City of Rolling Hills

Hazard Mitigation Plan

Final Draft Plan

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Credits

Special Thanks

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PART I: BACKGROUND

Executive Summary

The Plan includes resources and information to assist the City of Rolling Hills ("planning area"), their residents, public and private sector organizations, and others interested in participating in planning for hazard events. The Plan provides a list of activities that may assist the City in reducing risk and preventing loss from future hazard events. The action items address multi-hazard issues, as well as activities specifically for reducing risk and preventing losses relating to earthquake, land movement, wildfire, and drought.

The Hazard Mitigation Plan (Plan) was prepared in response to federal legislation known as the Disaster Mitigation Act of 2000 (DMA 2000). This Plan satisfies mitigation planning requirements for the City of Rolling Hills. 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 emergency management programs. This document is a federally mandated update to the original Natural Hazards Mitigation Plan (January 17, 2008). Under DMA 2000, each state and local government must have a federally approved mitigation plan to be eligible for hazard mitigation grant funding.

The Disaster Mitigation Act of 2000 (DMA 2000) is intended to facilitate cooperation between state and local governments, prompting them to work together. Through collaboration, mitigation needs can be identified before disasters strike, resulting in faster allocation of resources and more effective risk reduction projects.

Furthermore, in October 2006, the California State Legislature passed Assembly Bill 2140 which became effective January 1, 2007. Reflecting on DMA 2000, the intention of AB 2140 is to link by reference or format a jurisdiction's General Plan Safety Element with the Hazard Mitigation Plan in order to receive additional federal funding after a disaster. DMA 2000 requires that a Hazard Mitigation Plan describe the type, location, and extent of all of the natural hazards that can affect the jurisdiction; describe the jurisdiction's vulnerability to these hazards; include a mitigation strategy that provides the jurisdictions blueprint for reducing the potential losses; and, contain a plan maintenance process.

Assembly Bill 2140 limits the amount of additional state funding for certain disaster recovery projects funded by the California Disaster Assistance Act (CDAA) unless the local agency has complied with the provisions set forth in AB 2140. Among other requirements, the local jurisdiction must provide a certified copy of the Resolution of Adoption to the Federal Emergency Management Agency (FEMA) demonstrating that the approved Hazard Mitigation Plan has been adopted and incorporated into the Safety Element of the General Plan.

Though compliance with AB 2140 is optional, noncompliance would limit the City of Rolling Hills' ability to obtain additional funding for certain disaster recovery projects. Specifically, California Government Code Section 8685.9 states, " ...the state share shall not exceed 75 percent of total state eligible costs unless the local agency is located within a city, county, or city and county that has adopted a hazard mitigation plan in accordance with the Federal Disaster Mitigation Act of 2000 as part of the safety element of its general plan."

Mitigation Planning Benefits

Planning ahead helps residents, businesses, and government agencies effectively respond when disasters strike; and keeps public agencies eligible for Hazard Mitigation Grant Program (HMGP) funding. The long-term benefits of mitigation planning include:

- ✓ Greater understanding of hazards faced by a community
- ✓ Use of limited resources on hazards with the greatest effect on a community
- ✓ Financial savings through partnerships for planning and mitigation
- ✓ Reduced long-term impacts and damages to human health and structures, and lower repair costs
- ✓ More sustainable, disaster-resistant communities.

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 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 Cities 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 Cities, 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.

Support for 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 and 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 federal land management.

The City of Rolling Hills Hazard Mitigation Planning Team (Planning Team) consisting of staff from the City and Los Angeles County, Rolling Hills Community Association, and several utilities all working with Emergency Planning Consultants using the following approach to create the 2019 Hazard Mitigation Plan:

- ✓ Identify hazards posing a significant threat
- ✓ Profile these hazards
- ✓ Estimate inventory at risk and potential losses associated with these hazards
- ✓ Develop mitigation strategies and goals that address these hazards
- ✓ Develop plan maintenance procedures for implementation after the joint review by Cal OES and FEMA and FEMA approval.

As required by DMA 2000, the City informed the public about the planning process and provided opportunities for public input during the plan writing phase and decision-making phase. In addition, key agencies and stakeholders shared their expertise during the planning process. This Plan documents the process, outcome, and future of the City's mitigation planning efforts.

How is the Plan Organized?

The Mitigation Plan contains a Mitigation Actions Matrix, background on the purpose and methodology used to develop the mitigation plan, a profile of City of Rolling Hills, sections on the five hazards that occur in or near the City, and a number of appendices. All of the sections are described in detail in Section 1, Introduction.

Part I: Background

Executive Summary

The Executive Summary provides a very general overview of mitigation planning, the planning process, and the steps involved in implementing the Plan.

Section 1: Introduction

The Introduction describes the background and purpose of developing the Plan.

Section 2: Community Profile

The section presents the history, geography, demographics, and socioeconomics of the planning area as well as valuable information on the demographics and history of the region.

