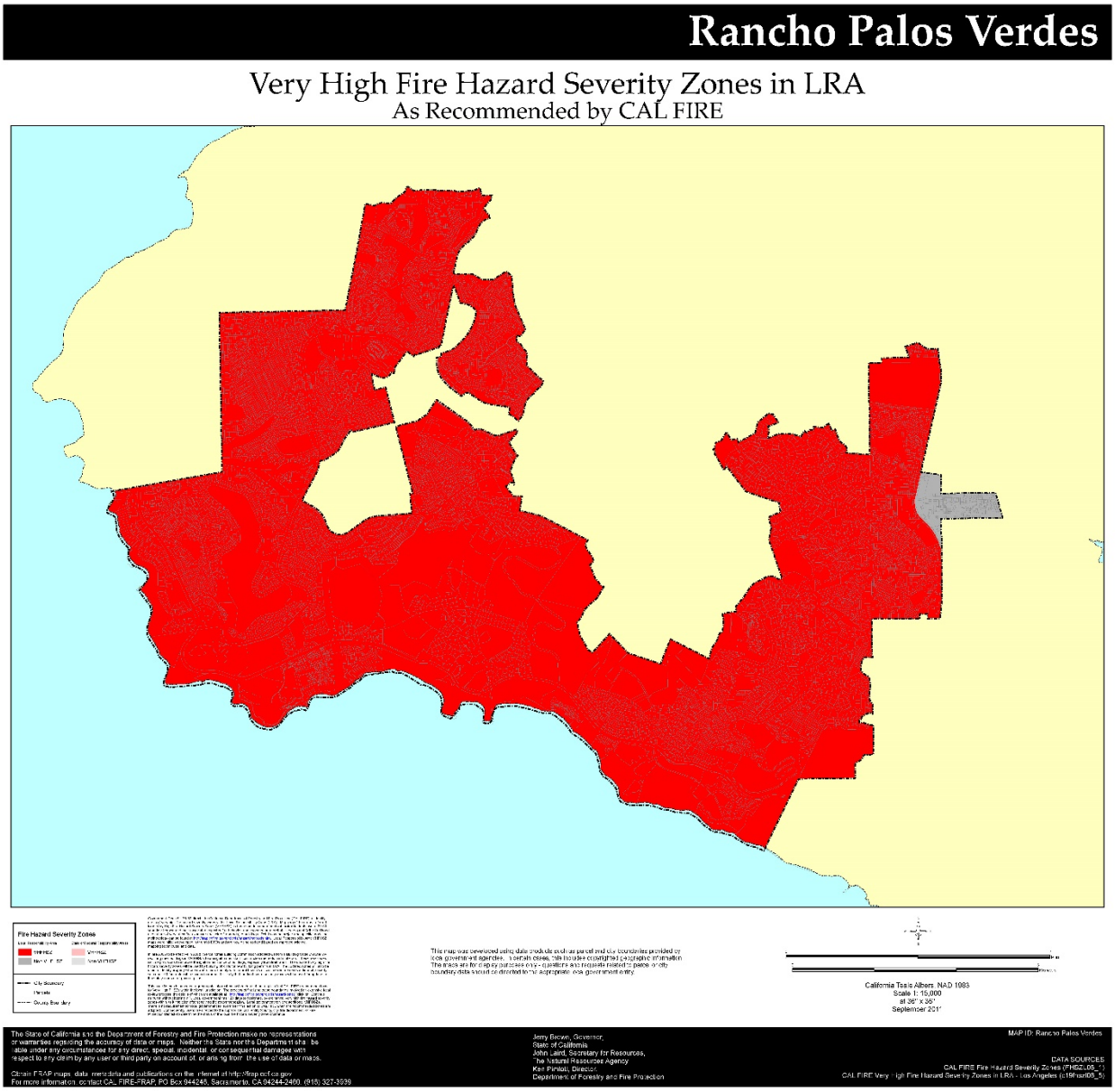
Local Conditions

According to the General Plans, the Palos Verdes Peninsula is a folded, uplifted block of sedimentary and metamorphic material located adjacent to the Pacific Ocean. The marine influence along with the local geology have played significant roles in shaping the terrestrial ecology and fire hazards potential of the Peninsula. Two geological factors important in this discussion include (1) the makeup of the local soils and (2) the topography of the Peninsula.

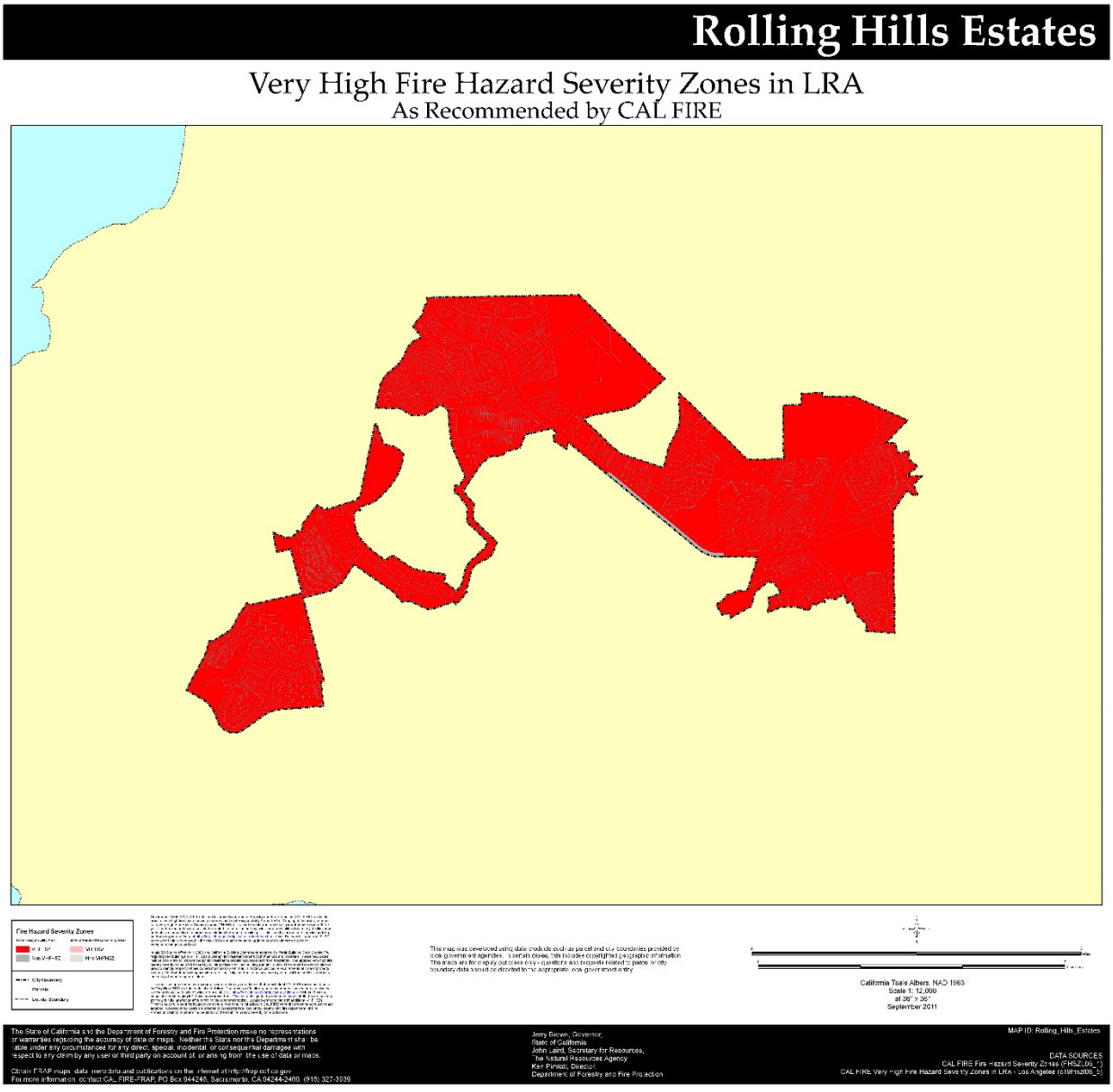
The soils encountered in the Peninsula have been derived from the parent metamorphic and sedimentary materials. Soils of this type are usually very clayey and not particularly conductive to the establishment of well-developed planned communities. This, in part, explains the absence of dense, heavy strands of native vegetation encountered in other areas.

The local topography can best be described as dominated by hillsides and canyons. This ecological condition adds to the hazard's potential. Development in some localities has extended into the canyons of the Project Area and has reduced the fire hazard by removing the vegetation. However, it has also introduced the human element into more outlying locations, thus increasing the hazard. In some cases, these divergent relationships have reduced the possibility of wildfire, but in most, they have enhanced the hazard of fire.

Map: Very High Fire Hazard Severity Zones – Rancho Palos Verdes
(Source: CAL FIRE Fire Severity Zones)



Map: Very High Fire Hazard Severity Zones – Rolling Hills Estates
(Source: CAL FIRE Fire Severity Zones)



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

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Impact of Flooding in the Cities of Rancho Palos Verdes and Rolling Hills Estates** below.

Impact of Wildfire in the Cities of Rancho Palos Verdes and Rolling Hills Estates

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

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.

Earth Movement

Previous Occurrences of Earth Movement in the Project Area

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

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

A: See **Previous Occurrences of Earth Movement in the Project Area** below.

The largest landslide to occur in the planning area was the Portuguese Bend Landslide. The slide area encompasses approximately 270 acres. The weight of the moving material is estimated to be about 60 million tons, with a maximum thickness calculated to be 250 feet. The slide began in August 1956 in conjunction with a County roadway project to extend Crenshaw Boulevard from Crest Road to Palos Verdes Drive South. Initially, movement was 3 to 4 inches per day, quickly slowing to 1 inch per day a month later. The reactivation of this ancient landslide resulted in the loss of 134 residential dwellings, which were damaged beyond repair and razed. Relocation to safer ground saved a few homes. (The Palos Verdes Peninsula: A Geologic Guide and More, by Martin Reiter, Kendall/Hunt Publishing Company, 1984) The slide also destroyed the Portuguese Bend Beach Club (Reiter, 1984), a private recreational facility that included a large clubhouse, saltwater pool, boating pier, tennis courts, and volleyball courts (PV News, 1948 & 1952). Between 1962 and 1970, movement slowed to ½ inch per day (Reiter, 1984). Today, movement is approximately 3 feet per year, depending on the amount of rainfall the previous season. Nearly all of the remaining homes in the active slide area have been placed on elevated or so-called "floating" foundations that can be adjusted as the earth continues to slowly move and buckle beneath the homes.

Reactivation of the 80-acre Abalone Cove Landslide was first noted at the shoreline in February 1974. At the time, Abalone Cove was a private beach club. Slow movement continued between the shoreline and Palos Verdes Drive South until 1978, but only impacted vacant land. In late April or early May 1978, following one of the rainiest seasons on record (29.61 inches fell during 1977-78 compared to an average annual rainfall of 11.38 inches), the slide began to accelerate, and cracking was seen in the roadway. The slide reached its maximum inland extent in February 1980, following 7.75 inches of rain during a 10-day period. Because the Abalone Cove Landslide started along the coastline and progressed landward, it was not triggered by drag from the abutting Portuguese Bend Landslide. The major factors attributed to reactivation of the slide appear to be rainfall and rising groundwater levels (Rieter, 1984). Although no homes were destroyed as a result of this slide, the visitor's center at the landmark Wayfarers Chapel was severely damaged and closed to the public in 1982. All but a small portion of the original structure was razed in 1995 and a new visitors center was constructed west of the slide scarp in 1999 (Daily Breeze, June 26, 1999).

A third landslide in the planning area that deserves mention is the Klondike Canyon Landslide. This landslide is located adjacent to the coastline and to the east of the much larger Portuguese Bend Landslide. Like the Portuguese Bend and the Abalone Cove Landslides, Woodring published the location of the ancient "Beach Club Landslide" in 1946. However, by that time, both Yacht Harbor Drive (in 1927) and Palos Verdes Drive South (in 1937) had been constructed across this landslide. Development of the two roadways was followed in the late 1940's by the construction of the Portuguese Bend Club and grading for the Seaview tract landward of Palos Verdes Drive South was completed in late 1956. Following record-breaking rainfall in 1977-1978,

the first indications of movement of the Klondike Canyon Landslide were noted in September 1979 at the intersection of Dauntless Drive and Exultant Drive in the Seaview tract. Heavy rainfall continued during 1979-1980 and 1982-1983, accelerating land movement, which damaged local roads and eventually destroyed one home in the Seaview tract. In 1982, the Klondike Canyon Landslide Geologic Abatement District was formed and began installing dewatering wells to lower the ground water table within the slide mass. (Kerwin, Scott, "Land Stability in the Klondike Canyon," Moore and Taber professional report, no date but probably 1981 or 1982) The dewatering efforts have been successful in stabilizing the area and additional landslide abatement efforts have continued since that time, such as drainage improvements in Klondike Canyon and the installation of a private sewer system in the Portuguese Bend Beach Club.

Unlike the slower moving landslides in the Portuguese Bend area, the planning area most recently experienced two fast-moving earth failures that each caused a considerable amount of property damage. In March 1997, two office buildings located in the 900 block of Indian Peak Road in Rolling Hills Estates toppled and slid down a hillside, causing damage to another building at 655 Deep Valley Drive. In June 1999, the entire 18th fairway of the Ocean Trails Golf Course slid into the ocean, just a week prior to the course's scheduled grand opening, taking approximately 12 acres of land with it.

In its 38-year history, the City of Rancho Palos Verdes has only declared a local emergency on two occasions, both related to earth movement caused by severe weather. On March 8, 1979, the City of Rancho Palos Verdes declared a local emergency due to severe land movement resulting from heavy and unusual rains. Rancho Palos Verdes again declared a local emergency on January 17, 1995 due to severe El Nino rainstorms that caused flooding and sliding throughout the community.

Previous Occurrences of Earth Movement in Los Angeles County

1928 St. Francis Dam

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

1956 Portuguese Bend

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

1958-1971 Pacific Palisades

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

1961 Mulholland Cut

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

1963 Baldwin Hills Dam

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

1969 Glendora

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

1969 Seventh Ave., Los Angeles County

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

1970 Princess Park

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

1971 Upper and Lower Van Norman Dams, San Fernando

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

1971 Juvenile Hall, San Fernando

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

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

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

1978 Bluebird Canyon Orange County

Cost, $52.7 million (2000 Dollars). October 2, 60 houses destroyed or damaged. Unusually heavy rains in March of 1978 may have contributed to initiation of the landslide. Although the 1978 slide area was approximately 3.5 acres, it is suspected to be a portion of a larger, ancient landslide.

1979 Big Rock, California, Los Angeles County

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

1980 Southern California Slides

Cost, $1.1 billion in damage (2000 Dollars). Heavy winter rainfall in 1979-90 caused damage in six Southern California counties. In 1980, the rainstorm started on February 8. A sequence of 5 days of continuous rain and 7 inches of precipitation had occurred by February 14. Slope failures were beginning to develop by February 15 and then very high-intensity rainfall occurred on February 16. As much as eight inches of rain fell in a six-hour period in many locations. Records and personal observations in the field on February 16 and 17 showed that the mountains and slopes literally fell apart on those two days.

1983 San Clemente, Orange County

Cost, $65 million (2000 Dollars). California Highway 1. Litigation at that time involved approximately $43.7 million (2000 Dollars?).

1983 Big Rock Mesa

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

1994 Northridge Earthquake Landslides

As a result of the M6.7 Northridge Earthquake, more than 11,000 landslides occurred over an area of 10,000 km^2. Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. Destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. Caused deaths from Coccidioidomycosis (valley fever) the spore of which was released from the soil and blown toward the coastal populated areas. The spore was released from the soil by the landslide activity.

March 1995 Los Angeles and Ventura Counties

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

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

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

A: See **Local Conditions** below.

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

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

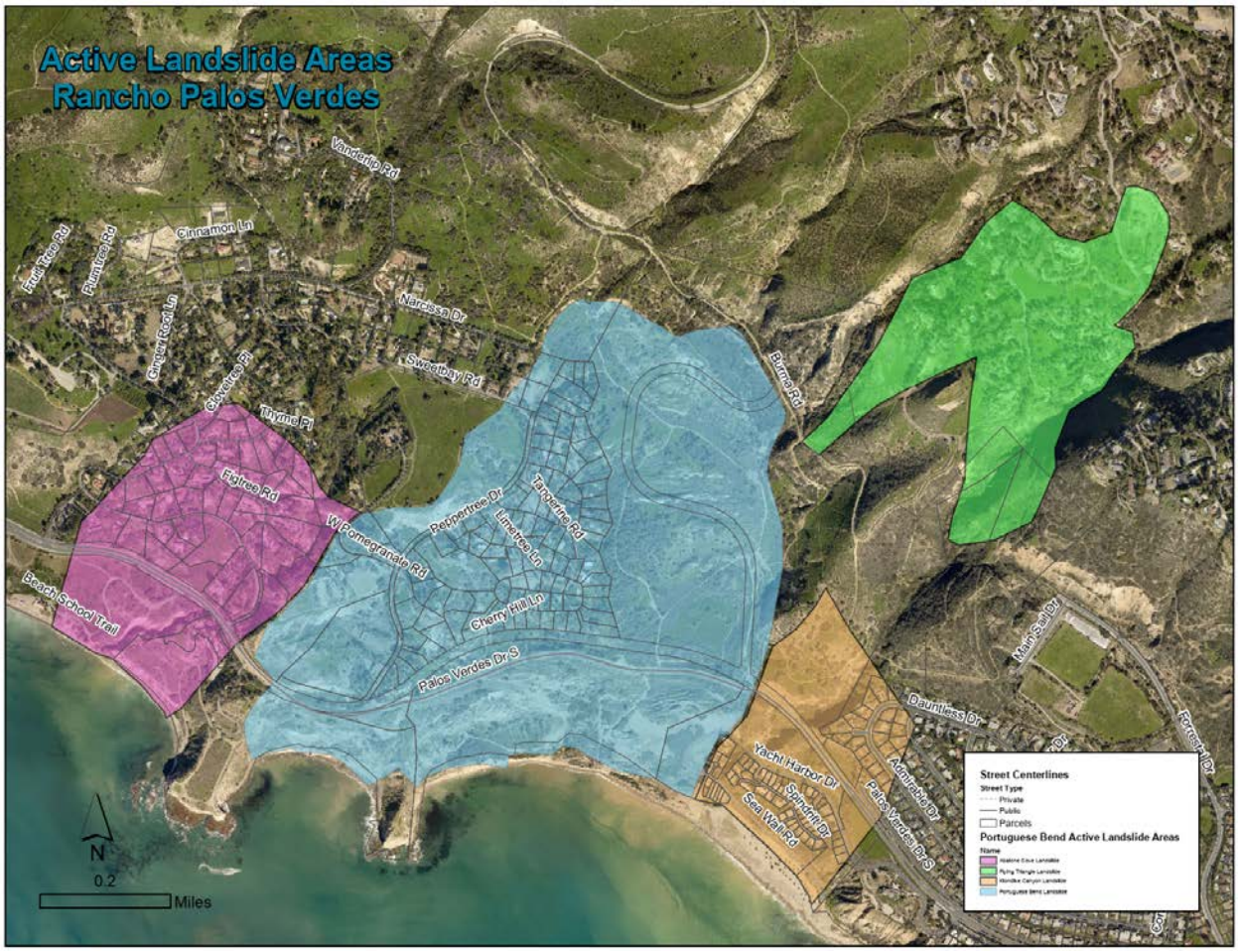
A: See **Local Conditions** below.

Local Conditions

According to the Rancho Palos Verdes General Plan (2018), development on the Palos Verdes Peninsula has taken advantage of natural plateaus, but, in some areas, steep slopes have created difficulties for access, utility service, and site improvements, resulting in constrained urban development. Within the planning area, 40% to 50% of all land area falls into the category of steep slopes (inclines of approximately 25% and greater).

A series of 13 staircase marine terraces developed surrounding the Palos Verdes Peninsula during the late Pleistocene and Holocene geologic times (the last few hundred thousand years). The landscape in parts of this area has also been significantly modified by the movement of massive landslides during the time between the formation of the oldest terraces and the present.

Map: Rancho Palos Verdes Active Landslide Areas
(Source: City of Rancho Palos Verdes)



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

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

A: See **Impact of Earth Movement in the Project Area** below.

Impact of Earth Movement in the Project Area

Based on the risk assessment, it is evident that earthquakes will continue to have potentially devastating economic impacts to the project area. 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.

Tsunami

Previous Occurrences of Tsunamis in Rancho Palos Verdes .

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

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

A: See **Previous Occurrences of Tsunami in the Project Area** below.

History has shown that the probability of a tsunami in the planning area is a relatively low threat and there is not considered to be any threat to the City of Rolling Hills Estates given that the City has no coastline.

However, the planning area has 7 ½ miles of coastline in the City of Rancho Palos Verdes. If a tsunami should occur, the consequences would be great. The impact could cause loss of life, destroy many high-priced homes along the bluffs and greatly affect City's many coastal public parks and commercial businesses, such as the Trump National Golf Club and the Terranea Resort. Even if all residents and visitors were safely evacuated, the damage to property would still be tremendous. Fortunately, the planning area has yet to be significantly impacted by a Tsunami event.

Previous Occurrences of Tsunamis in Los Angeles County

Tsunamis have been reported since ancient times. They have been documented extensively in California since 1806. Although the majority of tsunamis have occurred in Northern California, Southern California has been impacted as well. In the 1930's, four tsunamis struck the Los Angeles County, Orange County, and San Diego County coastal areas. In Orange County the tsunami wave reached heights of 20 feet or more above sea level. In 1964, following the Alaska Earthquake (Magnitude 8.2), tidal surges of approximately 4 feet to 5 feet hit the Huntington Harbor area causing moderate damage. Most recently, the 2011 M8.9 earthquake in Japan triggered tsunamis as far as the California coast, with Crescent City experiencing the most damage.

Table: Tsunami Events in California 1930-2013
(Source: Worldwide Tsunami Database, www.ngdc.noaa.gov)

Date	Location	Maximum Run up*(m)	Earthquake Magnitude
08/31/1930	Redondo Beach	6.10	5.2
08/31/1930	Santa Monica	6.10	5.2
08/31/1930	Venice	6.10	5.2
03/11/1933	La Jolla	0.10	6.3
03/11/1933	Long Beach	0.10	6.3
08/21/1934	Newport Beach	12.00	Unknown
02/09/1941	San Diego	Unknown	6.6

10/18/1989	Monterey	0.40	7.1
10/18/1989	Moss Landing	1.00	7.1
10/18/1989	Santa Cruz	0.10	7.1
04/25/1992	Arena Cove	0.10	7.1
04/25/1992	Monterey	0.10	7.1
09/01/1994	Crescent City	0.14	7.1
11/04/2000	Point Arguello	5.00	Unknown
6/15/2005	N. California	0.10	7.2

* Maximum Run up (M) -The maximum water height above sea level in meters. The run-up is the height the tsunami reached above a reference level such as mean sea level. It is not always clear which reference level was used.

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

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

A: See **Local Conditions** below.

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

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

A: See **Local Conditions** below.

Local Conditions

The probability of a tsunami in the planning area is a relatively low threat and there is not considered to be any threat to the City of Rolling Hills Estates given that the City has no coastline.

However, the planning area has 7 ½ miles of coastline in the City of Rancho Palos Verdes. If a tsunami should occur, the consequences would be great. The impact could cause loss of life, destroy many high-priced homes along the bluffs and greatly affect City's many coastal public parks and commercial businesses, such as the Trump National Golf Club and the Terranea Resort. Even if all residents and visitors were safely evacuated, the damage to property would still be tremendous. Fortunately, the planning area has yet to be significantly impacted by a Tsunami event.

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

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

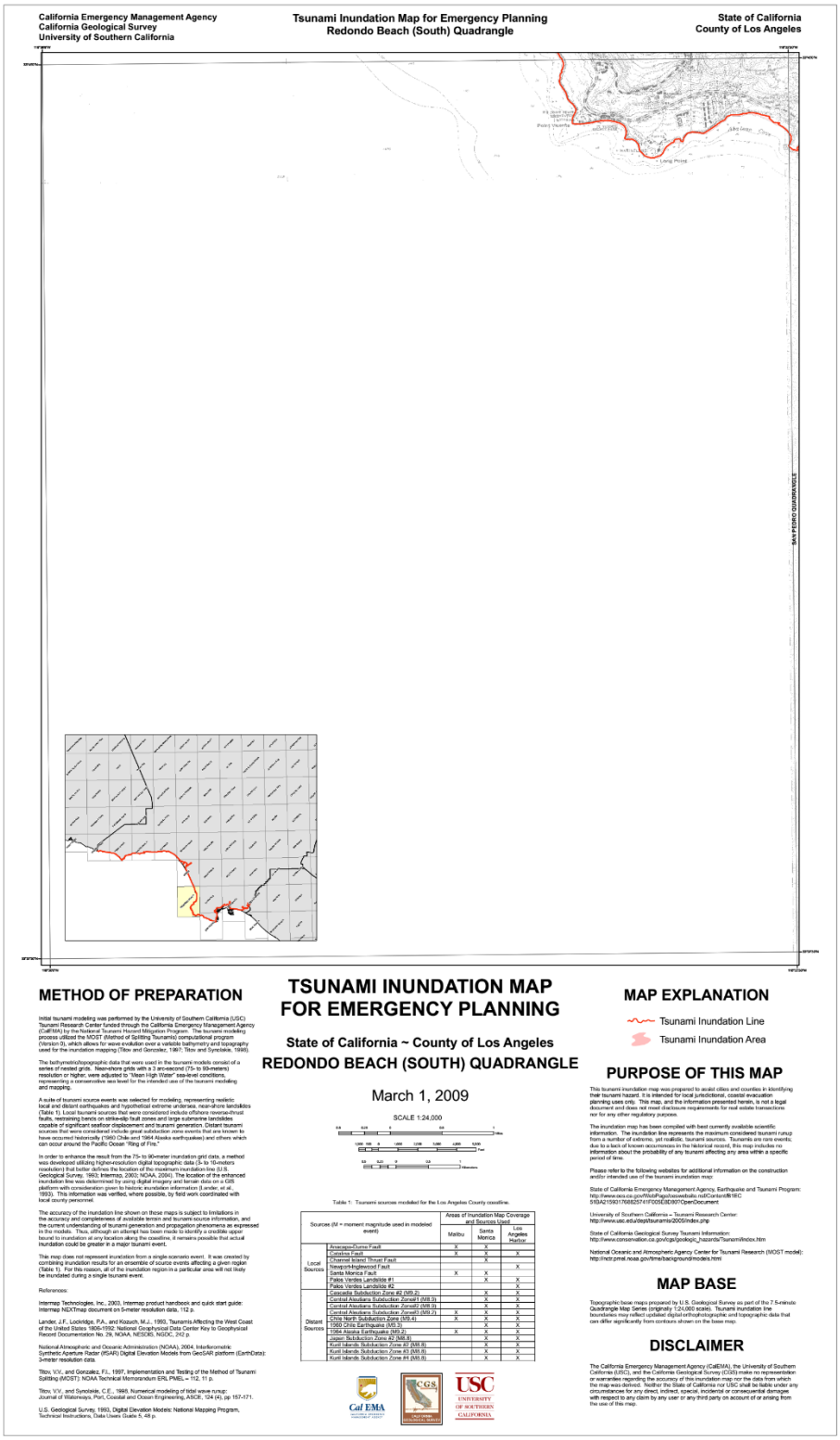
A: See **Impact of Earth Movement in the Project Area** below.

Impact of Tsunamis in Rancho Palos Verdes

Based on the risk assessment, it is evident that earthquakes will continue to have potentially devastating economic impacts to the project area. 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.

Map: Tsunami Inundation Map – Redondo Beach (South) Quadrangle (Source: State of California Department of Conservation)



California Emergency Management Agency
California Geological Survey
University of Southern California

Tsunami Inundation Map for Emergency Planning
Redondo Beach (South) Quadrangle

State of California
County of Los Angeles

SAN PEDRO QUADRANGLE

METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 3), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 93-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea-level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

The accuracy of the inundation line shown on these maps is subject to limitations in the accuracy and completeness of available terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena as expressed in the models. Thus, although an attempt has been made to identify a credible upper bound to inundation at any location along the coastline, it remains possible that actual inundation could be greater in a major tsunami event.

This map does not represent inundation from a single scenario event. It was created by combining inundation results for an ensemble of source events affecting a given region (Table 1). For this reason, all of the inundation region in a particular area will not likely be inundated during a single tsunami event.

References:

Intermap Technologies, Inc., 2003, Intermap product handbook and quick start guide: Intermap NEXTmap document on 5-meter resolution data, 112 p.

Lander, J.F., Lockridge, P.A., and Kozuch, M.J., 1993, Tsunamis Affecting the West Coast of the United States 1806-1992: National Geophysical Data Center Key to Geophysical Record Documentation No. 29, NOAA, NESDIS, NGDC, 242 p.

National Atmospheric and Oceanic Administration (NOAA), 2004, Interferometric Synthetic Aperture Radar (IfSAR) Digital Elevation Models from GeoSAR platform (EarthData): 3-meter resolution data.

Titov, V.V., and Gonzalez, F.I., 1997, Implementation and Testing of the Method of Tsunami Splitting (MOST): NOAA Technical Memorandum ERL PMEL – 112, 11 p.

Titov, V.V., and Synolakis, C.E., 1998, Numerical modeling of tidal wave runup: Journal of Waterways, Port, Coastal and Ocean Engineering, ASCE, 124 (4), pp 157-171.

U.S. Geological Survey, 1993, Digital Elevation Models: National Mapping Program, Technical Instructions, Data Users Guide 5, 46 p.

TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of Los Angeles

REDONDO BEACH (SOUTH) QUADRANGLE

March 1, 2009

SCALE 1:24,000

Table 1: Tsunami sources modeled for the Los Angeles County coastline.

Sources (M = moment magnitude used in modeled event)		Areas of Inundation Map Coverage and Sources Used		
		Malibu	Santa Monica	Los Angeles Harbor
Local Sources	Anacapa/Dume Fault	X	X	
	Catalina Fault	X	X	X
	Channel Island Thrust Fault		X	
	Newport-Inglewood Fault			X
	Santa Monica Fault	X	X	
	Palos Verdes Landslide #1		X	X
	Palos Verdes Landslide #2			X
Distant Sources	Cascadia Subduction Zone #2 (M9.2)		X	X
	Central Aleutians Subduction Zone#1 (M8.3)		X	X
	Central Aleutians Subduction Zone#2 (M9.7)	X	X	X
	Chile North Subduction Zone (M9.4)	X	X	X
	1960 Chile Earthquake (M9.5)		X	X
	1964 Alaska Earthquake (M9.2)	X	X	X
	Japan Subduction Zone #2 (M8.8)		X	X
	Kuril Islands Subduction Zone #7 (M8.8)		X	X
	Kuril Islands Subduction Zone #3 (M8.8)		X	X
	Kuril Islands Subduction Zone #4 (M8.8)		X	X

MAP EXPLANATION

Tsunami Inundation Line

Tsunami Inundation Area

PURPOSE OF THIS MAP

This tsunami inundation map was prepared to assist cities and counties in identifying their tsunami hazard. It is intended for local jurisdictional, coastal evacuation planning uses only. This map, and the information presented herein, is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose.

The inundation map has been compiled with best currently available scientific information. The inundation line represents the maximum considered tsunami runup from a number of extreme, yet realistic, tsunami sources. Tsunamis are rare events; due to a lack of known occurrences in the historical record, this map includes no information about the probability of any tsunami affecting any area within a specific period of time.

Please refer to the following websites for additional information on the construction and/or intended use of the tsunami inundation map:

State of California Emergency Management Agency, Earthquake and Tsunami Program: http://www.oes.ca.gov/WebPages/oeswebsite.nsf/Content/B18C510A215931766825741F005E0D80?OpenDocument

University of Southern California – Tsunami Research Center: http://www.usc.edu/dept/tsunamis/2005/index.php

State of California Geological Survey Tsunami Information: http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Index.htm

National Oceanic and Atmospheric Agency Center for Tsunami Research (MOST model): http://nctr.pmel.noaa.gov/time/background/models.html

MAP BASE

Topographic base maps prepared by U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital orthophotographic and topographic data that can differ significantly from contours shown on the base map.

DISCLAIMER

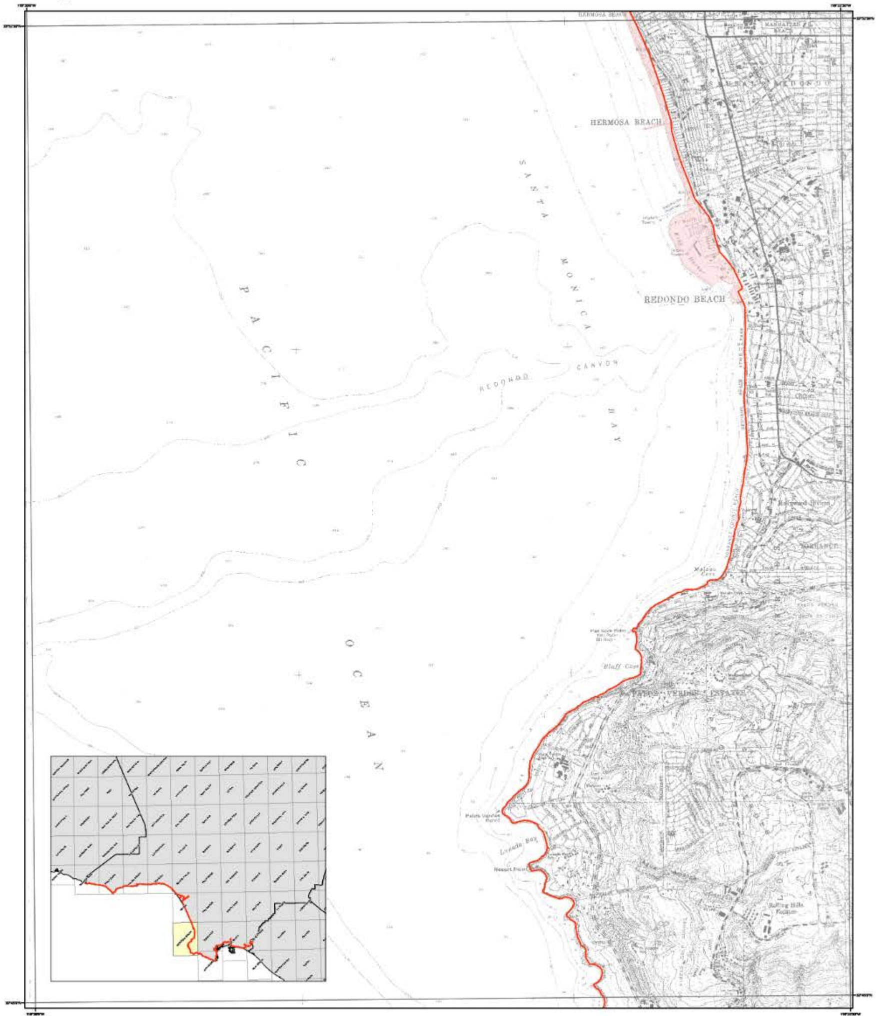
The California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS) make no representation or warranties regarding the accuracy of this inundation map nor the data from which the map was derived. Neither the State of California nor USC shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.

Map: Tsunami Inundation Map – Redondo Beach Quadrangle
(Source: State of California Department of Conservation)

California Emergency Management Agency
California Geological Survey
University of Southern California

Tsunami Inundation Map for Emergency Planning
Redondo Beach Quadrangle

State of California
County of Los Angeles



METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

The accuracy of the inundation line shown on these maps is subject to limitations in the accuracy and completeness of available terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena as expressed in the models. Thus, although an attempt has been made to identify a credible upper bound to inundation at any location along the coastline, it remains possible that actual inundation could be greater in a major tsunami event.

This map does not represent inundation from a single scenario event. It was created by combining inundation results for an ensemble of source events affecting a given region (Table 1). For this reason, all of the inundation region in a particular area will not likely be inundated during a single tsunami event.

References:

Intermap Technologies, Inc., 2003, Intermap product handbook and quick start guide: Intermap NEXTmap document on 5-meter resolution data, 112 p.

Lander, J.F., Lockridge, P.A., and Kozuch, M.J., 1993, Tsunamis Affecting the West Coast of the United States 1806-1992: National Geophysical Data Center Key to Geophysical Record Documentation No. 29, NOAA, NESDIS, NGDC, 242 p.

National Atmospheric and Oceanic Administration (NOAA), 2004, Interferometric Synthetic Aperture Radar (IfSAR) Digital Elevation Models from GeoSAR platform (EarthData): 3-meter resolution data.

Titov, V.V., and Gonzalez, F.I., 1997, Implementation and Testing of the Method of Tsunami Splitting (MOST): NOAA Technical Memorandum ERL PMEL – 112, 11 p.

Titov, V.V., and Synolakis, C.E., 1998, Numerical modeling of tidal wave runup: Journal of Waterways, Port, Coastal and Ocean Engineering, ASCE, 124 (4), pp 157-171.

U.S. Geological Survey, 1993, Digital Elevation Models: National Mapping Program, Technical Instructions, Data Users Guide 5, 48 p.

TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of Los Angeles
REDONDO BEACH QUADRANGLE

March 1, 2009

SCALE 1:24,000

Table 1: Tsunami sources modeled for the Los Angeles County coastline.

Sources (M = moment magnitude used in modeled event)		Areas of Inundation Map Coverage and Sources Used		
		Malibu	Santa Monica	Los Angeles Harbor
Local Sources	Anacapa-Dume Fault	X	X	
	Catalina Fault	X	X	X
	Channel Island Thrust Fault		X	
	Newport-Inglewood Fault			X
	Santa Monica Fault	X	X	
	Palos Verdes Landslide #1		X	X
	Palos Verdes Landslide #2			X
Distant Sources	Cascadia Subduction Zone #2 (M9.2)		X	X
	Central Aleutians Subduction Zone#1 (M8.9)		X	X
	Central Aleutians Subduction Zone#2 (M8.9)		X	X
	Central Aleutians Subduction Zone#3 (M9.2)	X	X	X
	Chile North Subduction Zone (M9.4)	X	X	X
	1960 Chile Earthquake (M9.3)		X	X
	1964 Alaska Earthquake (M9.2)	X	X	X
	Japan Subduction Zone #2 (M8.8)		X	X
	Kuril Islands Subduction Zone #2 (M8.8)		X	X
	Kuril Islands Subduction Zone #3 (M8.8)		X	X
	Kuril Islands Subduction Zone #4 (M8.8)		X	X

Cal EMA · CGS California Geological Survey · USC University of Southern California

MAP EXPLANATION

Tsunami Inundation Line
Tsunami Inundation Area

PURPOSE OF THIS MAP

This tsunami inundation map was prepared to assist cities and counties in identifying their tsunami hazard. It is intended for local jurisdictional, coastal evacuation planning uses only. This map, and the information presented herein, is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose.

The inundation map has been compiled with best currently available scientific information. The inundation line represents the maximum considered tsunami runup from a number of extreme, yet realistic, tsunami sources. Tsunamis are rare events; due to a lack of known occurrences in the historical record, this map includes no information about the probability of any tsunami affecting any area within a specific period of time.

Please refer to the following websites for additional information on the construction and/or intended use of the tsunami inundation map:

State of California Emergency Management Agency, Earthquake and Tsunami Program:
http://www.oes.ca.gov/WebPage/oeswebsite.nsf/Content/B1EC51BA215931768825741F005E8D80?OpenDocument

University of Southern California – Tsunami Research Center:
http://www.usc.edu/dept/tsunamis/2005/index.php

State of California Geological Survey Tsunami Information:
http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/index.htm

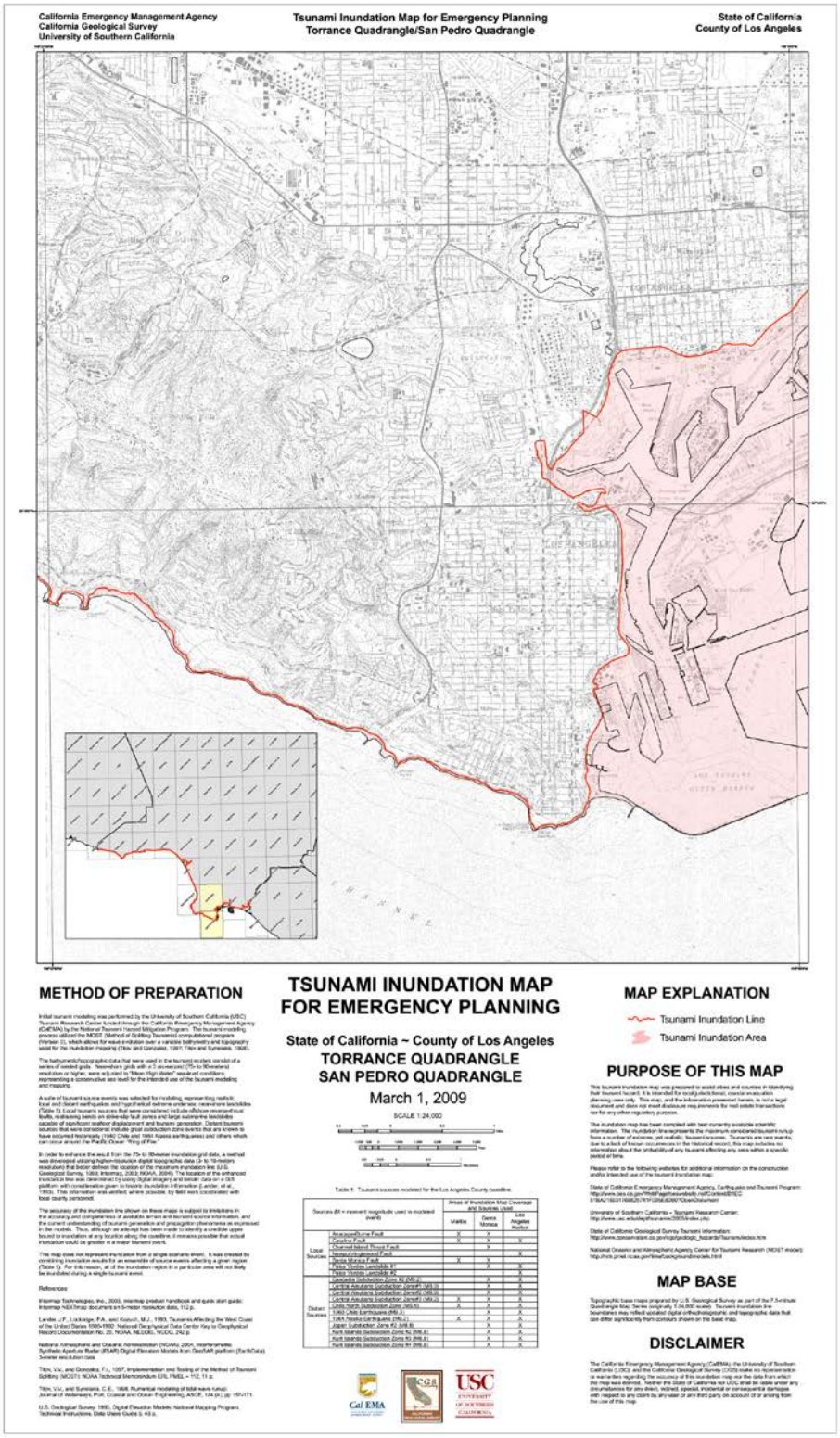
National Oceanic and Atmospheric Agency Center for Tsunami Research (MOST model):
http://nctr.pmel.noaa.gov/time/background/models.html

MAP BASE

Topographic base maps prepared by U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital orthophotographic and topographic data that can differ significantly from contours shown on the base map.