Part II: Hazard Analysis

This section provides information on the process used to assess the demographics and development patterns for the community along with an assessment of the hazards.

Section 3: Risk Assessment

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

Sections 4-7: Hazard-Specific Analysis

Hazard-Specific Analysis on the four hazards posing the greatest threat to the planning area. These hazards occur with some regularity and have been predicted through historic evidence and scientific methods. These hazards include:

Section 4: Earthquake
Section 5: Land Movement
Section 6: Wildfire
Section 7: Drought

Each Hazard-Specific Analysis includes information on the history, hazard causes, hazard characteristics, and hazard assessment.

Part III: Mitigation Strategies

Section 8: Mitigation Strategies

This section highlights the Mitigation Actions Matrix and: 1) past accomplishments; 2) planning approach; 3) goals and objectives; 4) identification, analysis, and implementation of mitigation activities; 5) prioritized mitigation activities; and 6) next steps.

Section 9: Planning Process

This section describes the mitigation planning process including: 1) Planning Team involvement, 2) extended Planning Team support, 3) public and other stakeholder involvement; and 4) integration of existing data and plans.

Section 10: Plan Maintenance

This section provides information on Plan implementation, monitoring and evaluation.

Part IV: Appendix

The Plan appendix is designed to provide users of the Plan with additional information to assist them in understanding the contents of the Plan.

Appendix: Benefit/Cost Analysis

This section describes FEMA's requirements for benefit cost analysis in hazards mitigation, as well as various approaches for conducting economic analysis of proposed mitigation activities.

Plan Mission

The mission of the City of Rolling Hills Hazard Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from hazards. This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the City towards building a Disaster Resilient Community.

Mitigation Planning Process

The City of Rolling Hills Hazard Mitigation Plan is the result of a collaborative planning effort between City of Rolling Hills, Rolling Hills Community Association, Los Angeles County Fire, Sheriff's and Building and Safety Departments, citizens, and regional and state organizations. Public participation played a key role in development of goals and action items. Public outreach activities were conducted to include City of Rolling Hills residents in plan development.

Outreach to citizens included informational postings on the City website and articles in the bi-weekly newsletter mailed to all 684 households informing of the preparation of the draft Plan. During the plan drafting period, the City also used its newsletter to inform residents regarding how to be ready for threats (e.g. possible landslides and mudslides in advance of a possible El Nino) and inviting public participation in discussion of a proposed Fire Fuel Hazard Abatement Ordinance. In addition, the City participated along with three other Palos Verdes Peninsula cities in the "Prepared Peninsula Expo" on November 1, 2015, a 5-hour event that covered preparedness for multiple types of hazards with interactions with law enforcement, Fire Department, Homeland Security and key city staff. This outreach served to maintain citizen awareness of the need to be ready with a well thought out emergency action plan but also provided a way for citizens to provide input in advance of the formal public review period for the Draft Hazard Mitigation Plan.

A Planning Team guided the process of developing the plan. The Planning Team utilized the contents from the 2008 Plan to create this 2019 document. Hazard mitigation strategy and goals were developed by understanding the risk posed by the identified hazards. The group also determined hazard mitigation activities and priorities to include scenarios for both present and future conditions. The final Plan will be implemented through various projects, changes in day-to-day city operations, and through continued hazard mitigation development. Through the Planning Team meetings, Mitigation Action Items identified in the 2008 Plan were reviewed and status information documented.

Public Input

The Plan was made available to the general public and external agencies through different venues including the Expo mentioned above, the City Newsletter, and the Planning Commission. The Planning Team recognizes that community involvement increases the likelihood that hazard mitigation will become a standard consideration for the City of Rolling Hills.

The Planning Team's notice in the City Newsletter directed readers to the City's website posting of the draft plan during the plan writing phase. During future updates every five years the Planning Team will follow a similar protocol of involving the general public.

Participating Organizations

For mitigation planning to be successful; like all community planning; it requires collaboration with, and support from, federal, state, local, and regional governments; citizens; the private sector; universities; and non-profit organizations. The Planning Team consulted a variety of sources to ensure that the planning process results in practicable actions tailored to local needs and circumstances.

The Planning Area and Hazards

Throughout history, the residents of the planning area have dealt with the various hazards affecting the area. The earliest inhabitants of the Palos Verdes Peninsula, the Tongva Indians, were careful to locate their villages on high ground for safety from winter floods (Source: Fink: Palos Verdes Peninsula: Time and the Terraced Land, 1987). Although there were far fewer people in the area prior to 1900, the hazards adversely affected the lives of those who depended on the land and climate conditions for food and welfare. For example, the drought of 1862-64 devastated local cattle ranching operations on the peninsula (source: Fink, 1987). As the population of the area has continued to increase over time, particularly in the last 50 years, the exposure to hazards creates an even higher risk than previously experienced.