DISCLAIMER

Map: Tsunami Inundation Map – Torrance Quadrangle/San Pedro Quadrangle (Source: State of California Department of Conservation)



Hazardous Material Events

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

Q: Does the plan include information on **previous occurrences** of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Previous Occurrence of Hazardous Material Events in Rancho Palos Verdes and Rolling Hills Estates** below.

Previous Occurrence of Hazardous Material Events in Rancho Palos Verdes and Rolling Hills Estates

According to the Planning Team, there have been no significant hazardous materials events in the project area.

Previous Occurrences of Hazardous Materials Release in Los Angeles County

There are small-scale hazardous materials releases on a regular basis. However, Los Angeles County has never experienced a large-scale life-threatening hazardous materials release.

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

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

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

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

Local Conditions

Chemicals, petroleum products, explosives, radiological materials and other hazardous materials are commonly used and transported in and through the planning area. Also, industry throughout the county is making technological changes that include an ever-increasing number of sophisticated hazardous materials processes. Transportation of hazardous materials by rail, highway, air, and pipeline present a totally different situation when an accidental release occurs.

The planning area does not have any heavy industry, which effectively limits the quantity of hazardous materials. The following locations, however, could subject the Planning Area to significant hazardous materials incidents:

1. Kaiser Medical Hospital – located along the Planning Area's north-eastern boundary
2. Pacific Coast Highway – arterial highway; potential transportation incidents
3. Interstate 110 – located east of the Planning Area; potential transportation incidents
4. Ports – Port of Los Angeles and Port of Long Beach; potential hazardous materials/terrorism/transportation incidents
5. Oil Refineries – located on Lomita Boulevard and the Crenshaw Boulevard Torrance Refinery; potential hazardous materials incident
6. LAX Airport – located north of the Planning Area; potential hazardous materials/terrorism/transportation incidents

The planning area is characterized by year-round mild to warm temperatures and light winds. The dominant wind pattern is daytime, offshore breezes from the northwest, occasionally broken by very strong Santa Ana winds from the northeasterly direction, resulting in wind velocities of up to 70 miles per hour. The Santa Ana winds typically occur during the autumn and winter months. The predominant offshore breezes could assist in the dispersal of airborne pollutants; however, an inversion layer of warm air occasionally overlaps the offshore breezes and may trap pollutants, particularly during the summer months. This phenomenon may compound health concerns related to degraded air quality.

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

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

A: See **Impact of Hazardous Material Events in Rancho Palos Verdes and Rolling Hills Estates** below.

Impacts of Hazardous Material Events in Rancho Palos Verdes and Rolling Hills Estates

Based on the risk assessment, it is evident that hazardous material events continue to have potentially devastating impacts to certain parts of the planning area.

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

- ✓ Potential for fires and explosions;
- ✓ Disruption of transportation systems;
- ✓ Destruction of utilities and other public services;
- ✓ Damage to public infrastructure and facilities;
- ✓ Residential displacement, including evacuations;
- ✓ Individuals trapped and injured in unsafe conditions;
- ✓ Health issues related to discharges or releases;

- ✓ Need for emergency food, shelter, and medical care;
- ✓ Economic impacts, both short and long-term;
- ✓ Water pollution and quality degradation.

Human-Caused Events

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

Q: Does the plan include information on **previous occurrences** of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Previous Occurrences of Human-Caused Events in Rancho Palos Verdes and Rolling Hills Estates** below.

Previous Occurrences of Human-Caused Events in Rancho Palos Verdes and Rolling Hills Estates

According to the Planning Team, there have been no significant human-caused events in the project area.

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

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

Previous Occurrences of Human-Caused Events in Los Angeles County

There has been history of civil unrest and acts of terrorism in Los Angeles County. These events are summarized below in "Local Conditions".

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

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

Local Conditions

Terrorism

Terrorism is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. Terrorists often use threats to create fear among the public, to try to convince citizens that their government is powerless to prevent terrorism, and to get immediate publicity for their causes. The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as one of two types: domestic terrorism or international terrorism.

> ***Domestic Terrorism*** *- involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction.*
>
> ***International Terrorism*** *- involves groups or individuals whose terrorist activities are foreign- based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries.*

A terrorist attack can take several forms, depending on the technological means available to the terrorist, the nature of the political issue motivating the attack, and the points of weakness of the terrorist's target. Bombings are the most frequently used terrorist method in the United States. Other possibilities include an attack at transportation facilities, an attack against utilities, other public services or an incident involving chemical or biological agents.

Throughout California and Los Angeles County there is a nearly limitless number of potential terrorist targets, including government facilities; schools; religious institutions; gathering places (shopping centers, entertainment venues, etc.); abortion clinics; power plants and other utility infrastructure; transportation infrastructure; oil refineries, water storage facilities; locations of high profile individuals; and, financial institutions.

Cyber Terrorism

Cyber terrorism is the act of Internet terrorism in terrorist activities, including acts of deliberate, large-scale disruption of computer networks, especially of personal computers attached to the Internet, by the means of tools such as computer viruses. Cyber terrorism can be also defined as the intentional use of computer, networks, and public internet to cause destruction and harm for personal objectives.

Civil Disorder

Civil disorder, also known as civil unrest or civil strife, is a broad term that is typically used by law enforcement to describe unrest caused by a group of people. Civil disturbance can include a form of protest against major socio-political problems, but also can simply be an expression of antisocial values. The “Occupy Movement” was an international progressive socio-political movement that expressed opposition to social and economic inequality and to the perceived lack of "real democracy" around the world. It aimed primarily to advance social and economic justice and new forms of democracy. The movement had many different scopes, since local groups often had different focuses, but its prime concerns included how large corporations (and the global financial system) control the world in a way that disproportionately benefited a minority, undermined democracy and caused instability. The Movement came to Los Angeles City Hall in September 2011.

Active Shooter

There are no reported events of an active shooter in Rancho Palos Verdes and Rolling Hills Estates; however, several schools and workplaces throughout the United States have witnessed tragic active shooting incidents in recent years. On February 14, 2018, seventeen students and staff at Marjory Stoneman Douglas High School in Parkland, Florida were fatally shot and seventeen others were wounded, making the shooting one of the deadliest school massacres in the United States, surpassing the Columbine High School massacre as the worst high school shooting in the United States.

The Sandy Hook Elementary School shooting on December 14, 2012 was the result of an active shooter. In this incident, a single man shot and killed 20 children and six staff at the school. Additionally, on February 14, 2018 a 19-year old gunman killed 17 students and injured 17 others at Douglas High School in Parkland, Florida.

An active shooter event could occur at any place, any time. Local law enforcement will generally be the first responder and should maintain trained personnel to handle these situations.

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

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

A: See **Impact of Human-Caused Events in Rancho Palos Verdes and Rolling Hills Estates** below.

Impacts of Human-Caused Events in Rancho Palos Verdes and Rolling Hills Estates

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

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;
- ✓ Secondary fires and explosions;
- ✓ Economic impacts (jobs, sales, tax revenue) upon the community;
- ✓ Significant demands on emergency services.

Utility-Related Events

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

Q: Does the plan include information on **previous occurrences** of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Previous Occurrences of Utility-Related Events in Rancho Palos Verdes and Rolling Hills Estates** below.

Previous Occurrences of Utility-Related Events in Rancho Palos Verdes and Rolling Hills Estates

Power Failure/Stoppages

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

Drought/Water Shortages

Fortunately, there is no severe history of drought within the project area. However, there was a Cal Water pipe break during 2019 that caused a disruption in water delivery interrupting service to much of the project area.

Natural Gas Pipelines

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

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

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

Previous Occurrences of Utility-Related Events in Los Angeles County

Power Failure and Stoppages

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

pouring out of manholes and flowing directly into storm drains. It took 24 hours before the beaches were closed.

Drought/Water Shortages

California's drought from 2012-2016 set several records:
• The period from 2012 to 2014 ranked as the driest three consecutive years for statewide precipitation.
• 2014 set new climate records for statewide average temperatures and for record-low water allocations in the State Water Project and federal Central Valley Project.
• 2013 set minimum annual precipitation records for many communities.

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

Natural Gas Pipelines

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

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

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

Local Conditions

Power Failure and Stoppages

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

The massive 2011 Southern California electricity outage brought to light many critical issues surrounding the state's power generation and distribution system, including its dependency on out-of-state resources. Although California has implemented effective energy conservation

programs, the state continues to experience both population growth and weather cycles that contribute to a heavy demand for power.

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

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

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

Drought/Water Shortages

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

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

One dry year does not normally constitute a drought in California, but serves as a reminder of the need to plan for droughts. California's extensive system of water supply infrastructure — its reservoirs, groundwater basins, and inter-regional conveyance facilities — mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.

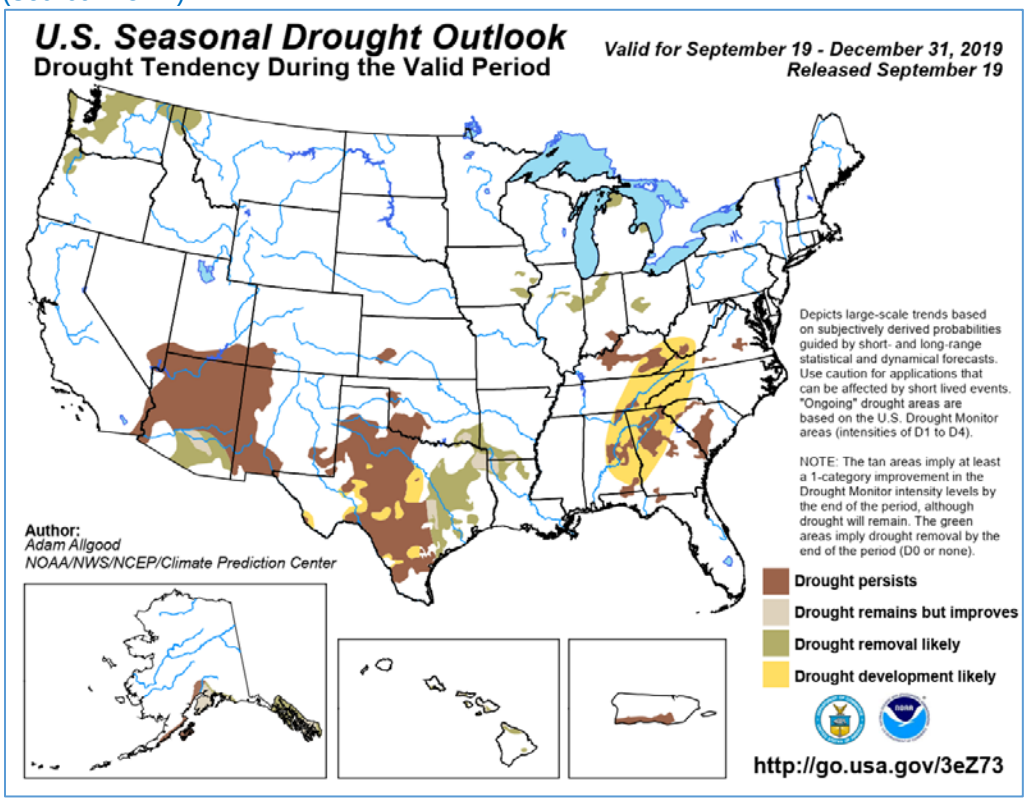
Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly,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

There are four different ways that drought can be defined:

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

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

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



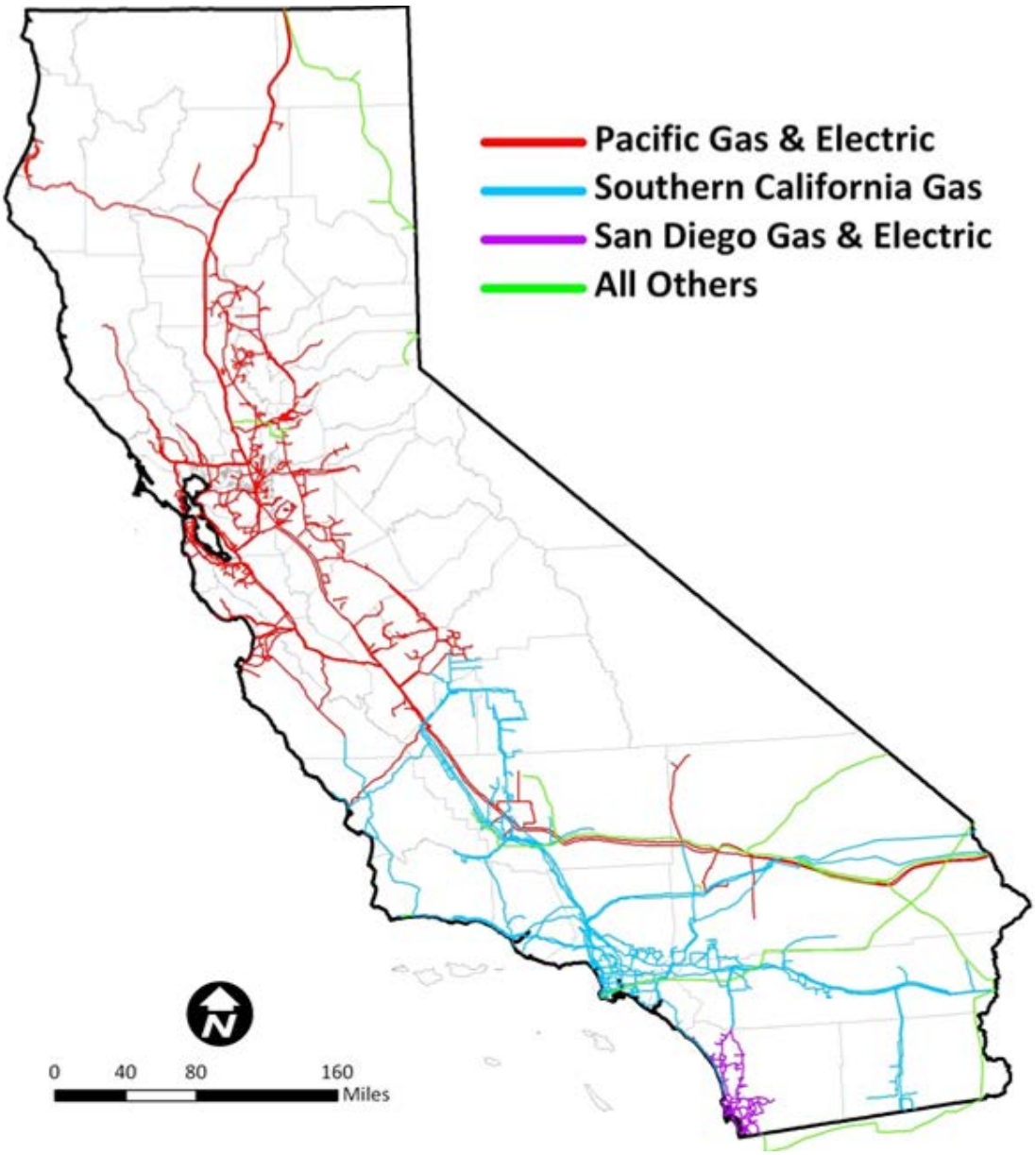
Natural Gas Pipelines

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

On September 9, 2010, a 30-inch steel natural gas transmission pipeline owned and operated by PG&E ruptured and exploded in the City of San Bruno residential neighborhood. The blast and ensuing inferno resulted in 8 confirmed deaths, 66 reported injuries, 34 destroyed structures, and 8 damaged structures. Cal OES has identified preliminary damage estimates at $15.4 million, including $2.5 million for debris removal, $10.2 million for protective measures, $2.1 million for roads and bridges, and $0.6 million for utilities and other facilities. Investigations into the cause of the explosion are under way by the National Safety Transportation Board (NSTB), the California Public Utilities Commission (CPUC), and PG&E. Although it will not be confirmed until official investigations are completed, initial speculation points to the weakening of the 60-year-old pipeline due to corrosion. The day after the explosion, the CPUC asked PG&E to provide a list of its top 100 high-priority projects to upgrade or replace portions of the pipeline for reasons of public safety, as well as information on the status of listed projects. The list was published on September 21, 2010. Although targeted for repair several years ago, the San Bruno pipeline was not on the list.

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

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



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

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

A: See **Impact of Utility-Related Events in Rancho Palos Verdes and Rolling Hills Estates** below.

Impacts of Utility-Related Events in Rancho Palos Verdes and Rolling Hills Estates

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

Impacts that 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;
- ✓ Negative impact on commercial and residential property values.

PART III: MITIGATION STRATEGIES

Mitigation Strategies

Overview of Mitigation Strategy

As the cost of damage from natural disasters continues to increase nationwide, the Cities of Rancho Palos Verdes and Rolling Hills Estates recognize 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 planning area.

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 Cities of Rancho Palos Verdes and Rolling Hills Estates;
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 plans within the cities including the Emergency Operations Plan and General Plan.

Mitigation Measure Categories

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

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

  Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

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

Q&A | ELEMENT C. MITIGATION STRATEGY | C3

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

A: See **Goals** below.

Goals

At the beginning of the 2019 planning process, the Planning Team agreed to keep the five goals from the 2014 Plan. The goals continue to be aligned with the risk assessment and Planning Team input and represents a long-term vision for hazard reduction or enhanced mitigation capabilities.

Each goal is supported by mitigation action items (see Mitigation Actions Matrix). The five 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 cities 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.

How are the Mitigation Action Items Organized?

The action items are a listing of activities in which planning area 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 a “coordinating organization” - 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.

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

Planning Mechanism

It's important that each action item be implemented. Perhaps the best way to ensure implementation is through integration with one or many of the planning area's existing "planning mechanisms" including the General Plans, Capital Improvement Programs, General Funds and grants. Opportunities for integration will be simple and easy in cases where the action item is already compatible with the content of the planning mechanism. As an example, if the action item calls for the creation of a floodplain ordinance and the same action is already identified in the General Plan's policies, then the General Plan will assist in implementation.

The Capital Improvement Program, depending on the budgetary environment, is updated every 5 years. The CIP includes infrastructure projects built and owned by each City. As such, the CIP is an excellent medium for funding and implementing action items from the Mitigation Plan. The Mitigation Actions Matrix includes several items from the existing CIP. The authors of the CIP served on the Planning Team and are already looking to funding addition Mitigation Plan action items in future CIPs.

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

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

Building and Infrastructure

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

Comments

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

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

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

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

Benefit and Cost Ratings

A general assessment of the benefits of proposed projects were weighed against relative costs as part of the project prioritization process. This 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. 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

The Planning Team stayed with the same priority rating as used in the 2014 Plan. Designations of "High", "Medium", and "Low" priority have been assigned to each action item using the following criteria:

Does the Action:

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

Can the Action:

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

Will the Action:

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

Is there:

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

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

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

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

Q: Does the plan document each jurisdiction's ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3)) c
A: See **Mitigation Actions Matrix** below.

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

Q: Does the plan identify and analyze a comprehensive range (different alternatives) of specific mitigation actions and projects to reduce the impacts from hazards? (Requirement §201.6(c)(3)(ii))
A: See **Mitigation Actions Matrix** below.

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

Q: Does the plan identify mitigation actions for every hazard posing a threat to each participating jurisdiction? (Requirement §201.6(c)(3)(ii))
A: See **Mitigation Actions Matrix** below.

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

Q: Do the identified mitigation actions and projects have an emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))
A: See **Mitigation Actions Matrix** below.