Although this Plan only analyzes and provides mitigation for the City of Rolling Hills, this section discusses natural disasters that have affected the entire Palos Verdes Peninsula. Because it is a single geographic landform, natural disasters that have occurred in other parts of the Peninsula in the past have a high likelihood to impact the planning area in the future.

The planning area maintains some of the lowest population densities in Los Angeles County, and offers the benefits of living in a Mediterranean type of climate. The area is characterized by the unique and attractive landscape, magnificent views, and a semi-rural/coastal environment that makes the area so popular. However, the potential impacts of natural hazards associated with the terrain make the environment and population vulnerable to natural disaster situations.

The planning area is vulnerable to significant disruption from a spectrum of natural hazards. It is difficult to predict when these disasters will occur, or the extent to which they will affect the planning area. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from these natural disasters.

Mitigation Planning

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

The Plan provides a set of action items to reduce risk from hazards such as education and outreach programs and the development of partnerships. The Plan also provides for the implementation of preventative activities, including programs that restrict and control development in areas subject to damage from hazards.

The resources and information within the Plan:

- Establish a basis for coordination and collaboration among agencies and the public in the City of Rolling Hills.
- Identify and prioritize future mitigation projects; and
- Assist in meeting the requirements of federal assistance programs.

The Plan works in conjunction with other City plans, including the City's Multi-Hazard Functional Plan (also known as Emergency Operations Plan).

Mitigation Plan Jurisdiction and Scope

The Plan affects the areas within the planning area boundaries, with emphasis on City-owned facilities as well as facilities supporting the City following a major emergency. This Plan provides a framework for planning for a range of hazards. The resources and background information in the Plan address existing and future land development throughout the City of Rolling Hills.

Risk Assessment

Risk assessment is the identification of risks posed by a hazard and the corresponding impacts to the community. This process involves five steps: 1) identify hazards, 2) profile hazards, 3) inventory critical assets, 4) assess risks, and 5) assess vulnerability of future development.

Step 1: Identify Hazards

The Planning Team identified the hazards that could significantly impact the planning area by referencing their General Plans and the County of Los Angeles All-Hazards Mitigation Plan (2014).

The Planning Team ranked the hazards based on the probability, magnitude/severity, warning time, and duration.

That analysis yielded the following hazards as posing the greatest risk to the planning area: earthquakes, land movement, wildfires, and drought.

Step 2: Profile Hazards

Hazard profiles determine the extent to which each hazard could impact the City. Each hazard profile contains the following information:

- Background and local conditions
- Historic frequency and probability of occurrence
- Severity
- Historic losses and impacts
- Designated hazard areas

Other factors considered include potential impact, onset, frequency, hazard duration, cascading effects, and recovery time for each hazard. Using this information, the Planning Team

assessed the relative risk of each hazard ranging from severe risk to no risk. Where applicable, the source(s) of information, data, and maps showing vulnerable areas and relevant community components are provided.

Step 3: Inventory Critical Assets

Once hazards and profiles were established, locations of critical facilities were plotted and analyzed. To estimate losses from each hazard (number of structures, value of structures and number of people), the Planning Team used local resources; Census data; Hazards U.S. - Multi-Hazard (HAZUS-MH), a Geographic Information System (GIS) risk assessment methodology; and other GIS capabilities including local, regional, and state mapping resources.

The inventory of critical and essential facilities shows a range of resources that could be lost or damaged for each hazard such as population, general building stock (residential and institutional), critical facilities (e.g. Police / Fire stations and transportation systems), and utilities.

Step 4: Assess Risks

Estimated losses to structures and their contents, as well as the losses to structure use and function, were identified (as data was available).

Step 5: Vulnerability Analysis of Future Development

This step provides a general description of the planning area 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 Plan provides a comprehensive description of the character of the planning area in Section 2: Community Profile. 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 helps to identify potential problem areas and could serve as a guide for incorporating the goals and ideas contained in this Plan into other community development plans.

Mitigation Goals

The risk assessment and public input involved a review of past mitigation actions, future goals, and appropriate mitigation strategies. The Planning Team identified five mitigation goals that summarize the hazard reduction outcome the City wants to achieve:

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

These goals guided the development and implementation of specific mitigation activities. Many of the mitigation objectives and action items come from current programs. Emphasis was placed on the effectiveness of the activities with respect to their estimated cost.

Plan Writing

Preparation of the First Draft Plan resulted from input from the Planning Team and assistance from the consultant. Once the Team had an opportunity to provide input, the Second Draft Plan was posted on the City's website and invitations were distributed to outside agencies announcing the availability of the Plan along with the opportunity to participate in the drafting of the plan. The remainder of the plan writing phase consisted of forwarding the Third Draft Plan to Cal OES and FEMA for review and Approval Pending Adoption. Any mandated revisions were incorporated into the Final Draft Plan. A detailed accounting of the plan writing phase is located in Part III: Mitigation Strategies – Section 9: Planning Process.

Approval Pending Adoption

The updated Draft Plan was then submitted to Cal OES and FEMA for a joint review. FEMA issued an Approval Pending Adoption notice on January 4, 2019.

Plan Adoption

The 2019 Hazard Mitigation Plan was adopted by the City of Rolling Hills on _____. A copy of the City Council resolution is located in Section 9: Planning Process.

Plan Approval

Following the Council's adoption, FEMA issued a final approval of the 2019 Plan on _____.

Plan Maintenance

Mitigation planning is an ongoing process involving changes as new hazards occur, as the area develops, and as more is learned about hazards and their impacts. The Planning Team will monitor changing conditions, help implement mitigation activities, review the plan on an annual (or more) basis to determine if City goals are being met, and provide an update to Cal OES and FEMA every five years. In addition, the Planning Team will review After-Action Reports generated after any disaster that impacts the City, and revise the Plan, as needed.

Section 1: Introduction

Throughout history, the residents of City of Rolling Hills have dealt with the various hazards affecting the area. Photos, journal entries, and newspapers show that the residents of the area dealt with or planned for earthquakes, wildfires, droughts, and land movement. It's impossible to predict exactly when these disasters will occur, or the extent to which they will affect the City. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from these natural disasters.

Although there were fewer people in the area, the hazards adversely affected the lives of those who depended on the land and climate conditions for food and welfare. As the population of the City continues to increase, the exposure to hazards creates an even higher risk than previously experienced.

The City of Rolling Hills is located near the coast in Los Angeles County, and offers the benefits of living in a Mediterranean type of climate. The 3 square mile City is an entirely residential private gated community. The City is characterized by the unique and attractive landscape and hilly terrain that makes the area so popular. However, the potential impacts of hazards associated with the terrain make the environment and population vulnerable to disasters.

According to the City's General Plan, prior to incorporation, a portion of the City known as the Flying Triangle was determined to be in a landslide area when in 1948 the County of Los Angeles performed soil and geology studies for potential development below this area. At the time the area was vacant. However, due to lack of restrictions and building codes, and lack of technology, the County of Los Angeles allowed this area to be developed. The City of Rolling Hills incorporated in 1957 and since has adopted the County of Los Angeles Building Codes. The City of Rolling Hills continued to allow limited construction under the Los Angeles County Codes.

In 1973, there was a large fire in the Flying Triangle which burned vegetation, a number of homes, stables and other structures. All of the homes were built back, with a signed waiver that the owners are aware that this is a slide area and indemnifying the City and County from any liability.

Why Develop a Mitigation Plan?

As the cost of damage from disasters continues to increase, the community realizes the importance of identifying effective ways to reduce vulnerability to disasters. Hazard mitigation plans assist communities in reducing risk from hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the City.

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

The resources and information within the Mitigation Plan:

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

The mitigation plan works in conjunction with other City plans, including the City's General Plan and Multi-Hazard Functional Plan.

Mitigation Planning Process

The process for creating the Plan started with identifying members for the Planning Team. Each team member represented different public agencies, the Rolling Hills Community Association, and utility companies with a role in mitigation efforts. The Planning Team met and identified characteristics and consequences of hazards with significant potential to affect the City. The Planning Team utilized the contents from the 2008 Plan to create the 2019 update.

Hazard mitigation strategy and goals were developed by understanding the risk posed by the identified hazards. The group also determined hazard mitigation activities and priorities to include scenarios for both present and future conditions. The final Plan will be implemented through various projects, changes in day-to-day City operations, and through continued hazard mitigation development.

Through a series of Planning Team meetings, Mitigation Action Items identified in the 2008 Plan were reviewed and status information documented.

Why Plan for Hazards?

Hazards impact residents, businesses, property, the environment, and the economy of the planning area. Earthquake, wildfire, land movement, and drought have either occurred in the past or have a high potential to expose planning area residents to the financial and emotional costs of recovering after disasters.

Even in those communities that are essentially "built-out" (i.e., have little or no vacant land remaining for development) generally population density continues to increase when existing lower density residential and non-residential development is replaced with medium and high density residential development projects. However, Rolling Hills has no commercially zoned land and there is little opportunity to subdivide existing residential lots, therefore the City's density and population has historically remained very stable.

The inevitability of hazards, the existing population and activity within the area create an urgent need to develop strategies, coordinate resources, and increase public awareness to reduce risk and prevent loss from future hazard events. Identifying the risks posed by hazards, and developing strategies to reduce the impact of a hazard event can assist in protecting life and property of citizens and communities. Residents can work with the City to create a mitigation plan that addresses the potential impacts of hazardous events.

Hazard Mitigation Legislation

Relevant hazard mitigation legislation and grants are highlighted below.