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

Q: Does the plan explain how the mitigation actions and projects will be prioritized (including cost benefit review)? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))
A: See **Mitigation Actions Matrix** below.

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

Q: Does the plan identify the position, office, department, or agency responsible for implementing and administering the action/project, potential funding sources and expected timeframes for completion? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D1

Q: Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D2

Q: Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D3

Q: Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))
A: See **Mitigation Actions Matrix** below.

Mitigation Actions Matrix

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

Table: Mitigation Actions Matrix – Rancho Palos Verdes

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Multi-Hazard Action Items														
MH-1 Integrate the goals and action items from the Plan into existing regulatory documents and programs, where appropriate.	✓ The Joint Hazard Mitigation Plan and its contents are discussed in the 2018 update to the Safety Element of the City's General Plan.	Hazard Mitigation Planning Subcommittee (HMS)	Ongoing	X	X	X	X	X	GF	H	L	H	Y	Revised
MH-2 Identify and pursue funding	✓ Successful California Water	City Manager's Office	Ongoing	X	X	X	X	X	GF	H	H	H	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
opportunities to develop and implement local mitigation activities.	Resources Storm Water/Flood Management Grant; ✓ Tiger 4 Federal Grant (San Ramon Stabilization) ✓ FEMA HMGP													
MH-3 HMS will continue to develop a sustainable process for implementing, monitoring, and evaluating regional mitigation activities.	o The HMS will meet semi-annually to monitor and evaluate regional mitigation activities.	HMS	Ongoing	X	X	X	X	X	GF	M	L	M	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
MH-4 Identify, improve, and sustain collaborative programs focusing on, public and private sector organizations, and individuals to avoid activity that increases risk to hazards.	✓ Adopted local code amendments for enhanced building, geotechnical, and fire safety. ✓ Published related information that is available at the public counter, printed handouts, city newsletter, list-serve messages, and on the website.	Community Development	Ongoing	X	X		X		GF	H	L	H	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	✓ Standardized plans and checklists made available for the public. ✓ Presented information on cable TV, at local school, and during annual B&S Month													
~~MH-5 Develop public and private partnerships to foster hazard mitigation program coordination and collaboration~~	~~✓ Maintain cooperative outreach with PVPLC~~ ~~✓ Integrate brush clearance support into waste~~	~~City Manager's Office, Public Works~~	~~Ongoing~~	~~X~~	~~X~~	~~X~~	~~X~~		~~GF~~			~~M~~		Deleted - redundant

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~with the City's HMS~~	~~hauler contract.~~													
MH-6 Develop inventories of critical facilities and infrastructure.	✓ Assess deterioration, deficiencies, and vulnerability to the identified hazards and prioritize mitigation projects. ✓ Planning Division is working with the South Bay Cities Council of Governments in Adaptation Planning	City Manager's Officer Public Works Building & Safety	Ongoing	X				X	GF	M	H	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	document, which identifies critical facilities throughout the City.													
MH-7 Strengthen emergency management program with maintained plans, training, and exercises.	✓ Emergency Operations Plan was updated in 2019. EOC Section training has been developed to train staff in their respective EOC positions. The City holds at least one	City Manager's Office	Ongoing	X	X	X	X	X	GF, GR	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	annual emergency preparedness exercise activating the EOC at Level III and utilizing the majority of staff in EOC positions.													
~~MH-8 Develop, enhance, and implement education programs aimed at mitigating natural hazards, and reducing the risk to citizens, public agencies, private property owners,~~	~~Enhanced building construction, geotechnical, and fire safety requirements Related information available at the public counter, on printed handouts, in city~~	~~City Manager's Office, Community Development LA County Fire Dept~~	~~Ongoing~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted – redundant

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~businesses, and schools.~~	~~newsletter, and on the website. Partial fee waivers for certain building construction and energy saving upgrades. Standardized plans and checklists made available for the public.~~													
MH-9 Use updated technical knowledge and tools to inform the public of hazard potential.	o Provide a separate public GIS web service that can be link from the City's website to show Hazard Maps	City Manager's Office, Planning, Public Works, GIS	Ongoing	X	X	X	X	X	GF, GR	M	L	M		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
MH-10 Maintain hazard warning systems to ensure effectiveness and efficiency and increase coordination between local jurisdictions and emergency service providers.	✓ Alert LA, Los Angeles County Regional Interoperability Community System ✓ Breaking News System ✓ Twitter Network	City Manager's Office	Ongoing	X	X	X	X	X	GF, GR	H	L	M	N	Revised
~~MH-11 Update and Incorporate the Regional Evacuation Routes into appropriate planning documents.~~	~~✓ Updated General Plan Safety Element in 2010.~~	~~City Manager's Office Planning Department~~	~~Ongoing~~	~~X~~	~~X~~			~~X~~	~~GF~~			~~H~~		Deleted – these maps are the responsibility of the County.
MH-12 Prepare a Pre-Disaster	o Establish restoration	City Manager's	5 years	X				X	GF, GR	H	M	M	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Recovery Plan including development of priorities for restoration of the community's infrastructure and vital public facilities following a disaster.	implementation procedures for vital facilities and establish decision making tools framework in the event of multiple site losses.	Office, Public Works Community Development												
MH-13 Develop policy for government to determine what reconstruction criteria should be applied to structures damaged during a disaster	o Adopted Chapter 34 and new State Existing Buildings Code o Develop additional zoning, building and reconstructi	Community Development	Ongoing	X					GF, GR	H	L	M	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	on policies and requirements for post-disaster situations. o Adopted California Building Code in 2016													
MH-14 Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure.	✓ Continue Landslide Road Maintenance Program. ✓ Continue Storm Drain User Fee Maintenance and CIP program. ✓ Continue Pavement	Public Works	Ongoing	X		X	X	X	GF, GR	H	L	H	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	✓ Management Program ✓ Continue Fuel Modification Program.													
MH-15 Place information on website and cable access channels to include information specific to residents, building code information, and educational information on damage prevention.	✓ Completed task now maintaining.	City Manager's Office, Community Development, & LACoFD	Ongoing	X	X			X	GF	M	L	H	N	Revised
~~MH-16 Establish policy to ensure~~		~~Public Works and Building~~	~~1-2 years~~	~~X~~				~~X~~	~~GF~~			~~H~~		Deleted (redundant)

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~mitigation projects are in place to safeguard critical facilities.~~		~~and Safety Division~~												
MH-16 Incorporate the building inventory into the Mitigation Plan update.	✓ Completed during 2014 update to the Mitigation Plan. ✓ Future changes to the building inventory will be incorporated into future updates to the Mitigation Plan.	Public Works and Building and Safety Division	Completed	X				X	GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
MH-17 Educate City staff on federal cost-share & grant programs, and other related federal programs so the full array of assistance available is understood.	✓ Register appropriate staff for courses in the federal Public Assistance Reimbursement Process. ✓ Develop an internal process for tracking and preparing reimbursement requests following a disaster.	City Manager's Office Finance/IT	Ongoing	X			X	X	GF, GR	M	L	H	N	Revised
~~MH-19 Determine the economic feasibility of mitigating natural hazards~~		~~City Manager's Office~~	~~Ongoing~~	~~X~~										Deleted (redundant)

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~that 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.~~														
MH-18 Developed a Climate Action Plan.	✓ Completed through the South Bay Cities Council of Governments in 2017.	City Manager's Office	Completed	X		X	X		GF	M	H	H	N	Completed
MH-19 Installation of an Emergency	✓ City staff worked with outside	City Manager's Office	Completed	X		X	X	X	GF	H	L	H	Y	Completed

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Communications Center (ECC) trailer and communications antenna on Rancho Palos Verdes City Hall Campus	vendors and members of the Palos Verdes Alert Network to install project in 2007.													
MH-20 Implementation of Emergency Preparedness Committee "Beauty and the Beast" emergency preparedness presentation for community education.	✓ Initiated 2010-2011	City Manager's Office	Ongoing	X	X	X	X	X	GF	M	L	H	N	Revised
MH-21 Emergency Preparedness	✓ Program initiated in	City Manager's Office	2012-13	X	X	X	X	X	GF	M	L	H	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Committee emergency preparedness public service announcements program.	the FY 2010-11.													
MH-22 Implemented 3-day Emergency Personal Preparedness Kits City Council prize drawing program.	✓ Program began in FY 2011-12.	City Manager's Office	Annual	X	X	X	X	X	GF	M	L	H	N	Revised
~~MH-23 City Emergency Operations Plan updated and approved by City Council.~~	~~✓ Completed December 2010~~	~~City Manager's Office~~	~~2010~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted - redundant
~~MH-24 City Emergency Operations Plan~~	~~As of 5-14-12, the plan is still at~~	~~City Manager's Office~~	~~2012~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted – redundant

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~sent to Cal OES for approval.~~	~~Cal OES for review.~~													
~~MH-25 Cal OES Grant approved for production of All-Hazard Multijurisdictional Mitigation Plan.~~	~~Submitted application November 2010~~	~~City Manager's Office~~	~~2011-2012~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF, GR~~			~~H~~		Deleted – redundant
~~MH-26 Conducted NIMS ICS 300 training for all City Emergency Operations Center section management staff.~~	~~✓ Provided training as referenced in the City's Emergency Operations Plan and to fulfill NIMS requirements.~~	~~City Manager's Office~~	~~2011~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted – not mitigation
MH-27 Maintain Disaster Service Volunteer Program.	✓ Implemented program in 2013.	City Manager's Office	2011-2012	X	X	X	X	X	GF	H	L	H	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~MH-28 Provided Emergency Operations Center (EOC) Section training for all EOC Staff.~~	~~✓ City staff and emergency management consultant provided structure and criteria for EOC section training classes.~~	~~City Manager's Office~~	~~2011~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted – not mitigation
MH-29 Conduct functional emergency preparedness exercise with a theme of mitigation or recovery	✓ At least one functional staff emergency preparedness exercise is held by the City each year as recommended by Cal OES and	City Manager's Office	Annually	X	X	X	X	X	GF, GR	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	FEMA in order to received disaster reimbursement funds.													
~~MH-30 Send emergency preparedness staff to workshops, seminars, and annual conferences for continual update of emergency management practices.~~	~~✓ City staff is sent to emergency preparedness training opportunities as often as possible.~~	~~City Manager's Office~~	~~Ongoing~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted – not mitigation
MH-31 Implemented emergency cache supply system.	✓ City staff and emergency preparedness consultant	City Manager's Office	Ongoing	X	X	X	X	X	GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	completed program and training of staff in 2011.													
~~MH-32 Participate in LA County Department of Health Services Antibiotics (Doxycycline) program.~~	~~✓ City participates in program to assist with continuity of government if staff and/or council member's are affected by a biological weapons attack.~~	~~City Manager's Office~~	~~Ongoing~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted – not mitigation

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~MH-33 Implementing American Red Cross (ARC) human shelter network.~~	~~o City shelter facilities are inspected and approved by ARC. Memorandum of Understanding between City and ARC coming soon.~~	~~City's Manager's Office~~	~~2012~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted – not mitigation
MH-34 Purchase Mobile EOC.	o Explore possibility of purchasing a mobile EOC in case primary and secondary EOC's are rendered out of commission and/or another	City Manager's Office	5 years	X	X	X	X	X	GF, GR	H	H	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	Peninsula City needs assistance.													
MH-35 Secure funding for seismic retrofit or reconstruction of the City Hall Campus with independent EOC.	o The City Hall Campus will not withstand a strong earthquake or other type of disaster. The primary EOC is located within the building and also subject to collapse or severe damage.	City Manager's Office	5 years	X	X	X	X	X	GR	H	H	H	Y	Revised
MH-36 Secure funding for utility vehicles and earthmoving equipment.	o Front Loader, Haul Truck, 4-wheel drive	City Manager's Office, Public Works	1-3 years	X	X	X	X	X	GR	H	H	H	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	vehicles, ATV's and/or "Gator" utility vehicles.													
MH-37 Secure funding for an emergency management consultant to provide Memorandum of Understanding's (MOU's) between city and vendors for food, water, temporary housing, and heavy equipment.	o Cal OES and FEMA recommend cities be prepared by having MOU's in place first available service, protection from price gouging practices, and to simplify business transactions.	City Manager's Office	1-3 years	X	X	X	X	X	GR	H	H	H	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
MH-38 Secure funding for consultant to update Joint Hazard Mitigation Plan.	o Joint Hazard Mitigation Plans need to be updated every five years and a consultant with expertise in the subject matter is highly recommended.	City Manager's Office	5 years	X	X	X	X	X	GR	H	H	H		Revised
~~MH-39 Complete a funding for a consultant to provide a Continuity of Operations Plan for the City.~~	~~o Cal OES and FEMA recommend cities have a Continuity of Operations Plan. Fulfillment of this recommendation will~~	~~City Manager's Office~~	~~1-3 years~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GR~~		~~H~~	~~H~~		Deleted – redundant

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	~~enhance the City's chances of receiving future disaster reimbursement funds.~~													
~~MH-40 Secure funding for a consultant to secure funding and provide a children and family plan program and supplies to use during an emergency and/or disaster.~~	~~o Staff may need to come in to work and bring children and/or family members they can't leave behind. A program like this would augment the City's~~	~~City Manager's Office~~	~~1-3 years~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GR~~			~~H~~		Deleted – not mitigation

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	~~response and recovery capabilities.~~													
MH-41 Secure funding for EOC Map Plotter.	o Following an emergency, the ability to create and post maps would greatly enhance the City's ability to mitigate against additional damages.	City Manager's Office	1-3 years	X	X	X	X	X	GR	H	H	H	Y	Revised
MH-42 Secure funding to purchase existing City EOC equipment & peripherals	o The City's EOC could use more equipment. More computers	City Manager's Office	Completed	X	X	X	X	X	GR	H	H	H	Y	Completed

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
(e.g. laptop computers, furniture, IT and telecommunications upgrades, etc.).	and telecommunication upgrades at the EOC Sections would assist staff with doing a more effective and efficient job.													
~~MH-43 Secure funding to purchase protective Hazardous Materials equipment for staff to use in case of terrorist, sabotage, or WMD attacks.~~	~~o Even though the odds are low that the City would be affected by a hazardous materials incident, it would not be a~~	~~City Manager's Office~~	~~1-3 years~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GR~~			~~L~~		Deleted – not practical

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	~~detriment to the City to have equipment on hand for disasters and/or emergencies just in case.~~													
MH-44 Construction to stabilize San Ramon Canyon and roadways.	o Divert runoff to minimize Tarapaca landslide movement, mudslides, and flooding on PVDS/25th Street.	Public Works		X		X			GF, GR	H	H	H	Y	Revised
MH-45 Emergency	✓ Installation of emergency	Public Works	Completed					X	GF	H	L	H	Y	Completed

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Generator Upgrades.	generators and propane fuel storage at City Hall (7-day supply), PVIC and Hesse Park (3-day fuel supply, each). ✓ Completed in 2011.													
MH-46 Hazardous Waste Roundup	✓ Hold free collection events for public drop off of hazardous waste.	Public Works	Annual	X	X				GF	H	H	H	Y	Revised
MH-47 Brush and Landscape	✓ Hold free collection	Public Works	Ongoing	X					GF	H	H	H	Y	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Materials Collection.	events for public drop off of brush and vegetation waste. ✓ Twice annually													
MH-48 Heating System dedicated circuit at City Hall.	✓ Installed dedicated electrical circuit for space heaters to prevent overloading. ✓ Completed in 2010	Public Works	Completed	X					GF	H	L	H	Y	Completed
MH-49 Urban Forest Maintenance	✓ Continue regular trimming of urban street trees to	Public Works	Ongoing	X					GF	H	L	H	Y	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	safeguard utility lines and structures.													
~~MH-50 Revised City's Emergency Operations Plan – Finance & Administration Section~~	~~✓ Update reflects current operations and increases the chance of receiving state and federal disaster reimbursement funds.~~	~~Finance/IT Department~~	~~Completed~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GL~~			~~H~~		Deleted – not mitigation
~~MH-51 Revised City's Emergency Operations Plan to include an Incident~~	~~✓ Completed~~ ~~✓ The system assists staff and other agency members~~	~~Finance/IT Department~~	~~Done~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GL~~			~~H~~		Deleted – not mitigation

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~Management / Messaging System.~~	~~respond to disasters by locating and mapping incidents and providing an electronic messaging center inside the EOC.~~													
MH-52 Update GIS system to assist staff and first responders with preparing, planning, response, and recovery operations.	✓ Completed manually mapped incidents reported during EOC drill to assist staff in decision making	Finance/IT Department	Completed	X	X	X	X	X	GF	H	L	H	N	Complete

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~MH-53 Modified and expanded the role of the City Emergency Operations Center.~~	~~✓ Completed.~~ ~~✓ Reconfigured the location of EOC Sections, installed additional white boards, new SMART boards, and satellite TV capabilities.~~	~~City Manager's Office Finance/IT Department~~	~~2011~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF~~			~~H~~		Deleted – not mitigation
MH-54 Maintain an off-site backup computer server.	✓ Backup server available in the event the main system is deemed inoperable.	Finance/IT Department	Ongoing	X	X	X	X	X	GF	H	M	H	Y	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~MH-55 Prepare a Vendor Memorandum of Understanding.~~	~~✓ Finance to work with other city departments (e.g. PW and Community Development) to set up vendor Memorandum of Understandings to establish a partnership for first available service and to protect the City from price gouging practices.~~	~~Finance/IT Department Public Works Community Development~~	~~2014~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	*			~~M~~		Deleted – not mitigation

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~MH-56 Training on federal disaster reimbursement process.~~	~~✓ Finance/IT Department or consultant to train Finance staff to learn the state and federal reimbursement process and how to fill out the forms.~~	~~Finance/IT Department~~	~~2013~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GL, GF~~			~~H~~		Deleted – not mitigation
~~MH-57 Secure funding to purchase a 10' X 30' storage container to be placed on City Hall Campus grounds for various emergency/disa~~	~~✓ Storage space is a premium at all City facilities. If additional emergency supplies and/or equipment is~~	~~City Manager's Office Public Works~~	~~1-3 Years~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~GF, Grant~~			~~H~~		Deleted – not mitigation

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~ster response equipment and supplies.~~	~~procured, there is an absolute need for more storage space.~~													
MH-58 Establish Preserve Access Protocol to (1) identify and (2) establish maintenance criteria for vehicular access trails in the Preserve to serve public safety personnel and efforts. Will also establish protocols for entering/working	✓ This will be part of the Preserve Access Protocol required 90 days after NCCP/HCP approval. ✓ Expansion of fire roads ✓ Annual	Public Works, Recreation, Community Development	Ongoing	X	X	X	X	X	GF, GR	H	H	H	Y	New

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
in Preserve during hazardous weather (high fire danger, dangerous swell, etc.)														
MH-59 Identify grant funding sources for public right of ways impacted by the Preserve Access Protocol.									GR	H	H	H	Y	New
MH-60 Additional equipment to communicate with residents both in events with and without power (this came up in the														