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

Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation Program (PDM) was authorized by §203 of the Stafford Act, 42 United States Code (USC), 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 Indian tribal governments) implement cost-effective hazard mitigation activities that complement a comprehensive mitigation program.

Traditionally, two types of federal grants (planning and competitive) are offered under the PDM Program. Planning grants allocate funds to each state for mitigation plan development. Competitive grants distribute funds to states, local governments, and federally recognized Indian tribal governments via a competitive application process. FEMA reviews and ranks the submittals based on pre-determined criteria. The minimum eligibility requirements for competitive grants include participation in good standing in the National Flood Insurance Program (NFIP) and a FEMA-approved Mitigation Plan.
(Source: http://www.fema.gov/fima/pdm.shtm)

Flood Mitigation Assistance Program

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

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

Disaster Mitigation Act of 2000

DMA 2000 (DMA 2000) was signed by President Clinton on October 30, 2000 (Public Law 106-390). Section 322 primarily deals with the development of mitigation plans. The Interim Final Rule for planning provisions (44 CFR Part 201) was published in the Federal Register twice: February 26, 2002 and October 1, 2002. The mitigation planning requirements are implemented via 44 CFR Part 201.6.

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.

Under DMA 2000 state and local government (each city, county, and special district), and tribal government must develop a Mitigation Plan to be eligible to receive HMGP funds. Every mitigation plan, which must be reviewed by the state and approved by FEMA, should address the following items:

- ✓ Plan Promulgation
- ✓ Planning Process including Public Involvement
- ✓ Hazard Identification and Risk Assessment
- ✓ Mitigation Strategy
- ✓ Plan Implementation and Maintenance Procedures

State and Federal Support

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.

Cal OES is the lead agency for mitigation planning support to local governments. In addition, FEMA offers grants, tools, and training.

HAZUS-MH uses Geographic Information System technology to produce detailed maps and analytical reports on physical damage to building stock, critical facilities, transportation systems, and utilities.

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

- 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

Hazards U.S. – Multi-Hazard

In 1997, FEMA developed a standardized model for estimating losses caused by an earthquake. Hazards U.S. (HAZUS) addressed the need for more effective national, state, and local planning and the need to identify areas that face the highest risk and potential for loss.

Hazards U.S. Multi-Hazard (HAZUS-MH) provides models to estimate potential losses from floods (coastal and riverine) and winds (hail, hurricane, tornado, tropical cyclone, and thunderstorm). HAZUS-MH applies engineering and scientific risk calculations developed by

hazard and information technology experts to provide defensible damage and loss estimates. This methodology provides a consistent framework for assessing risk across a variety of hazards.

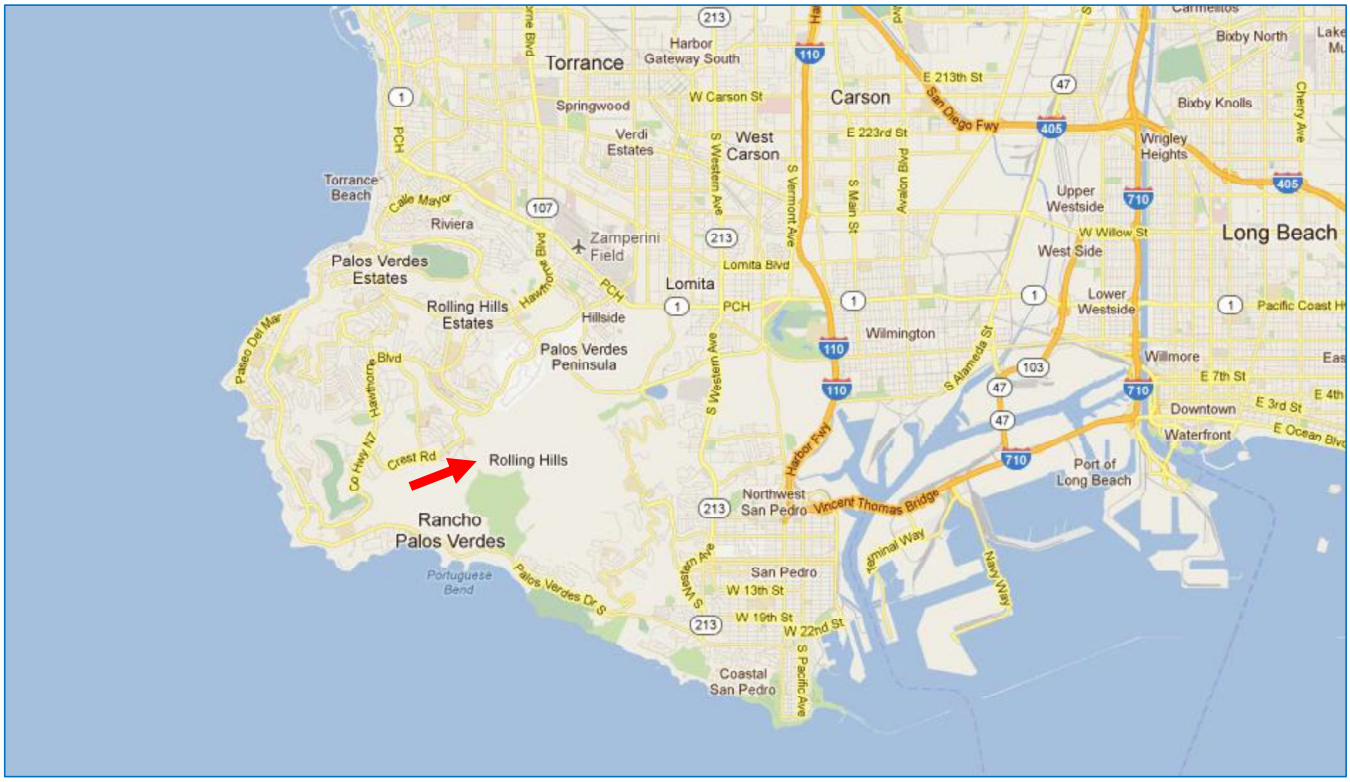
HAZUS-MH uses Geographic Information System technology to produce detailed maps and analytical reports on physical damage to building stock, critical facilities, transportation systems, and utilities. The damage reports cover induced damage (debris, fire, hazardous material, and inundation) and direct economic and social losses (casualties, shelter requirements, and economic impacts), promoting standardization.

HAZUS maps and reports in the Plan were developed by the County of Los Angeles for inclusion in the County's 2014 All-Hazard Mitigation Plan.

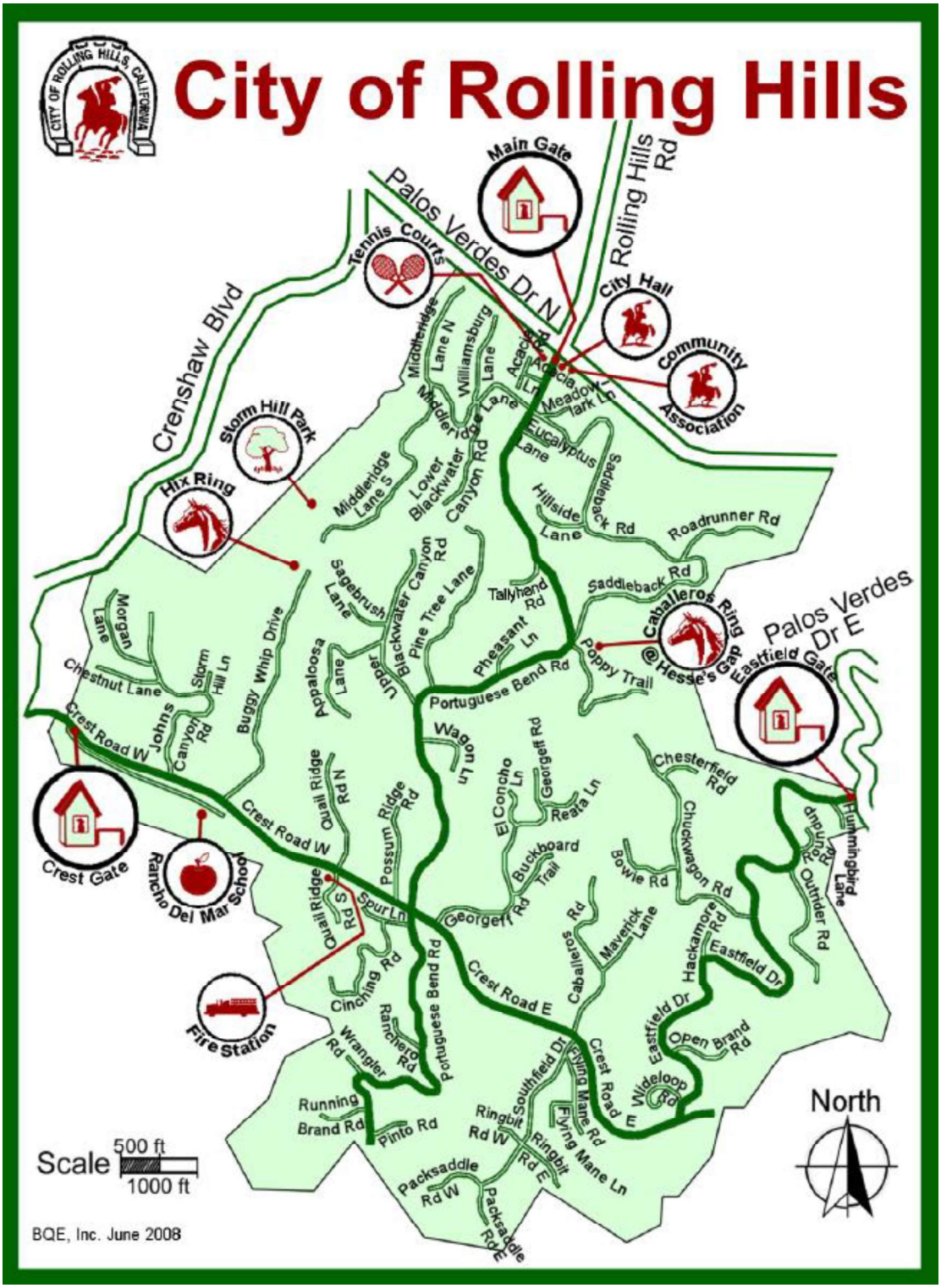
Who Does the Plan Affect?