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Malibu Woolsey fire when they had no power and emergency communication systems non-operational. They are looking at more manual sirens now.)														
Earthquake Action Items														
EQ-1 Integrate new earthquake hazard mapping data and improve technical analysis of earthquake hazards using GIS technology.	✓ Incorporate Fault Lines layer from USGS for EOC 2011; Integrate GIS files produced by HAZUS analysis into City GIS system for	Finance/IT Department	Ongoing	X	X	X		X	GL, GF	H	M	H	N	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	future implementation.													
EQ-2 Identify funding sources for structural and nonstructural retrofitting of structures that are identified as seismically vulnerable for private property owners and businesses.	✓ Started in 2008 with fee reductions and retrofit standard plans for residential structures. ✓ Seek grant funding	HMS	Ongoing	X	X		X	X	GL, GF	H	H	H	Y	Revised
EQ-3 Encourage seismic strength evaluations of critical facilities and public infrastructure in the City to meet	✓ Started 2010: Completed for Administration, CDD	Building and Safety Departments	5 years	X				X	GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
current seismic standards.	and RPV TV buildings													
EQ-4 Encourage reduction of nonstructural and structural earthquake hazards in homes, businesses, and government offices through public awareness.	o City Website o Standard Plans o Fee Discounts	City Manager's Office HMS	Ongoing	X	X				GF	H	L	H	Y	Revised
EQ-5 Hazard mitigation of seismic concerns, maintenance, and code related deficiencies at Ladera Linda	✓ Building assessment conducted ✓ Feasibility Evaluation began in 2011	Community Development Department, Public Works	Ongoing	X				X	*	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
EQ-6 Participate in the OES SAP evaluator program.	✓ Building & Safety inspection staff members are now certified	Community Development	Completed	X			X	X	GF	H	L	H		Completed
EQ-7 Ceiling Tile Seismic Retrofit in City Hall, PVIC and Hesse Park	o All three facilities completed in 2012.	Public Works	Completed	X					GL	H	L	H	Y	Completed
EQ-8 Funding for a seismically sound EOC.	o													
Wildfire Action Items														
WF-1 Encourage development and dissemination of information relating to the fire hazard to	✓ Materials developed and being distributed on an ongoing basis.	City Manager's Office, LACoFD, Building and Safety Division	Ongoing	X	X				GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
help educate and assist builders & homeowners in being engaged in wildfire mitigation activities, and to help guide emergency services during response.														
WF-2 Increase communication, coordination & collaboration between wildland/urban interface property owners, local planners and fire prevention crews & officials	o City and LACoFD work together to manage, communicate, coordinate, and mitigate wildland interface projects	HMS	Ongoing	X	X	X	X	X	GL	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
to address risks, existing mitigation measures, and federal assistance programs.	within City boundaries.													
WF-3 Encourage implementation of wildfire mitigation activities through enforcement in a manner consistent with the goals of promoting sustainable ecological management & community stability.	o LACoFD and the City's Planning Department continue to implement wildfire mitigation activities through community education programs and written policy.	LACoFD Planning Department	Ongoing			X			GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
WF-4 Conduct Fire Expo.	o Conducted in 2009 by LACoFD. Businesses attended and provided information on products for retrofitting homes to protect from wildfires (hardened homes)	LACoFD	Completed	X	X	X	X	X	LACFD	H	L	H		Completed
WF-5 Establish and implement Weed Abatement Enforcement Program.	o Weed abatement notices were mailed to residents annually with information	LACoFD	Ongoing	X	X	X	X	X	GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	as to what they need to comply with. o Properties inspected annually.													
WF-6 Defensible home and fuel modification model project that shows building changes residents can implement.	o Shows landscape examples of what can be done to lower wildfire risk (defensible space).	LACoFD – Forestry Division	Ongoing	X	X		X		LACFD	H	L	H		Revised
WF-7 Burma Road Maintenance Agreement	o Partner with Edison, Cal Water, and LACoFD to maintain Burma Road by preserving	Public Works	Ongoing				X	X	GF	H	L	H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	for emergency access. o Expansion of fire roads. o Annual													
WF-8 Fuel Modification Program	o Remove brush and debris within defensible space of development using LACC and goats. o Annual maintenance program.	Public Works	Ongoing	X		X			GF	H	L	H	Y	Revised
WF-9 GIS mapping of fuel modification defensible space areas.	✓ Completed o Add new or updated Fuel Modification	Public Works	Ongoing	X					GF, GR	H	L	H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	areas to layer on City GIS system.													
WF-10 Continue to contract for heat camera monitoring (Catalina).	✓													New
WF-11 Additional funding for undergrounding utilities.	✓													New
Earth Movement Action Items														
EM-1 Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in	o Established 2 landslide abatement districts (Abalone Cove and Klondike Canyon).	Planning, and Building & Safety Divisions	Ongoing	X	X				GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
hazard-prone areas.	o Published related information on website.													
EM-2 Address construction and subdivision design within steep slopes to reduce the potential adverse impacts from development.	✓ Public awareness of landslides area is provided daily. ✓ Geology/soils report required for review and approval by City Geologist prior to application completeness. ✓ Code prohibits most activity	Planning and Building & Safety Divisions	Ongoing	X	X		X		GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	over extreme slope areas. ✓ Fire Department review required prior to new construction application completeness.													
EM-3 Regulate activities and provide public outreach in identified potential and historical landslide areas.	✓ Information regarding location of landslide areas are provided on City's website. All code/policy changes/ordinances are	Planning and Building & Safety Divisions	Ongoing	X	X	X			GF	H	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	available online. ✓ Building & Safety regulates all activities after approval through Planning Department and City Geologist reviews.													
EM-4 Develop public information programs regarding proper maintenance of steep slopes and surface drainage structures	✓ Vegetation management & flood control brochures made available.	Planning and Building Department	Ongoing	X	X				GF	Y	L	H	Y	Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
located on private property.														
EM-5 PVDS Shoulder Abutment	✓ 1,200 foot shoulder rebuild along south side of PVDS in landslide area to mitigate road movement. Completed 2010 ✓ Reestablish drainage through area, completed 2011. ✓ Ongoing Maintenance	Public Works	Completed	X					GF, GR	H	L	H	Y	Completed

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
EM-6 Install/maintain dewatering wells in landslide areas to mitigate land movement.	✓ Annually or as funds are available for these agencies.	Public Works, Abalone Cove Landslide Abatement District Klondike Canyon Landslide Abatement District	Ongoing	X		X			*	H	M	H	Y	Revised
EM-7 Identify funding sources for sewer disruption and water quality issues resulting from landslides.										H	H	H	Y	New
Tsunami Action Items														
TS-1 TsunamiReady	Pursue status as a TsunamiReady community	HMS	1-2 years	X	X	X	X	X	GF	H	L	H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	through the National Weather Service.													
TS-2 Increase Tsunami awareness.	Add Tsunami awareness information to City's website. Add link to State of California's Tsunami Awareness resources.	HMS	1-2 years	X	X	X	X	X	GF	H	L	H		Revised
Hazardous Material Action Items														
HM-1														
HM-2														
Human-Caused Action Items														
HC-1 Cyberterrorism: Mitigation: Additional														

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High, n/a=not applicable)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
training for IT Staff especially and potentially regular staff; Additional security measures (security software, cloud, firewalls, etc.).														
HC-2														
Utility-Related Action Items														
UR-1														
UR-2														

Table: Mitigation Actions Matrix – Rolling Hills Estates

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Multi-Hazard Action Items														
MH-1 Integrate the goals and action items from the Joint Natural Hazards Mitigation Plan into existing regulatory	o General Plan Safety Element Update	Community Development, General Plan Advisory Committee & Michael Baker International Consultants.	Ongoing	X	X	X	X	X	GF, GR			H		Revised Note: General Plan Update currently underway. Will include MJHMP in General Plan Safety Element.

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
documents and programs, where appropriate.														
MH-2 Identify and pursue funding opportunities to develop and implement local mitigation activities.	✓ FEMA HMGP ✓ 2018-Awarded $40,882 in recovery funds from Cal OES/FEMA for Disaster #DR-4305	City Manager's Office	Ongoing	X	X	X	X	X	GR, GR			H		Revised Note: Ongoing – Cal OES and FEMA
MH-3 Hazard Mitigation Planning Subcommittee will continue to develop a sustainable process for implementing, monitoring, and evaluating regional	o Meet annually	HMS	Ongoing				X		GF			M		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
mitigation activities.														
MH-4 Identify, improve, and sustain collaborative programs focusing on, public and private sector organizations, and individuals to avoid activity that increases risk to natural hazards.	o Cal Water – Palos Verdes Peninsula Water Reliability Project. o Southern California Edison PSPS o Southern California Gas Company programs.	Community Development, City Manager's Office	Ongoing	X	X		X		GF, GR			H		Revised Note: Development of Public, Private Partnerships (PPP) within community. Note: Rate Payers possible source of funding.
MH-5 Develop public and private partnerships to foster natural hazard mitigation program coordination and	o Continue Waste Management disposal of brush clearance material and	City Manager's Office	Ongoing	X	X		X		GF			M		Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
collaboration with the City's Hazard Mitigation Subcommittee.	curb side pickup of hazardous waste													
MH-6 Develop inventories of critical facilities and infrastructure.	o Assess structural vulnerability to the identified hazards and prioritize mitigation projects.	Public Works, Building & Safety, City Manager's Office	Ongoing	X				X	X					Revised
MH-7 Strengthen emergency management program with maintained plans, training, and exercises.	o Completion and ongoing review of our Continuity and Operations Plan ✓ Development of Horse Census.	City Manager's Office	Ongoing					X	GF, GR			H		Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	✓ NIMS/SEMS training for staff and city council ✓ Disaster drills and exercises for staff. ✓ Emergency operations training for staff. ✓ Equine preparedness o Development of Emergency Operations Plan and COOP. ✓ CERT Trainings for community.													
MH-8 Develop, enhance, and	✓ "Nextdoor" is a social network	City Manager's Office	Ongoing	X	X	X	X	X	GF, GR			H		Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
implement education programs aimed at mitigating natural hazards, and reducing the risk to citizens, public agencies, private property owners, businesses, and schools.	that enables neighbors to communicate with each other and allows the City to post important information during times of emergency. ✓ Launched Social Media Platforms/City Accounts- FB, ND, IG, Twitter – (as above reasoning for use) ✓ Annual Preparedness Expo – Large													

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	scale event promoting emergency preparedness. ✓ Launched Mass Notification System – Nixle/Everbridge. Alert system used for urgent notifications & advisories. Ability to apply IPAWS. ✓ Setting up emergency webpage.													
MH-9 Use updated technical knowledge and tools to inform	✓ Safety Element Update,	Community Development, Public Works	Ongoing	X	X	X	X	X	GF, GR			H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
the public of hazard potential.	website, City newsletter ✓ Nixle / Everbridge – Mass Notification System. ✓ Social Media Platforms (FB, ND, IG, Twitter) ✓ E-notify (city e-mail list).	City Manager's Office												
MH-10 Maintain hazard warning systems to ensure effectiveness and efficiency and increase coordination between local jurisdictions and	✓ Alert LA (Sheriff's Dept) ✓ Los Angeles County Regional Interoperability Community System	City Manager's Office	Ongoing	X				X	GF, GR			M		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
emergency service providers.	o South Bay Alerts – Regional Multijurisdictional Notification System.													
MH-11 Develop an Evacuation Plan as a Function-Specific Annex to the Emergency Operations Plan.	o Development of EOP o Identifying exits and entrances of Peninsula.	City Manager's Office, Public Works Department, LA County Sheriff, LA County Fire	Ongoing	X	X	X	X	X	GR, GR			H		Revised
MH-12 Develop Pre-Disaster Recovery Plan including priorities for restoration of the community's infrastructure and vital public	o Development of COOP (Continuity of Operations Plan).	Public Works, Community Development Department, City Manager's Office	1-5 years	X	X		X	X	GF, GR			H		

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
facilities following a disaster.														
MH-13 Adopt and implement State Building Code Chapter 34.	o Develop policy for government to determine what reconstruction criteria should be applied to structures damaged during a disaster. Develop additional zoning, building and reconstruction policies and requirements in the local	Building & Safety	5 years	X					GR, GR			L		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	government development and building codes for post-disaster situations (Post-Disaster Recovery Plan).													
MH-14 Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure.	o Safety Element Update ✓ Promote emergency preparedness through public awareness campaigns (social media, annual emergency	Public Works, Building & Safety City Manager's Office	Ongoing	X	X	X	X	X	GR, GR			H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	expo. And newsletters).													
MH-15 Maintain information on website and cable access channels to include information specific to residents, building code information, and educational information on damage prevention.	✓ Completed task; now maintaining.	City Manager's Office, Community Development, Building & Safety	Ongoing	X	X				GF, GR			H		Revised
~~MH-16 Establish policy to ensure mitigation projects are in place to~~		~~Public Works and Building & Safety Division~~	~~1-2 years~~	~~X~~				~~X~~						Deleted (redundant)

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
~~safeguard critical facilities.~~														
MH-16 Incorporate the building and infrastructure inventory into the Mitigation Plan update.	✓ Completed 2012. o Incorporate future building inventory revisions into future updates of the Mitigation Plan.	Public Works, Building & Safety	Ongoing	X				X	GF, GF			H		Revised
MH-17 Educate City staff on federal cost-share & grant programs, and other related federal programs so the full array of assistance	✓ Attend CalOES and FEMA workshops and briefings including Notice of Interests (NOI).	City Manager's Office	Ongoing				X		GF, GR			M		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
available is understood.	✓ LA County programs – South Bay Cities Council of Governments Programs.													
~~MH-19 Determine the economic feasibility of mitigating natural hazards that 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.~~		~~City Manager's Office~~	~~Ongoing~~	~~X~~										Deleted (redundant)

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
MH-18 Update Climate Action Plan.	o To be completed through the South Bay Cities Council of Governments. ✓ Energy Efficiency CAP Completed in 2015; Complete CAP December 2017.	City Manager's Office, Community Development			X	X	X					H		Revised
~~MH-21 Prepare a cost analysis of replacing vulnerable public infrastructure, buildings and critical facilities~~		~~Planning and Building Safety Department~~	~~Ongoing~~	~~X~~				~~X~~						Deleted (redundant)
MH-19 Update the Continuity of	✓ Continuity of Operations Plan	City Manager's Office	3 years	X				X	GF, GR			H		New

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
Operations Plan (COOP).	completed in 2014 ✓ Update every 5 years													
MH-20 Provide updated mobile communication devices for key personnel.	o Research and purchase updated equipment ✓ Mobile devices and computer tablets purchased for department heads, City Management, and key staff.	City Manager's Office	1 year	X				X	GF, GF			H		New
MH-21 Solicit grant funds for emergency supplies. Solicit grant funds for emergency	o Request for local funding submitted; Safety Element Update to	City Manager's Office	Ongoing	X	X			X	GF, GR			H		New

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
equipment and supplies caches including equine cache and supplies.	address appropriate placement of supplies o Request/solicit grant funding and use General Fund for emergency preparedness supplies and strategic caches.													
MH-22 Coordinate with the Los Angeles County Sanitation District to ensure that an appropriate mitigation action plan and disaster	o Safety Element Update	City Manager's Office, Public Works	2 years	X			X		GR, GR			H		New

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
response plan is in place for the Palos Verdes Landfill.														
MH-23 Identify neighborhoods in the City that are currently on septic tank systems. Using grant funds, tie into main line sewer system. Mitigation activity to reduce risk to public health, environment, and public/private property and/or infrastructure.	o Assess neighborhoods that are currently on septic systems.	Public Works, Building and Safety, Emergency Services	5 years	X	X	X	X	X	GR, GR	M	H	M	Y	New
MH-24 Purchase of an electric utility cart/ATV for		Community Services, City Maintenance	2 years	X	X	X	X	X	GR, GR	M	L	M		New

Action Item	Accomplishments (✓) and Ideas for Future Implementation (○)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
City Maintenance Department. The electric cart/ATV will be used for trail inspections including: weed abatement, trail maintenance, delivery of supplies and tools in the event of an emergency or disaster.														
MH-25 Install curb and gutter systems in areas lacking adequate drainage to prevent flooding and ensure stormwater compliance.		Public Works	1-5 years	X	X	X	X	X	GR, GR	M	M	M	Y	New

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
MH-26 Stabilization work of county sewer line in canyon area of Academy Hill		Public Works, City Manager's Office	1-5 years	X	X	X	X	X	GR, GR	M	H	H	Y	New
Earthquake Action Items														
EQ-1 Integrate new earthquake hazard mapping data and improve technical analysis of earthquake hazards using GIS technology.	o Information to be generated through Safety Element Update and incorporated into City GIS	Finance and IT Department, Community Development, City Manager's Office	2 Years	X	X	X		X	GF, GR			H		Added funding source and ranking
EQ-2 Encourage seismic strength evaluations of critical facilities and public infrastructure in the City to meet	✓ Completed evaluation in 2006.	Building & Safety		X				X						Completed

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
current seismic standards.														
EQ-3 Encourage reduction of nonstructural and structural earthquake hazards in homes, businesses, and government offices through public awareness.	o City Website o Social Media PSAs and Annual Emergency Preparedness Expo.	City Manager's Office	Ongoing	X	X				GF, GF			H	Y	Revised
Wildfire Action Items														
WF-1 Encourage development and dissemination of information relating to the fire hazard to help educate and	o Materials developed and being distributed on an ongoing basis and	LA County Fire, Building & Safety, City Manager's Office	Ongoing	X					GF, GF			H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
assist builders & homeowners in being engaged in wildfire mitigation activities, and to help guide emergency services during response.	posted on City website. o 2019 Natural Disaster Town Hall for Peninsula community – Assembly Member, LA County Fire, Cal OES, and Utility company presentations. o Development of LA County's Ready, Set, Go campaign. o Social Media PSAs. o Prepared Peninsula Expo													

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
	o National Fire Prevention Week													
WF-2 Continue communication, coordination & collaboration between wildland/urban interface property owners, local planners and fire prevention crews & officials to address risks, existing mitigation measures, and federal assistance programs.	o Annual brush clearance coordinated by LA County Fire, LA County Ag Comm Weights and Measures, and City.	LA County Fire, City Maintenance	Ongoing	X	X		X	X	GF, GR			H		Revised
WF-3 Encourage implementation of	o Plan Check for fire code	LA County Fire, Community	Ongoing			X			GF, GF			H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
wildfire mitigation activities through enforcement in a manner consistent with the goals of promoting sustainable ecological management & community stability.	compliance, and Planning Department Code Enforcement and Fire Department inspections.	Development, LA County Building & Safety, Public Works												
WF-4 Conduct Annual Fire Department Open House.	o Annual Fire Department Open House at local station 106 – in coordination with City Emergency Preparedness Expo	LA County Fire	Annual, Ongoing	X	X	X	X	X				M		New

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
WF-5 Establish and implement Weed Abatement Enforcement Program.	o Weed abatement notices were mailed to residents annually with information. o Properties inspected annually.	LA County Fire, LA County Agricultural Commissioner Weights and Measures Department	Ongoing	X	X	X	X	X	GF, GF			H		New
WF-6 Defensible home and fuel modification model project that shows building changes residents can implement.	o Shows landscape examples of what can be done to lower wildfire risk (defensible space) on City website.	LA County Fire – Forestry Division Los Angeles County Building and Safety/City Planning requirements	Ongoing	X	X		X		GF, GF			M		New
WF-7 Participation in the Alert Wildfire Camera program	o	City Manager's Office	1-3 years	X	X	X	X	X	GR, GR	M	M	H	Y	New

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
and Fire Detection Network in partnership with neighboring jurisdictions and outside research and/or utility companies.														
WF-8 Undergrounding of electrical utilities for wildfire prevention.	o	Public Works, City Manager's Office	1-5 years	X	X	X	X	X	GR, GR	H	H	H	Y	New
Earth Movement Action Items														
EM-1 Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and	o Safety Element Update o Identified in GIS	Community Development, Building & Safety Public Works	2 years	X	X	X			GR, GR			H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
property in hazard-prone areas.														
EM-2 Address construction and subdivision design within steep slopes to reduce the potential adverse impacts from development.	o Safety Element Update	Community Development, Building & Safety	2 years	X	X		X		GR, GR			H		Revised
EM-3 Regulate activities in identified potential and historical landslide areas.	o Safety Element Update	Community Development, Building & Safety, Public Works	Ongoing	X	X				GR, GR			H		Revised
EM-4 Develop public information programs regarding proper	o Safety Element Update o Sandbags	Community Development, Building & Safety, Public Works	Ongoing	X	X				GR, GR			H		Revised

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
maintenance of steep slopes and surface drainage structures located on private property.														
Flood Action Items														
FLD-1 Continue to participate in the National Flood Insurance Program	Continue through the development review process and issuance of building permits.	Community Development, Building & Safety, Public Works	Ongoing	X	X	X	X	X	GF, GF			H		New
FLD-2 Fund, Design, and Construct storm drain pipe repairs at 11 locations identified in major need of repair. Work includes relining 45 priority storm drains to	o Storm drain assessment completed o Relining of severe storm drains as first priority. o Continue improvements	Public Works	Ongoing	X		X		X	GF, GF			H		New

Action Item	Accomplishments (✓) and Ideas for Future Implementation (O)	Coordinating Organization	Timeline	Plan Goals					Funding Source and Planning Mechanisms (GF=General Fund, GR=Grant, CIP, GP=General Plan)	Benefit (L=Low, M=Med, H=High)	Cost (L=Low, M=Med, H=High)	Ranking (L=Low, M=Med, H=High)	Buildings & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2019 Comments (Status – Completed, Revised, Deleted, New, and Deferred)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services						
ensure the integrity of the system for flooding purposes, and supports clean and efficient drainage to outlets.	on assessed storm drains. o Continue maintenance on storm drains and outlets.													
Hazardous Material Action Items														
HM-1														
HM-2														
Human-Caused Action Items														
HC-1														
HC-2														
Utility-Related Action Items														
UR-1														
UR-2														

Plan Maintenance

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

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

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

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

Method and Scheduling of Plan Implementation

The Planning Team that was involved in research and writing of the Plan will also be responsible for implementation. During implementation, each City will gather its own members of the Planning Team. The Planning Team Co-Chairs (RPV: Gabriella Yap – Administration – Deputy City Manager, and RHE Jessica Slawson – Administration - Administrative Analyst) who will be referred to as the Local Mitigation Officers.

	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

Each 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 Officers will be responsible for submitting it to the State Hazard Mitigation Officer at California Office of Emergency Services (Cal OES). Cal OES will then submit the plan to the Federal Emergency Management Agency (FEMA) for review and approval. This review will address the requirements set forth in 44 C.F.R. Section 201.6 (Local Mitigation Plans). Upon acceptance by FEMA, both the City of Rancho Palos Verdes and the City of Rolling Hills Estates will gain separate eligibilities for Hazard Mitigation Grant Program funds.

Local Mitigation Officer

Under the direction of the Local Mitigation Officers, the Planning Team will take responsibility for plan maintenance and implementation. The Local Mitigation Officers 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 Officers will coordinate with City leadership to ensure funding and support for 5-year updates to Plan as required by FEMA.

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

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

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

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

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

Implementation through Existing Programs

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

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

Some of the goals and action items in the Mitigation Plan will be achieved through activities recommended in each city's CIP. Various of each city's departments develop their respective CIP and review it on an annual basis. Upon annual review of the CIP, the Planning Team will work with the various departments in each city 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 each city's planning documents and procedures.