The Plan affects the entire planning area. This Plan provides a framework for planning for hazards. The resources and background information in the plan is applicable area-wide, and the goals and recommendations can lay groundwork for other local mitigation plans and partnerships. The following maps show: 1) regional proximity of planning area, and 2) city map.

Map: Regional Proximity of Planning Area
(Source: Google Maps)



Map: City Map of Rolling Hills
(Source: City of Rolling Hills)



Section 2: Community Profile

Geography and the Environment

The City of Rolling Hills is characterized by beautifully wooded deep canyons and hilly terrain located on the San Pedro Hills of the Palos Verdes Peninsula in Southern California. The City of Rolling Hills is 3 square miles and is an entirely residential private gated community consisting of mostly large estate sized lots developed with one-story ranch style residences with agricultural and equestrian accessory structures and uses. Lot sizes range from a minimum of one acre to several acres in size. (Source: General Plan - Land Use Element)

The City of Rolling Hills is located in the northwestern quadrant of Los Angeles County. It is bordered on three sides by the City of Rancho Palos Verdes and on the north and northeast by the City of Rolling Hills Estates. Neighborhoods adjoining the City include Miraleste (southeast) and Portuguese Bend (southwest) in Rancho Palos Verdes,

Elevations in the City range from a high of 1350 feet above sea level to a low of 500 feet above sea level.

History

From its inception in 1936, Rolling Hills has been guided by deed restrictions established by the original developer. The City was incorporated on January 24, 1957. From its beginning, the emphasis in Rolling Hills has been to create and maintain a distinctive rural residential character which preserves the sense of openness created by the areas hilly topography (Source: General Plan - Introduction, Housing Element).

Rolling Hills has no public roads or streets. Use of privately-owned roadways requires approval of the Rolling Hills Community Association. The City's privately-owned road network is typified by winding roads with a 25 to 50-foot paved cross section lacking in curbs, gutters, or sidewalks. Road width, coupled with steep grades and private roadways, effectively precludes public transit within the City (Source: General Plan - Housing Element).

The City has five major collector streets: Portuguese Bend Road, Crest Road, Eastfield Drive, Southfield Drive, and Saddleback Road (Source: General Plan – Circulation Element). Direct public transit service is not provided since all of the City's roadways are private. There are no current plans to expand transit services adjacent to Rolling Hills (Source: General Plan-Circulation Element).

The City of Rolling Hills is 100% residential. There are no hospitals, commercial uses, corporations, or transportation corridors located within the city limits. One school is located in the City, however it is located outside the gates. The school is public and is operated by the Palos Verdes Peninsula Unified School District. The only City-owned structure is City Hall.

Rolling Hills consists of a single gated community. Residents work, shop, attend school, and obtain other services in the other towns on the Palos Verdes Peninsula. Incorporated in 1957, the City has maintained a rural ranch-like character, with no traffic lights, large spaces between houses and wide equestrian paths along streets.

Climate

Temperatures in the Peninsula range from 56.1 degrees in the winter months to 69.7 degrees in the summer months. However, the temperatures can vary over a wide range, particularly when the Santa Ana winds blow, bringing higher temperatures and very low humidity. Temperatures rarely exceed 85 degrees in the summer months (June - September), and rarely drop below 45.3 degrees in the winter months (November-March). In September 1955, the highest temperature was recorded at 110 degrees in lower Rolling Hills. The lowest temperature of 21 degrees was in December 1990 at the Botanic Gardens in Rolling Hills Estates. (Peninsula News, 1997)

It is rare to have wind speeds over 30 mph in the planning area. This is largely due to phenomenon created by the peninsula's natural landform.

Rainfall in the planning area averages 13.57 inches of rain per year. Due to the Peninsula's topography, the south and west slopes tend to receive less rain than the north and east slopes. Furthermore, actual rainfall in Southern California tends to fall in large amounts during sporadic and often heavy storms rather than consistently during storms at somewhat regular intervals. In short, rainfall in Southern California might be characterized as feast or famine within a single year.