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

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

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

It's important to note that since the approval and adoption of the 2014 Hazard Mitigation Plan, the City of Rancho Palos Verdes updated its Annual Budget and the General Plan. Information pertaining to hazards from the Mitigation Plan were incorporated into the General Plan. The City of Rolling Hills Estates updated the Annual Budget and General Plan. In both cases, although the Annual Budgets provided funding for a few of the mitigation action items, those items were not specifically identified as coming from the 2014 Hazard Mitigation Plan.

Economic Analysis of Mitigation Projects

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

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

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

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

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

FEMA Benefit-Cost Analysis Guidelines

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

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

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

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

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

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

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

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

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

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

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

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

Evaluating and Updating the Plan

The Planning Team will be responsible for coordinating implementation of plan by monitoring the progress of the mitigation action items and documenting progress notes for each item. It will be up to the Local Mitigation Officers to hold either a live meeting versus tasking the coordinating agencies with status updates on their own assigned mitigation action items. The monitoring meetings will take place no less than quarterly. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the mitigation plan. See the **Quarterly Implementation Report** discussed below which will be a valuable tool for the Planning Team to measure the success of the Hazard Mitigation Plan. The focus of the quarterly meetings will be on the progress and changes to the Mitigation Action Items.

Annual Implementation Report

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

Insert annual matrix when finalizing plan

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

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

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

A: See **Evaluation** below.

Evaluation

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

Formal Update Process

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

The Planning Team will review the goals and mitigation action items to determine their relevance to changing situations in each city, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The Planning Team will also review the Plan's **Risk Assessment** portion of the Plan to determine if this information should be updated or modified, given any new available data. The **coordinating organizations** responsible for the various action items will report on the status of their projects, including the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised. Amending will be made to the Mitigation Actions Matrix and other sections in the Plan as deemed necessary by the Planning Team.

Q&A | ELEMENT A: PLANNING PROCESS | A5

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

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

Continued Public Involvement

Both cities are dedicated to involving the public directly in the continual review and updates to the Mitigation Plan. Copies of the Plan will be catalogued and made available at each 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. Public meetings 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 Officers will be responsible for using each city's 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.

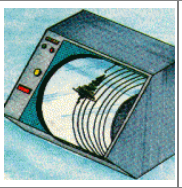
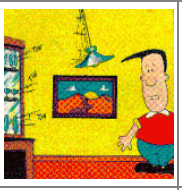
Another tool used to describe earthquake intensity is the Magnitude Scale. The Magnitude Scale is sometimes referred to as the Richter Scale. The two are similar but not exactly the same. The Magnitude Scale was devised as a means of rating earthquake strength and is an indirect measure of seismic energy 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.

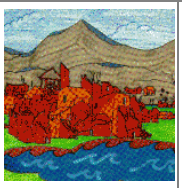
An earthquake generates different types of seismic shock waves that travel outward from the focus or point of rupture on a fault. Seismic waves that travel through the earth's crust are called body waves and are divided into primary (P) and secondary (S) waves. Because P waves move faster (1.7 times) 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	N/A	N/A	Not Felt
	II	N/A	N/A	Felt by persons at rest, on upper floors, or favorably placed.
	III	N/A	N/A	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
	IV	N/A	N/A	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	N/A	N/A	Rails bent greatly. Underground pipelines completely out of services.
	XII	N/A	N/A	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, rockslides, 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

Description

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. Much of Los Angeles 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 as highlighted in **Table: Top 20 Largest California Wildfires**. 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.

Table: Top 20 Largest California Wildfires
(Source: CAL FIRE, 2019)

	FIRE NAME *(CAUSE)*	DATE	COUNTY	*ACRES*	STRUCTURES	DEATHS
1	**MENDOCINO COMPLEX** *(Under Investigation)*	July 2018	Colusa County, Lake County, Mendocino County & Glenn County	**459,123**	280	1
2	**THOMAS** *(Under Investigation)*	December 2017	Ventura & Santa Barbara	**281,893**	1,063	2
3	**CEDAR** *(Human Related)*	October 2003	San Diego	**273,246**	2,820	15
4	**RUSH** *(Lightning)*	August 2012	Lassen	**271,911 CA / 43,666 NV**	0	0
5	**RIM** *(Human Related)*	August 2013	Tuolumne	**257,314**	112	0
6	**ZACA** *(Human Related)*	July 2007	Santa Barbara	**240,207**	1	0
7	**CARR** *(Human Related)*	July 2018	Shasta County, Trinity County	**229,651**	1,614	8
8	**MATILIJA** *(Undetermined)*	September 1932	Ventura	**220,000**	0	0
9	**WITCH** *(Powerlines)*	October 2007	San Diego	**197,990**	1,650	2
10	**KLAMATH THEATER COMPLEX** *(Lightning)*	June 2008	Siskiyou	**192,038**	0	2
11	**MARBLE CONE** *(Lightning)*	July 1977	Monterey	**177,866**	0	0
12	**LAGUNA (POWERLINES)**	September 1970	San Diego	**175,425**	382	5
13	**BASIN COMPLEX** *(Lightning)*	June 2008	Monterey	**162,818**	58	0
14	**DAY FIRE** *(Human Related)*	September 2006	Ventura	**162,702**	11	0
15	**STATION** *(Human Related)*	August 2009	Los Angeles	**160,557**	209	2
16	**CAMP FIRE (Under Investigation)**	November 2018	Butte	**153,336**	18,804	85
17	**ROUGH** *(Lightning)*	July 2015	Fresno	**151,623**	4	0
18	**McNALLY** *(Human Related)*	July 2002	Tulare	**150,696**	17	0
19	**STANISLAUS COMPLEX** *(Lightning)*	August 1987	Tuolumne	**145,980**	28	1
20	**BIG BAR COMPLEX** *(Lightning)*	August 1999	Trinity	**140,948**	0	0

*There is no doubt that there were fires with significant acreage burned in years prior to 1932, but those records are less reliable, and this list is meant to give an overview of the large fires in more recent times.
**This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.

2/19/2019

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. 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.

The 2009 Station Fire

The 2009 Station Fire was the largest wildfire in the history of Los Angeles County. The fire ignited in the Angeles National Forest on August 26, 2009. The blaze threatened 12,000 structures in the nearby communities of La Cañada Flintridge, Pasadena, Glendale, Acton, La Crescenta, Juniper Hills, Littlerock and Altadena. On September 3, 2009, officials announced that the Station Fire was caused by arson. The fire burned 160,577 acres, destroyed 209 structures, and killed two firefighters.

The 2017 Southern California Fires

California's wetter-than-normal winter in 2016-2017 proved to be a double-edged sword. While frequent storms helped eradicate the state's five-year drought, the wet weather allowed abundant vegetation to grow and subsequently serve as fuel for wildfires in the spring and summer. In December, Southern California faced multiple simultaneous fires which included: The Creek Fire (over 15,600 acres and 60 residences destroyed), Rye Fire (over 6,000 acres and six structures destroyed) and Lilac Fire (4,100 acres and 157 structures destroyed).

Fire Name	County	Acres Burned	Home Lost
Creek	Los Angeles	15,600	60
Fye	Los Angeles	6,000	6
Lilac	San Diego	4,100	157
Source: CAL FIRE			

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 fires is the result of three primary factors: (1) severe drought, accompanied by 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.

Earth Movement Hazards

Hazard Characteristics

Landslides are a serious geologic hazard in almost every state in America. Nationally, landslides cause 25 to 50 deaths each year. The best estimate of direct and indirect costs of landslide damage in the United States range between $1 and $2 billion annually. As a seismically active region, California has a significant number of locations impacted by landslides. Some landslides result in private property damage; other landslides impact transportation corridors, fuel and energy conduits, and communication facilities. They can also pose a serious threat to human life.

Landslides can be broken down into two categories: 1) rapidly moving (generally known as debris flows), and; 2) slow moving. Rapidly moving landslides or debris flows present the greatest risk to human life, and people living in or traveling through areas prone to rapidly moving landslides, are at increased risk of serious injury. Slow moving landslides can cause significant property damage but are less likely to result in serious human injuries.

The primary effects of mudslides/landslides include: abrupt depression and lateral displacement of hillside surfaces over distances of up to several hundreds of feet, disruption of surface drainage, blockage of flood control channels and roadways, displacement or destruction of improvements such as roadways, buildings, and water wells.

Historic Southern California Landslides

1956 Portuguese Bend

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

1958-1971 Pacific Palisades

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

1961 Mulholland Cut

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

1969 Glendora

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

1969 Seventh Ave., Los Angeles County

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

1970 Princess Park

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

1971 Upper and Lower Van Norman Dams, San Fernando

Cost, $302.4 million (2000 Dollars) Earthquake-induced landslides. Damage due to the February 9, 1971, Magnitude 7.5 San Fernando, Earthquake.
The earthquake of February 9 severely damaged the Upper and Lower Van Norman Dams.

1971 Juvenile Hall, San Fernando

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

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

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

1978 Bluebird Canyon Orange County

Cost, $52.7 million (2000 Dollars) October 2, 60 houses destroyed or damaged. Unusually heavy rains in March of 1978 may have contributed to initiation of the landslide. Although the 1978 slide area was approximately 3.5 acres, it is suspected to be a portion of a larger, ancient landslide.

1979 Big Rock, California, Los Angeles County

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

1980 Southern California Slides

Cost, $1.1 billion in damage (2000 Dollars) Heavy winter rainfall in 1979-90 caused damage in six Southern California counties. In 1980, the rainstorm started on February 8. A sequence of 5 days of continuous rain and 7 inches of precipitation had occurred by February 14. Slope failures were beginning to develop by February 15 and then very high-intensity rainfall occurred on February 16. As much as eight inches of rain fell in a six-hour period in many locations. Records and personal observations in the field on February 16 and 17 showed that the mountains and slopes literally fell apart on those two days.

1983 San Clemente, Orange County

Cost, $65 million (2000 Dollars), California Highway 1. Litigation at that time involved approximately $43.7 million (2000).

1983 Big Rock Mesa

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

1978-1980 San Diego County

Experienced major damage from storms in 1978, 1979, and 1979-80, as did neighboring areas of Los Angeles and Orange County. One hundred and twenty landslides were reported to have occurred in San Diego County during these 2 years. Rainfall for the rainy seasons of 78-79 and 79-80 was 14.82 and 15.61 inches (37.6 and 39.6 cm) respectively, compared to a 125-year average (1850-1975) of 9.71 inches (24.7 cm). Significant landslides occurred in the Friars Formation, a unit that was noted as slide-prone in the Seismic Safety Study for the City of San Diego. Of the nine landslides that caused damage in excess of $1 million, seven occurred in the Friars Formation, and two in the Santiago Formation in the northern part of San Diego County.

1994 Northridge Earthquake Landslides

As a result of the Magnitude 6.7 Northridge Earthquake, more than 11,000 landslides occurred over an area of 10,000 km^2. Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. Destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. Caused deaths from Coccidioidomycosis (valley fever) the spore of which was released from the soil and blown toward the coastal populated areas. The spore was released from the soil by the landslide activity.

March 1995 Los Angeles and Ventura Counties

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

January 2005 Ventura County

On January 10, 2005, a landslide once again struck the community of La Conchita, killing ten people and destroying or seriously damaging 36 houses.

Earth Movement Characteristics

What is a landslide?

"A landslide is defined as, the movement of a mass of rock, debris, or earth movement down a slope. Landslides are a type of "mass wasting" which denotes any down slope movement of soil and rock under the direct influence of gravity. The term "landslide" encompasses events such as rock falls, topples, slides, spreads, and flows.

Landslides are initiated by rainfall, earthquakes, volcanic activity, changes in groundwater, disturbance and change of a slope by human-caused construction activities, or any combination of these factors. Landslides also occur underwater, causing tidal waves and damage to coastal areas. These landslides are called submarine landslides."

The size of a landslide usually depends on the geology and the initial cause of the landslide. Landslides vary greatly in their volume of rock and soil, the length, width, and depth of the area affected, frequency of occurrence, and speed of movement. Some characteristics that determine the type of landslide are slope of the hillside, moisture content, and the nature of the underlying materials. Landslides are given different names, depending on the type of failure, and their composition and characteristics.

Slides move in contact with the underlying surface. These movements include rotational slides where sliding material moves along a curved surface and translational slides where movement occurs along a flat surface. These slides are generally slow moving and can be deep. Slumps are small rotational slides that are generally shallow. Slow-moving landslides occur on relatively gentle slopes and cause significant property damage but are far less likely to result in serious injuries than rapidly moving landslides.

What is a Debris Flow?

A debris or mud flow is a river of rock, earth and other materials, including vegetation that is saturated with water. This high percentage of water gives the debris flow a very rapid rate of movement down a slope. Debris flows move with speeds greater than 20 miles per hour, and often move much faster. This high rate of speed makes debris flows extremely dangerous to people and property in its path.

Areas Particularly Susceptible to Landslides

Locations at risk from landslides or debris flows include areas with one or more of the following conditions:

- ✓ On or close to steep hills
- ✓ Steep road-cuts or excavations
- ✓ Existing landslides or places of known historic landslides (such sites often have tilted power lines, trees tilted in various directions, cracks in the ground, and irregular-surfaced ground)
- ✓ Steep areas where surface runoff is channeled, such as below culverts, V-shaped valleys, canyon bottoms, and steep stream channels
- ✓ Fan-shaped areas of sediment and boulder accumulation at the outlets of canyons
- ✓ Canyon areas below hillside and mountains that recently (within 1-6 years) were subjected to a wildland fire

Excavation and Grading

Slope excavation is common in the development of home sites or roads on sloping terrain. Grading these slopes results in slopes that are steeper than the pre-existing natural slopes. Since slope steepness is a major factor in landslides, these steeper slopes are at an increased risk for landslides.

The added weight of fill placed on slopes also results in an increased landslide hazard. Small landslides are fairly common along roads, in either the road cut or the road fill. Landslides occurring below new construction sites are indicators of the potential impacts stemming from excavation.

Drainage and Groundwater Alterations

Water flowing through or above ground, is often the trigger for landslides. Any activity that increases the amount of water flowing into landslide-prone slopes increases landslide hazards. Broken or leaking water or sewer lines can be especially problematic, as does water retention facilities that direct water onto slopes. However, even lawn irrigation in landslide prone locations results in damaging landslides. Ineffective storm water management and excess runoff also cause erosion and increase the risk of landslide hazards. Drainage is affected, naturally by the geology and topography of an area. Development that results in an increase in impervious surface impairs the ability of the land to absorb water and redirects water to other areas. Channels, streams, ponding, and erosion on slopes indicate potential slope problems.

Road and driveway drains, gutters, downspouts, and other constructed drainage facilities concentrates and accelerates flow. Ground saturation and concentrated velocity flow are major causes of slope problems and triggers landslides.

Changes in Vegetation

Removing vegetation from very steep slopes increases landslide hazards. Areas that experience wildfire and land clearing for development may have long periods of increased landslide hazard. Also, certain types of ground cover require constant watering to remain green. Changing away from native ground cover plants increases the risk of landslide.

Tsunami Hazards
Hazard Characteristics

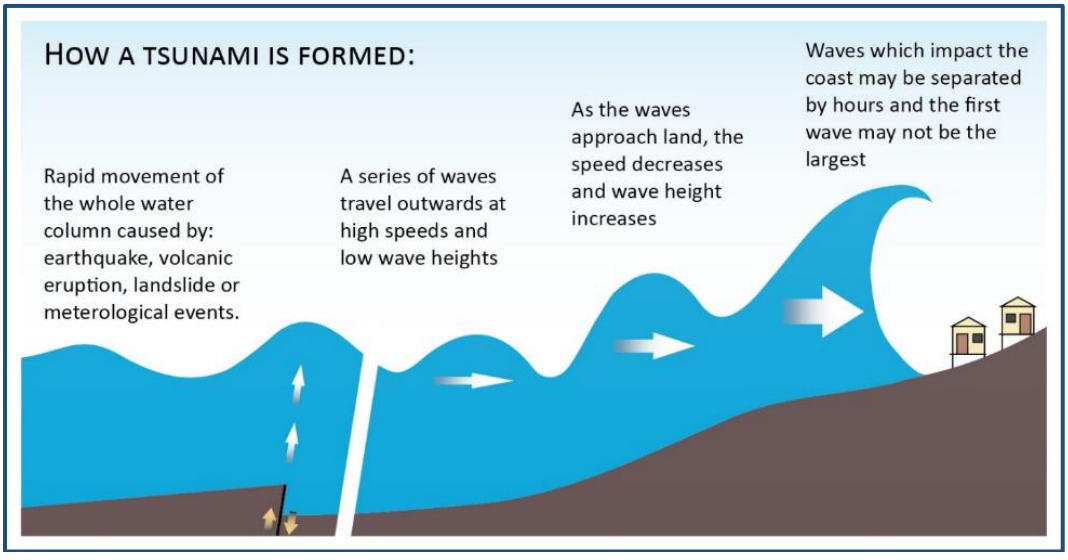
Definition

The phenomenon we call “tsunami” (soo-NAH-mee) is a series of traveling ocean waves of extremely long length generated primarily by earthquakes occurring below or near the ocean floor. Underwater volcanic eruptions and landslides can also generate tsunamis. In the deep ocean, the tsunami waves move across the deep ocean with a speed exceeding 500 miles per hour, and a wave height of only a few inches. Tsunami waves are distinguished from ordinary ocean waves by their great length between wave crests, often exceeding 60 miles or more in the deep ocean, and by the time between these crests, ranging from 10 minutes to an hour.

As they reach the shallow waters of the coast, the waves slow down and the water can pile up into a wall of destruction up to 30 feet or more in height. The effect can be amplified where a bay, harbor or lagoon funnels the wave as it moves inland. Large tsunamis have been known to rise over 100 feet. Even a tsunami 1-3 feet high can inflict destructive damage and cause many deaths and injuries.

Tsunamis typically are classified as either local or distant. Tsunamis from local sources usually result from earthquakes occurring off nearby coats. Tsunamis from distant sources are the most common type observed along the California Coast. Tsunamis generated by earthquakes in South America and the Aleutian-Alaskan region have posed a greater hazard to the West Coast of the United States than locally generated tsunamis. There is a history of Pacific-wide tsunamis occurring every 10 to 20 years. (Source: TyCom EIR, 9/2001).

Figure: Tsunami Formation



How Fast?

Unnoticed tsunami waves can travel at the speed of a commercial jet plane, over 500 miles per hour. They can move from one side of the Pacific Ocean to the other in less than a day. This great speed makes it important to be aware of the tsunami as soon as it is generated. Scientists can predict when a tsunami will arrive at various places by knowing the source characteristics of the earthquake that generated the tsunami and the characteristics of the sea floor along the paths to those places. Tsunamis travel much slower in more shallow coastal waters where their wave heights begin to increase dramatically.

How Big?

Offshore and coastal features can determine the size and impact of tsunami waves. Reefs, bays, entrances to rivers, undersea features and the slope of the beach all help to modify the tsunami as it attacks the coastline. When the tsunami reaches the coast and moves inland, the water level can rise many feet. In extreme cases, water level has risen to more than 50 feet for tsunamis of distant origin and over 100 feet for tsunami waves generated near the earthquake's epicenter. The first wave may not be the largest in the series of waves. One coastal community may see no damaging wave activity while in another nearby community destructive waves can be large and violent. The flooding can extend inland by 1,000 feet or more, covering large expanses of land with water and debris.

How Frequent?

Since scientists cannot predict when earthquakes will occur, they cannot determine exactly when a tsunami will be generated. However, by looking at past historical tsunamis and run-up maps, scientists know where tsunamis are most likely to be generated. Past tsunami height measurements are useful in predicting future tsunami impact and flooding limits at specific coastal locations and communities.

What causes Tsunamis?

There are many causes of tsunamis but the most prevalent is earthquakes. In addition, landslides, volcanic eruptions, explosions, and even the impact of cosmic bodies, such as meteorites, can generate tsunamis.

Plate Tectonics

Plate Tectonic Theory is based on an earth model characterized by a small number of lithospheric plates, 40 to 150 miles thick that float on a viscous under-layer called the asthenosphere. These plates, which cover the entire surface of the earth and contain both the continents and sea floor, move relative to each other at rates of up to several inches per year. The region where two plates come in contact is called a plate boundary, and the way in which one plate moves relative to another determines the type of boundary: spreading, where the two plates move away from each other; subduction, where the two plates move toward each other and one slides beneath the other; and transform, where the two plates slide horizontally past each other. Subduction zones are characterized by deep ocean trenches, and the volcanic islands or volcanic mountain chains associated with the many subduction zones around the Pacific Rim are sometimes called the Ring of Fire.

Earthquakes and Tsunamis

An earthquake can be caused by volcanic activity, but most are generated by movements along fault zones associated with the plate boundaries. Most strong earthquakes, representing 80% of the total energy released worldwide by earthquakes, occur in subduction zones where an oceanic plate slides under a continental plate or another younger oceanic plate.

Not all earthquakes generate tsunamis. To generate a tsunami, the fault where the earthquake occurs must be underneath or near the ocean, and cause vertical movement of the sea floor over a large area, hundreds or thousands of square miles. “By far, the most destructive tsunamis are generated from large, shallow earthquakes with an epicenter or fault line near or on the ocean floor.” The amount of vertical and horizontal motion of the sea floor, the area over which it occurs, the simultaneous occurrence of slumping of underwater sediments due to the shaking, and the efficiency with which energy is transferred from the earth’s crust to the ocean water are all part of the tsunami generation mechanism. The sudden vertical displacements over such large areas, disturb the ocean's surface, displace water, and generate destructive tsunami waves.

Although all oceanic regions of the world can experience tsunamis, the most destructive and repeated occurrences of tsunamis are in the Pacific Rim region.

Tsunami Earthquakes

The September 2, 1992 Earthquake (M7.2) was barely felt by residents along the coast of Nicaragua. Located well off-shore, the severity of shaking on a scale of Modified Mercalli I to XII, was mostly II along the coast, and reached III at only a few places. Twenty to 70 minutes after the earthquake occurred, a tsunami struck the coast of Nicaragua with wave amplitudes up to 13 feet above normal sea level in most places and a maximum run-up height of 35 ft. The waves caught coastal residents by complete surprise and caused many casualties and considerable property damage.

This tsunami was caused by a tsunami earthquake, an earthquake that produces an unusually large tsunami relative to the earthquake magnitude. Tsunami earthquakes are characterized by a very shallow focus, fault dislocations greater than several meters, and fault surfaces that are smaller than for a normal earthquake.

Tsunami earthquakes are also slow earthquakes, with slippage along the fault beneath the sea floor occurring more slowly than it would in a normal earthquake. The only known method to quickly recognize a tsunami earthquake is to estimate a parameter called the seismic moment using very long period seismic waves (more than 50 seconds/cycle). Two other destructive and deadly tsunamis from tsunami earthquakes have occurred in recent years in Java, Indonesia (June 2, 1994) and Peru (February 21, 1996).

Types of Tsunamis

Pacific-Wide and Regional Tsunamis

Tsunamis can be categorized as “local” and Pacific-Wide. Typically, a Pacific-Wide tsunami is generated by major vertical ocean bottom movement in offshore deep trenches. A ”local” tsunami can be a component of the Pacific-Wide tsunami in the area of the earthquake or a wave that is confined to the area of generation within a bay or harbor and caused by movement of the bay itself or landslides.

On December 26, 2004 the second biggest earthquake in recorded history occurred off the coast of Indonesia. The Magnitude 9.3 earthquake unleashed a devastating tsunami that traveled thousands of kilometers across the Indian Ocean, taking the lives of nearly 300,000 people in countries as far apart as Indonesia, the Maldives, Sri Lanka and Somalia. The catastrophe was one of the deadliest events in modern history.

In 1960, a large tsunami caused widespread death and destruction throughout the Pacific was generated by an earthquake located off the coast of Chile. It caused loss of life and property damage not only along the Chile coast but also in Hawaii and as far away as Japan. The Great Alaskan Earthquake of 1964 killed 106 people and produced deadly tsunami waves in Alaska, Oregon and California.

In July 1993, a tsunami generated in the Sea of Japan killed over 120 people in Japan. Damage also occurred in Korea and Russia but spared other countries since the tsunami wave energy was confined within the Sea of Japan. The 1993 Japan Sea tsunami is known as a "regional event" since its impact was confined to a relatively small area. For people living along the northwestern coast of Japan, the tsunami waves followed the earthquake within a few minutes.

During the 1990's, destructive regional tsunamis also occurred in Nicaragua, Indonesia, the Philippines, Papua New Guinea, and Peru, killing thousands of people. Others caused property damage in Chile and Mexico. Some damage also occurred in the far field in the Marquesas Islands (French Polynesia) from the July 30, 1995, Chilean and February 21, 1996, Peruvian tsunamis.

In less than a day, tsunamis can travel from one side of the Pacific to the other. However, people living near areas where large earthquakes occur may find that the tsunami waves will reach their shores within minutes of the earthquake. For these reasons, the tsunami threat to many areas such as Alaska, the Philippines, Japan and the West Coast of the United States can be immediate (for tsunamis from nearby earthquakes which take only a few minutes to reach coastal areas) or less urgent (for tsunamis from distant earthquakes which take from three to 22 hours to reach coastal areas).

Tsunami Watches and Warnings

Warning System

The tsunami warning system in the United States is a function of the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service. Development of the tsunami warning system was impelled by the disastrous waves generated in the 1964 Alaska Tsunami, which surprised Hawaii and the U.S. West Coast, taking a heavy toll in life and property.

The disastrous 1964 tsunami resulted in the development of a regional warning system in Alaska. The Alaska Tsunami Warning Center is in Palmer, Alaska. This facility is the nerve center for an elaborate telemetry network of remote seismic stations in Alaska, Washington, California, Colorado, and other locations. Tidal data is also telemetered directly to the ATWC from eight Alaskan locations. Tidal data from Canada, Washington, Oregon, and California are available via telephone, teletype, and computer readout.

Notification

The National Warning System (NAWAS) is an integral part of the Alaska Tsunami Warning Center. Reports of major earthquakes occurring anywhere in the Pacific Basin that may generate seismic sea waves are transmitted to the Honolulu Observatory for evaluation. An Alaska Tsunami Warning Center is also in place for public notification of earthquakes in the Pacific Basin near Alaska, Canada, and Northern California. The Observatory Staff determines action to be taken and relays warnings over the NAWAS circuits to inform and warn West Coast states. The same information is also transmitted to local jurisdictions over appropriate radio systems, teletype, and telephone circuits to ensure maximum dissemination.

A Tsunami Watch Bulletin is issued if an earthquake has occurred in the Pacific Basin and could cause a tsunami. A Tsunami Warning Bulletin is issued when an earthquake has occurred and a tsunami is spreading across the Pacific Ocean. When a threat no longer exists, a Cancellation Bulletin is issued.

Attachments

Planning Team Agendas

FEMA Letter of Approval

City Council Staff Reports

City Council Resolutions

insert

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

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

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

Planning Team Sign-In Sheets

Cities of Rancho Palos Verdes and Rolling Hills Estates
Hazard Mitigation Planning Team Meeting #1
April 11, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Katie Lozano	RPV Recreation & Parks Dept
Vina Ramos	Finance RPV
Jackie Ruiz	Administration RPV
Jessica Slawson	RHE Admin.
Natalie Chan	RPV PUBLIC WORKS
So Kim	CITY OF RPV - CDD
Jeannie Naughton	City of RHE Planning
ISMEL ESTRADA	EMERGENCY PLANNING CONSULTANTS

Cities of Rancho Palos Verdes and Rolling Hills Estates
Hazard Mitigation Planning Team Meeting #2
May 30, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Kati Lozano	Rec & Parks – RPV
Jackie Ruiz	Administration Department
Jessica Slawson	Admin. Dept.
Jeannie Naughton	Planning
Lukasz Buchwald	IT
Natalie Chan	RPV- PW
So Kim	RPV -Plng
Octavio Silva	RPV - Plng

Cities of Rancho Palos Verdes and Rolling Hills Estates
Hazard Mitigation Planning Team Meeting #3
June 26, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Octavio Silva	City of RPV (CDD)
Jackie Ruiz	City of Rancho Palos Verdes (Administration)
Katie Lozano	City of RPV Rec & Parks
Jeannie Naughton	City of Rolling Hills Estates Planning
Jessica Slawson	City of Rolling Hills Estates.
Vina Ramos	City of RPV
Natalie Chan	RPV-PW

Cities of Rancho Palos Verdes and Rolling Hills Estates
Hazard Mitigation Planning Team Meeting #4
September 30, 2019

Name	Department
Jessica Slawson	CM office, RHE City
Jeannie Naughton	Community Development, RHE City
Alexa Davis	RHE Asst CM
Megan Barnes	Administration, RPV
GABRIELLA YAP	ADMINISTRATION, RPV DCM
Vina Ramos	Finance
Kate Cozad	R&P
Octavio Silva	CDD

Planning Team Agendas

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

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

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

Agenda

Cities of Rancho Palos Verdes and Rolling Hills Estates

Planning Team Meeting #1

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

Agenda

Cities of Rancho Palos Verdes and Rolling Hills Estates

Planning Team Meeting #2

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

Agenda

Cities of Rancho Palos Verdes and Rolling Hills Estates

Planning Team Meeting #3

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

Agenda

Cities of Rancho Palos Verdes and Rolling Hills Estates

Planning Team Meeting #4

1. **Review First Draft Plan (distributed ahead of meeting to all members).**

2. **Discuss Strategy for Distributing Second Draft Plan to External Agencies and General Public. Also, discuss submission to Cal OES/FEMA for review and approval. Upon return of Approval Pending Adoption, updated Plan will be set for separate public meetings with both the City Councils for Plan adoption.**

Web Postings and Notices

Rancho Palos Verdes Noticing of Availability of Second Draft Plan:

City website- http://www.rpvca.gov/

City “Notify Me” Breaking News list - http://www.rpvca.gov/list.aspx?PRVMSG=274

City Facebook - https://www.facebook.com/CityofRanchoPalosVerdes/

City Instagram - https://www.instagram.com/ranchopalosverdescity/

City Nextdoor- https://nextdoor.com/agency-detail/ca/palos-verdes-peninsula/city-of-rancho-palos-verdes/

City Twitter - https://twitter.com/CityofRPV

Winter 2019 City Newsletter, if timing coincides

Los Angeles County Disaster Management Area G - Jeff Robinson, Executive Director

Rancho Palos Verdes Emergency Preparedness Committee
- https://www.rpvca.gov/167/Emergency-Preparedness-Committee Diana Feinberg, Chair

Rancho Palos Verdes Council of Homeowners Associations
- http://www.palosverdes.com/choa/ John Maniatakis, President

Palos Verdes Peninsula Land Conservancy - https://pvplc.org/ Adrienne Mohan, Executive Director

Palos Verdes Peninsula Community Emergency Response Team
- http://www.pvpcert.org/ pvpcert@palosverdes.com

Legal notice in the Palos Verdes Peninsula News - https://www.pvnews.com/ - Susan Pilgrim, Legals, Southern California News Group

Hazus: Earthquake Global Risk Report

Region Name: RanchoPalosVerdes

Earthquake Scenario: M7.4-Palos Verdes v10

Print Date: June 01, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

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

Table of Contents

General Description of the Region

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

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

California

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

The geographical size of the region is 27.04 square miles and contains 21 census tracts. There are over 33 thousand households in the region which has a total population of 87,982 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 31 thousand buildings in the region with a total building replacement value (excluding contents) of 14,941 (millions of dollars). Approximately 94.00 % of the buildings (and 90.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 1,187 and 38 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 31 thousand buildings in the region which have an aggregate total replacement value of 14,941 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 93% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

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

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 34 schools, 0 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 32 hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 1,225.00 (millions of dollars). This inventory includes over 100.66 miles of highways, 1 bridges, 1,188.06 miles of pipes.

Table 1: Transportation System Lifeline Inventory

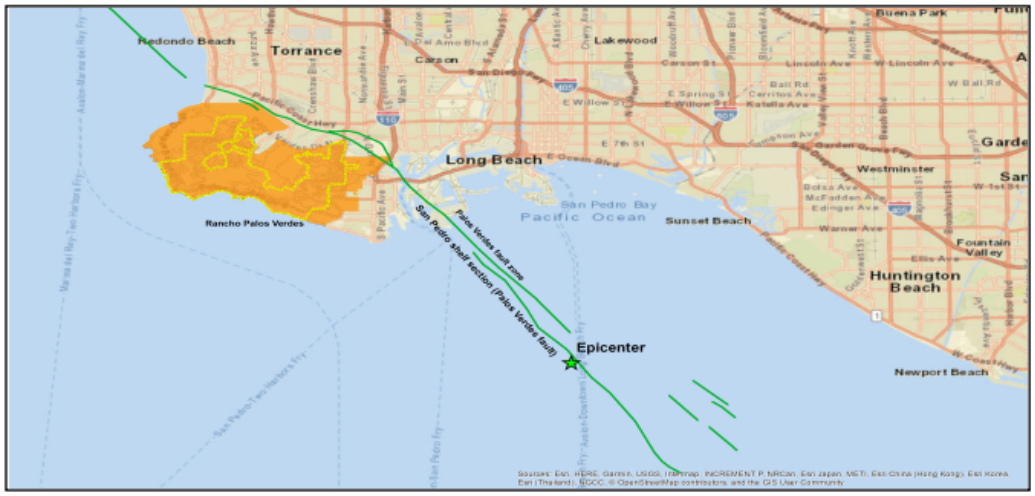
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	1	0.8579
	Segments	124	1147.9863
	Tunnels	0	0.0000
	Subtotal		**1148.8442**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	41	37.3909
	Tunnels	0	0.0000
	Subtotal		**37.3909**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
	Subtotal		**0.0000**
Bus	Facilities	1	1.2862
	Subtotal		**1.2862**
Ferry	Facilities	0	0.0000
	Subtotal		**0.0000**
Port	Facilities	0	0.0000
	Subtotal		**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
	Subtotal		**0.0000**
	Total		**1,187.50**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	19.1274
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**19.1274**
Waste Water	Distribution Lines	NA	11.4764
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**11.4764**
Natural Gas	Distribution Lines	NA	7.6510
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**7.6510**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	0	0.0000
		Subtotal	**0.0000**
		Total	**38.30**

Earthquake Scenario

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



Scenario Name	M7.4-Palos Verdes v10
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	7.38
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	

Direct Earthquake Damage

Building Damage

Hazus estimates that about 9,920 buildings will be at least moderately damaged. This is over 32.00 % of the buildings in the region. There are an estimated 587 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

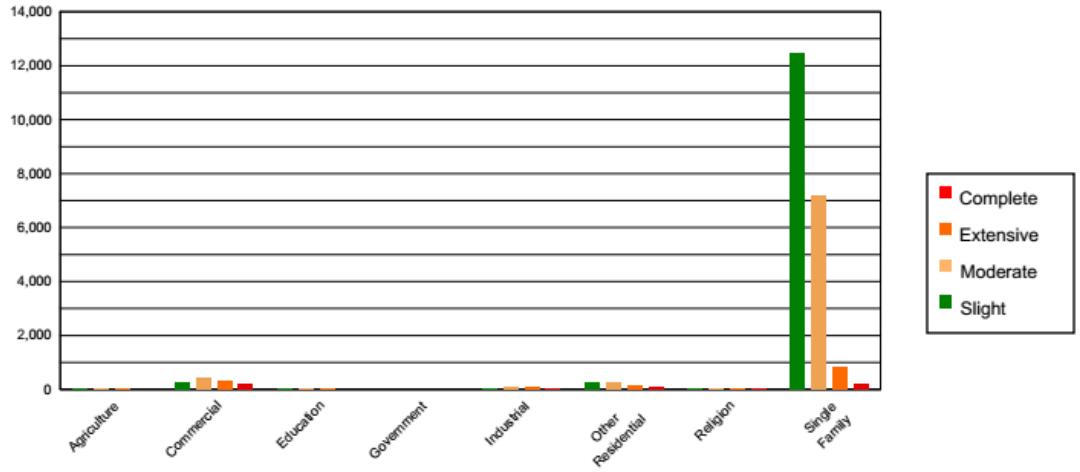


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	6.07	0.07	9.61	0.07	10.78	0.14	6.19	0.44	4.36	0.74
Commercial	152.76	1.85	246.82	1.89	400.79	5.05	297.50	21.36	186.13	31.70
Education	10.75	0.13	14.78	0.11	15.67	0.20	8.40	0.60	4.40	0.75
Government	1.88	0.02	2.98	0.02	4.94	0.06	4.21	0.30	3.00	0.51
Industrial	26.14	0.32	44.59	0.34	82.27	1.04	64.89	4.66	44.11	7.51
Other Residential	155.06	1.87	250.60	1.92	235.24	2.96	166.65	11.97	105.44	17.96
Religion	14.99	0.18	22.06	0.17	27.57	0.35	19.33	1.39	12.05	2.05
Single Family	7903.34	95.55	12481.85	95.48	7163.84	90.21	825.34	59.27	227.63	38.77
Total	8,271		13,073		7,941		1,393		587	

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

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	8048.98	97.32	12759.01	97.60	7307.64	92.02	827.38	59.42	247.30	42.12
Steel	23.90	0.29	41.17	0.31	107.83	1.36	109.57	7.87	70.94	12.08
Concrete	41.23	0.50	69.92	0.53	93.87	1.18	75.15	5.40	50.17	8.55
Precast	27.11	0.33	48.92	0.37	104.98	1.32	78.87	5.66	46.23	7.87
RM	122.53	1.48	127.14	0.97	224.14	2.82	156.82	11.26	59.04	10.06
URM	5.01	0.06	11.21	0.09	25.69	0.32	23.98	1.72	30.96	5.27
MH	2.22	0.03	15.92	0.12	76.94	0.97	120.73	8.67	82.48	14.05
Total	**8,271**		**13,073**		**7,941**		**1,393**		**587**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

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

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	34	0	0	0
EOCs	0	0	0	0
PoliceStations	1	0	0	0
FireStations	0	0	0	0

Transportation Lifeline Damage

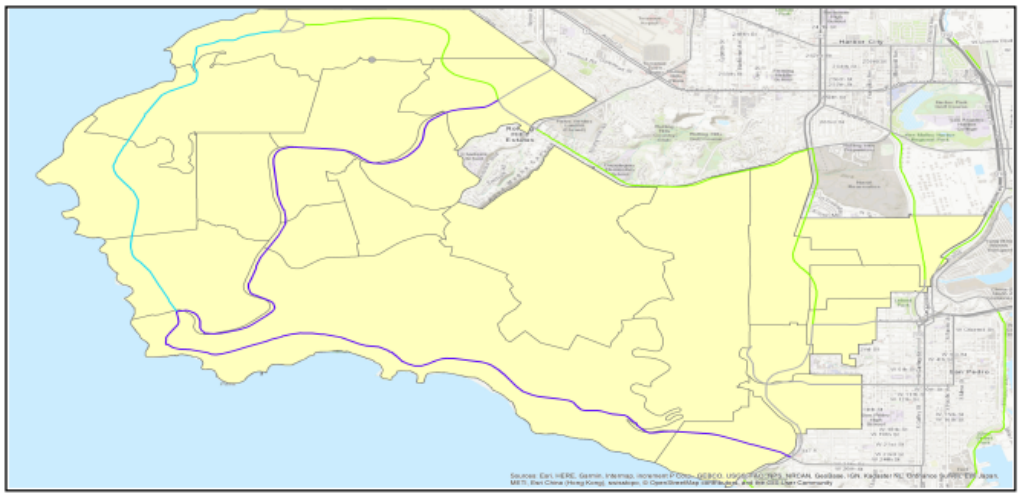


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	124	0	0	123	123
	Bridges	1	0	0	1	1
	Tunnels	0	0	0	0	0
Railways	Segments	41	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	1	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

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

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

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

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	594	432	108
Waste Water	357	217	54
Natural Gas	238	74	19
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	33,920	14,730	3,593	0	0	0
Electric Power		21,932	12,730	4,742	832	32

Induced Earthquake Damage

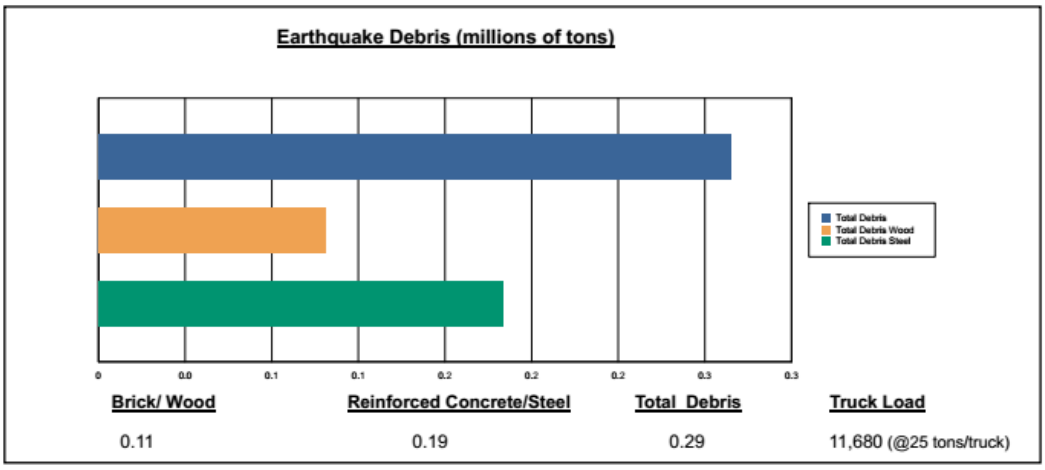
Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 1 ignitions that will burn about 0.02 sq. mi 0.07 % of the region's total area.) The model also estimates that the fires will displace about 163 people and burn about 21 (millions of dollars) of building value.

Debris Generation

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

The model estimates that a total of 292,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 36.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 11,680 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.



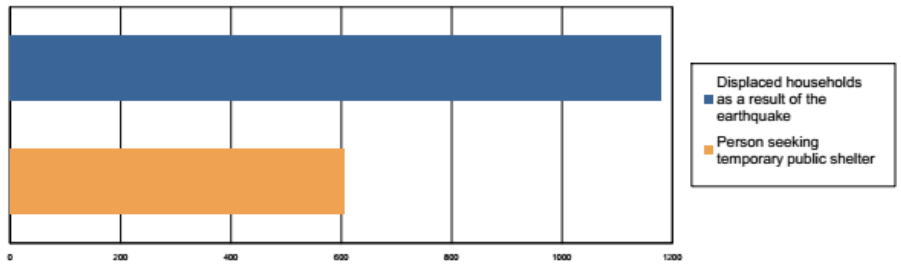
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.11	0.19	0.29	11,680 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 1,178 households to be displaced due to the earthquake. Of these, 607 people (out of a total population of 87,982) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
1,178	607

Casualties

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

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

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

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	9.44	2.75	0.45	0.88
	Commuting	0.01	0.01	0.02	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	11.47	3.28	0.51	1.00
	Other-Residential	57.10	14.91	2.07	4.03
	Single Family	126.02	19.08	1.04	1.82
	Total	**204**	**40**	**4**	**8**
2 PM	Commercial	565.56	164.61	26.81	52.67
	Commuting	0.06	0.07	0.14	0.03
	Educational	155.53	45.35	7.55	14.78
	Hotels	0.00	0.00	0.00	0.00
	Industrial	84.52	24.12	3.75	7.29
	Other-Residential	13.24	3.46	0.49	0.91
	Single Family	31.62	4.83	0.30	0.45
	Total	**851**	**242**	**39**	**76**
5 PM	Commercial	390.49	113.31	18.52	35.93
	Commuting	1.03	1.21	2.23	0.42
	Educational	12.17	3.55	0.59	1.16
	Hotels	0.00	0.00	0.00	0.00
	Industrial	52.82	15.08	2.34	4.56
	Other-Residential	21.92	5.74	0.81	1.53
	Single Family	48.90	7.47	0.47	0.70
	Total	**527**	**146**	**25**	**44**

Economic Loss

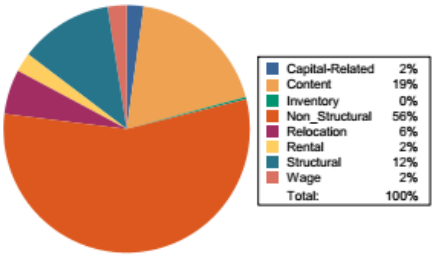
The total economic loss estimated for the earthquake is 2,122.46 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

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

The total building-related losses were 2,118.57 (millions of dollars); 13 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 70 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

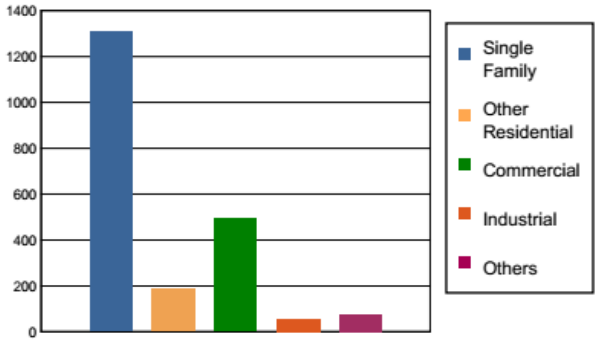


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	1.7659	46.4318	0.8498	1.6829	50.7304
	Capital-Related	0.0000	0.7506	42.6733	0.5050	0.4804	44.4093
	Rental	20.2587	8.8392	20.9021	0.2908	1.0480	51.3388
	Relocation	73.9202	6.8010	32.1652	1.6175	7.9618	122.4657
	Subtotal	**94.1789**	**18.1567**	**142.1724**	**3.2631**	**11.1731**	**268.9442**
Capital Stock Losses							
	Structural	162.9327	19.7009	61.4312	7.4269	11.2211	262.7128
	Non_Structural	804.4038	119.5998	199.5253	27.1969	35.9045	1,186.6303
	Content	245.7565	27.9342	89.5244	16.9505	15.7754	395.9410
	Inventory	0.0000	0.0000	1.6292	2.5836	0.1251	4.3379
	Subtotal	**1213.0930**	**167.2349**	**352.1101**	**54.1579**	**63.0261**	**1849.6220**
	Total	**1307.27**	**185.39**	**494.28**	**57.42**	**74.20**	**2118.57**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

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

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	1147.9863	0.0000	0.00
	Bridges	0.8579	0.1327	15.47
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**1148.8442**	**0.1327**	
Railways	Segments	37.3909	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**37.3909**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	1.2862	0.4970	38.64
	Subtotal	**1.2862**	**0.4970**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**1,187.52**	**0.63**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	19.1274	1.9455	10.17
	Subtotal	**19.1274**	**1.9455**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	11.4764	0.9773	8.52
	Subtotal	**11.4764**	**0.9773**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	7.6510	0.3348	4.38
	Subtotal	**7.6510**	**0.3348**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**38.25**	**3.26**	

Appendix A: County Listing for the Region

Los Angeles,CA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California					
	Los Angeles	87,982	13,519	1,422	14,941
Total Region		**87,982**	**13,519**	**1,422**	**14,941**

Hazus: Earthquake Global Risk Report

Region Name: RHE_SP3

Earthquake Scenario: M7.4-Palos Verdes v10

Print Date: June 02, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

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

Table of Contents

General Description of the Region

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

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

California

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

The geographical size of the region is 16.56 square miles and contains 14 census tracts. There are over 22 thousand households in the region which has a total population of 58,256 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 20 thousand buildings in the region with a total building replacement value (excluding contents) of 9,584 (millions of dollars). Approximately 93.00 % of the buildings (and 88.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 1,119 and 24 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 20 thousand buildings in the region which have an aggregate total replacement value of 9,584 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 91% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

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

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 22 schools, 0 fire stations, 2 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 1 hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 1,143.00 (millions of dollars). This inventory includes over 95.07 miles of highways, 1 bridges, 758.69 miles of pipes.

Table 1: Transportation System Lifeline Inventory

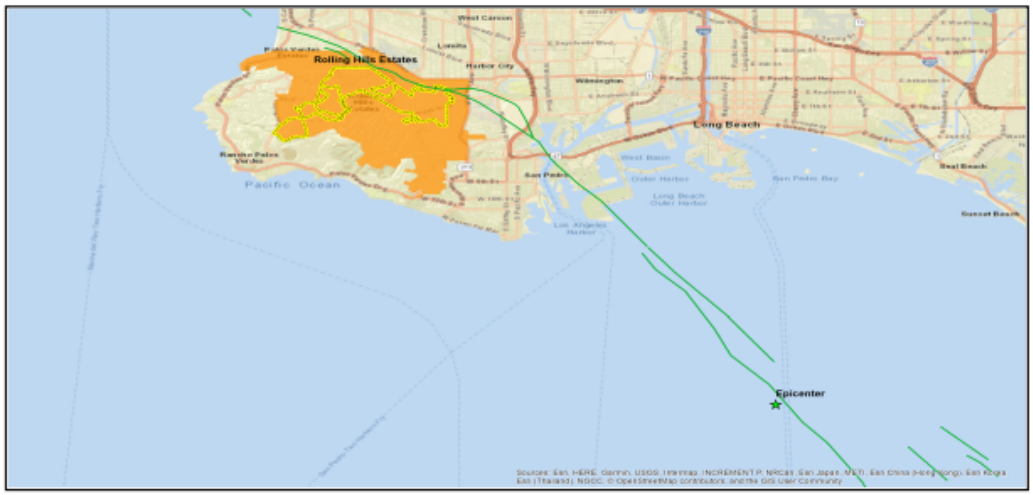
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	1	0.8579
	Segments	112	1096.0731
	Tunnels	0	0.0000
	Subtotal		**1096.9310**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	16	20.8393
	Tunnels	0	0.0000
	Subtotal		**20.8393**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
	Subtotal		**0.0000**
Bus	Facilities	1	1.2862
	Subtotal		**1.2862**
Ferry	Facilities	0	0.0000
	Subtotal		**0.0000**
Port	Facilities	0	0.0000
	Subtotal		**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
	Subtotal		**0.0000**
	Total		**1,119.10**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	12.2185
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**12.2185**
Waste Water	Distribution Lines	NA	7.3311
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**7.3311**
Natural Gas	Distribution Lines	NA	4.8874
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**4.8874**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	0	0.0000
		Subtotal	**0.0000**
		Total	**24.40**

Earthquake Scenario

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



Scenario Name	M7.4-Palos Verdes v10
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	7.38
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	

Direct Earthquake Damage

Building Damage

Hazus estimates that about 7,229 buildings will be at least moderately damaged. This is over 36.00 % of the buildings in the region. There are an estimated 631 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

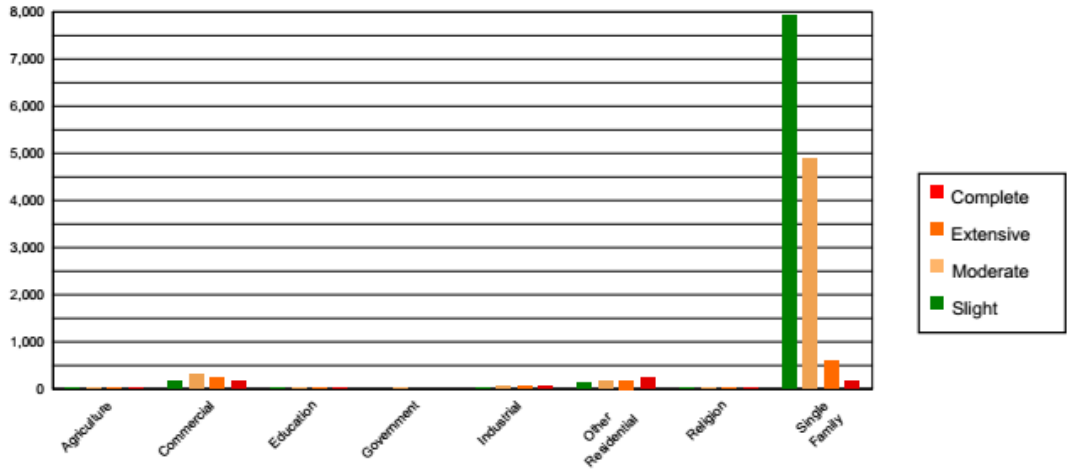


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	5.63	0.12	9.79	0.12	11.44	0.21	6.87	0.61	5.28	0.83
Commercial	96.57	2.02	171.79	2.07	302.73	5.53	246.15	21.92	171.76	27.19
Education	7.29	0.15	11.12	0.13	12.42	0.23	7.05	0.63	4.12	0.65
Government	1.76	0.04	2.71	0.03	3.90	0.07	3.22	0.29	2.41	0.38
Industrial	15.21	0.32	29.73	0.36	60.31	1.10	52.44	4.67	40.31	6.38
Other Residential	78.12	1.64	142.05	1.71	162.16	2.96	184.67	16.45	225.00	35.61
Religion	10.22	0.21	16.67	0.20	21.94	0.40	16.53	1.47	11.65	1.84
Single Family	4558.29	95.50	7922.81	95.38	4899.73	89.50	605.89	53.96	171.28	27.11
Total	4,773		8,307		5,475		1,123		632	

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

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	4641.25	97.24	8098.00	97.49	5005.23	91.43	613.35	54.63	188.80	29.88
Steel	14.59	0.31	28.01	0.34	79.09	1.44	88.51	7.88	65.33	10.34
Concrete	24.74	0.52	46.75	0.56	67.64	1.24	59.59	5.31	45.17	7.15
Precast	17.22	0.36	35.11	0.42	80.77	1.48	65.41	5.83	43.38	6.87
RM	71.94	1.51	83.95	1.01	159.39	2.91	122.22	10.88	54.02	8.55
URM	2.70	0.06	7.01	0.08	18.06	0.33	18.40	1.64	26.73	4.23
MH	0.63	0.01	7.85	0.09	64.45	1.18	155.35	13.84	208.37	32.98
Total	**4,773**		**8,307**		**5,475**		**1,123**		**632**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

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

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	22	0	0	0
EOCs	0	0	0	0
PoliceStations	2	0	0	0
FireStations	0	0	0	0

Transportation Lifeline Damage

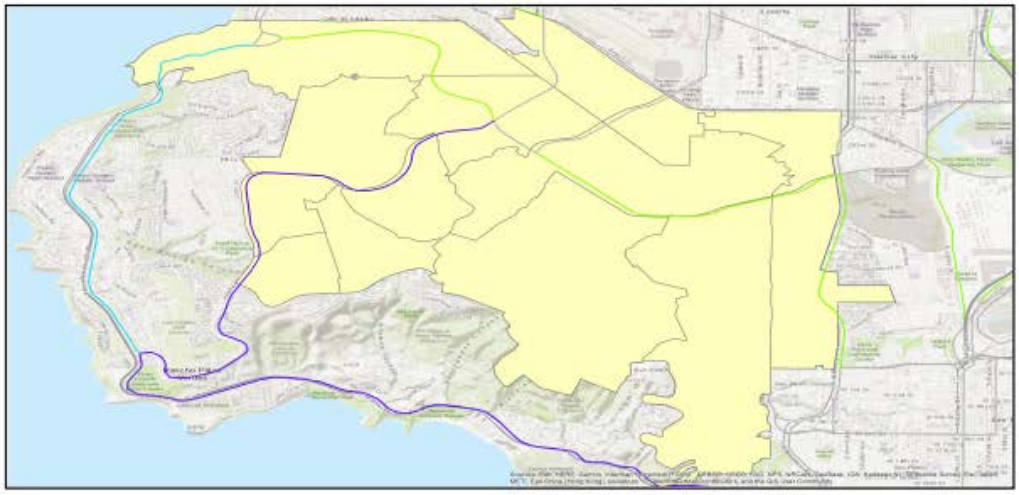


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations_			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	112	0	0	103	103
	Bridges	1	0	0	1	1
	Tunnels	0	0	0	0	0
Railways	Segments	16	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	1	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

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

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

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

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	380	0	0
Waste Water	228	0	0
Natural Gas	152	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water						
Electric Power		15,665	9,390	3,663	669	22

Induced Earthquake Damage

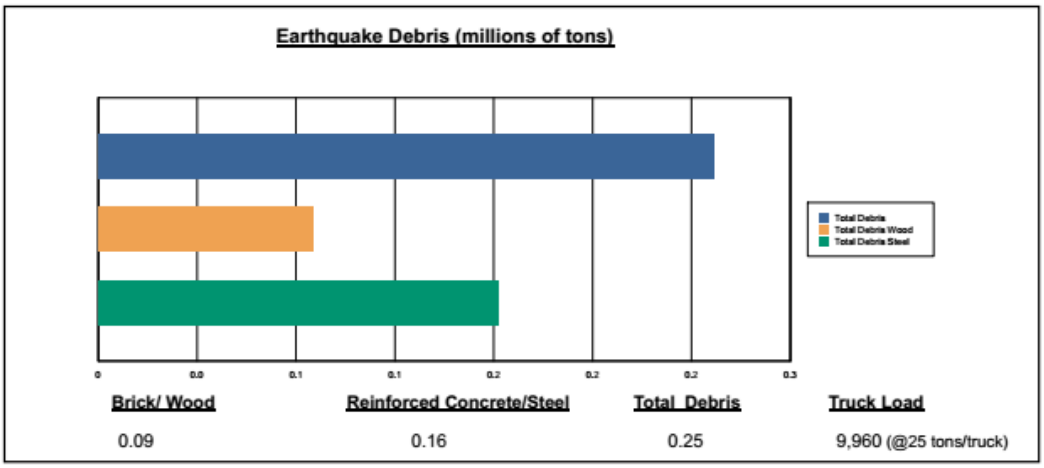
Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 1 ignitions that will burn about 0.02 sq. mi 0.12 % of the region's total area.) The model also estimates that the fires will displace about 238 people and burn about 29 (millions of dollars) of building value.

Debris Generation

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

The model estimates that a total of 249,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 35.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 9,960 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.



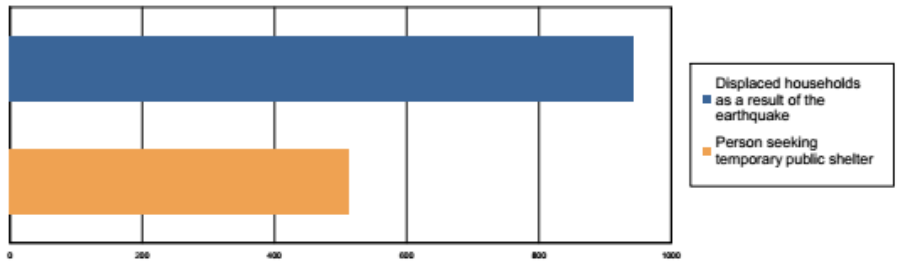
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.09	0.16	0.25	9,960 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 943 households to be displaced due to the earthquake. Of these, 512 people (out of a total population of 58,256) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
943	512

Casualties

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

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

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

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	7.55	2.25	0.37	0.73
	Commuting	0.01	0.01	0.02	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	8.60	2.52	0.40	0.78
	Other-Residential	66.40	17.48	2.18	4.17
	Single Family	91.72	14.37	0.82	1.45
	Total	**174**	**37**	**4**	**7**
2 PM	Commercial	449.93	133.61	22.02	43.27
	Commuting	0.06	0.07	0.14	0.03
	Educational	123.97	36.88	6.21	12.16
	Hotels	0.00	0.00	0.00	0.00
	Industrial	63.37	18.52	2.93	5.70
	Other-Residential	15.40	4.05	0.51	0.94
	Single Family	22.59	3.56	0.23	0.35
	Total	**675**	**197**	**32**	**62**
5 PM	Commercial	310.62	91.95	15.20	29.51
	Commuting	1.03	1.21	2.23	0.42
	Educational	8.61	2.56	0.43	0.85
	Hotels	0.00	0.00	0.00	0.00
	Industrial	39.61	11.57	1.83	3.56
	Other-Residential	25.07	6.62	0.85	1.58
	Single Family	35.67	5.63	0.37	0.56
	Total	**421**	**120**	**21**	**36**

Economic Loss

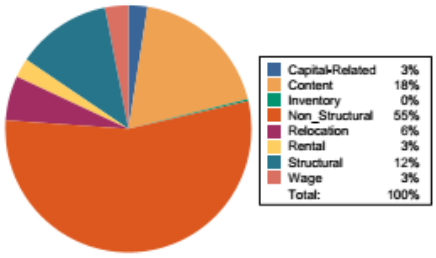
The total economic loss estimated for the earthquake is 1,601.37 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

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

The total building-related losses were 1,600.74 (millions of dollars); 14 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 65 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

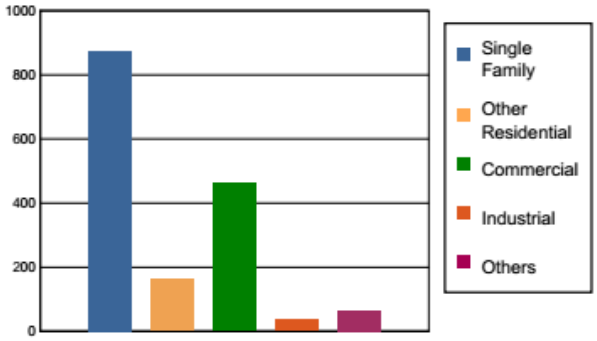


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	1.4413	44.5183	0.5422	1.6514	48.1532
	Capital-Related	0.0000	0.6131	40.5877	0.3221	0.4211	41.9440
	Rental	13.9775	7.3783	18.8418	0.1910	0.9003	41.2889
	Relocation	51.0275	6.3776	29.1200	1.0734	6.9449	94.5434
	Subtotal	**65.0050**	**15.8103**	**133.0678**	**2.1287**	**9.9177**	**225.9295**
Capital Stock Losses							
	Structural	109.7526	18.4048	57.0525	4.6021	10.1610	199.9730
	Non_Structural	536.5701	104.1194	186.6097	17.0374	32.2133	876.5499
	Content	162.5004	24.0092	83.8919	10.4331	14.3432	295.1778
	Inventory	0.0000	0.0000	1.6103	1.3679	0.1352	3.1134
	Subtotal	**808.8231**	**146.5334**	**329.1644**	**33.4405**	**56.8527**	**1374.8141**
	Total	**873.83**	**162.34**	**462.23**	**35.57**	**66.77**	**1600.74**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

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

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	1096.0731	0.0000	0.00
	Bridges	0.8579	0.1327	15.47
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**1096.9310**	**0.1327**	
Railways	Segments	20.8393	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**20.8393**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	1.2862	0.4970	38.64
	Subtotal	**1.2862**	**0.4970**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**1,119.06**	**0.63**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	12.2185	0.0000	0.00
	Subtotal	**12.2185**	**0.0000**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	7.3311	0.0000	0.00
	Subtotal	**7.3311**	**0.0000**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	4.8874	0.0000	0.00
	Subtotal	**4.8874**	**0.0000**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**24.44**	**0.00**	

Appendix A: County Listing for the Region

Los Angeles,CA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California					
	Los Angeles	58,256	8,423	1,160	9,584
Total Region		**58,256**	**8,423**	**1,160**	**9,584**