The City of Rolling Hills enjoys the advantages of being located on the San Pedro Hills of the Palos Verdes Peninsula, including cool sea breezes and low concentrations of smog in the summer months, more sunshine due to its elevation above much of the coastal fog, and commanding views of the Pacific Ocean and Los Angeles Basin (Source: General Plan - Land Use Element).

Minerals and Soils

The characteristics of the minerals and soils present in City of Rolling Hills indicate the potential types of hazards that may occur. Rock hardness and soil characteristics can determine whether or not an area will be prone to geologic hazards such as earthquakes, liquefaction and landslides.

Soils in Rolling Hills consist primarily of those which exist on gently sloping or rolling foothills and terraces throughout the Los Angeles Basin. The following soil types have been identified in the City: Altamont-Diablo Association (30-50% of the slopes), Ramona-Placentia Association (5-9% of the slopes), and Diablo-Altamont Association (2-9% of the slopes) (Source: General Plan - OSCE). No mineral resources or mines are indicated for the Rolling Hills area (Source: General Plan - OSCE).

Most of Rolling Hills is composed of "Altamira Shale", which is a marine deposit composed of various types of shale, including: clay shale, diatomaceous shale (diatoms are microscopic plants and animals whose skeleton is made of silicon dioxide), siliceous shale (silicon dioxide cement causing the rock to be very hard). The main contributor to land sliding is volcanic ash occurring in layers called "tuff", which may be altered to a particular clay called "bentonite" that when wetted becomes conducive to sliding. Also common is basalt. The contact between the shale and basalt can be conducive to land sliding due to differences in permeability. Finally, there is what is known as "catalina schist breccia", which is not known to be particularly unstable.

As far as soils, the Altamira Shale weathers to “adobe clay” a black, clay soil that is very hard when dry and spongy when wet. It is very common throughout the peninsula as an alteration product of the shales. The diatomaceous shale, if abundant in diatoms, has been quarried at various locales on the peninsula. Its primary use is filtering material.

Other Significant Geologic Features

The City of Rolling Hills, like most of the Los Angeles Basin, lies over the area of one or more known earthquake faults, and potentially many more unknown faults, particularly so-called lateral or blind thrust faults.

The major faults that have the potential to affect the greater Los Angeles Basin, and therefore the City of Rolling Hills are:

Newport-Inglewood
Palos Verdes
Santa Monica
Cabrillo

The Los Angeles Basin has a history of powerful and relatively frequent earthquakes, dating back to the powerful 8.0+ magnitude, 1857 San Andreas Earthquake that did substantial damage to the relatively few buildings that existed at the time. Paleoseismological research indicates that large (8.0+) earthquakes occur on the San Andreas fault at intervals between 45 and 332 years with an average interval of 140 years. Other lesser faults have also caused very damaging earthquakes since 1857. Notable earthquakes include the 1933 Long Beach Earthquake, the 1971 San Fernando Earthquake, the 1987 Whittier Earthquake, and the 1994 Northridge Earthquake.

In addition, many areas in the Los Angeles Basin have sandy soils that are subject to liquefaction. The City of Rolling Hills has liquefaction zones that are discussed in Section 4: Earthquake.

The City of Rolling Hills also has areas with landslide potential. Currently the city has potentially active landslide activity in the Flying Triangle Area. Although Rolling Hills is subject to moderate to high seismic shaking, the general lack of thick, loose, sandy soils and saturated alluvial deposits makes the potential for liquefaction low to very low (Source: General Plan - Safety Element).

The City of Rolling Hills, because of the nearby seismic sources and presence of large landslides and steep road cuts in some locations is vulnerable to earthquake-induced slope instability (Source: General Plan - Safety Element). The City of Rolling Hills has the potential for complex, shallow and deep-seated earthquake-induced hillslope failure particularly if combined with high rain fall (Source: General Plan - Safety Element).

Population and Demographics

City of Rolling Hills has a population of 1,860 (2010 US Census) in an area of 3 square miles.

An increase of people living in cities including Rolling Hills slowly creates more community exposure, and changes how agencies prepare for and respond to hazards. For example, more people living on the urban fringe can increase risk of fire. Wildfire has an increased chance of starting due to human activities in the urban/rural interface, and has the potential to injure more people and cause more property damage. But an urban/wildland fire is not the only exposure to the City of Rolling Hills. In the 1987 publication, Fire Following Earthquake issued by the All

Industry Research Advisory Council, Charles Scawthorn explains how a post-earthquake urban conflagration would develop. The conflagration would be started by fires resulting from earthquake damage, but made much worse by the loss of pressure in the fire mains, caused by either lack of electricity to power water pumps, and /or loss of water pressure resulting from broken fire mains.

The City of Rolling Hills is experiencing very little in-fill building of net new residences. As a result, the population density is stable and not expected to increase service loads on the built infrastructure, including roads, water supply, sewer services and storm drains. As a nearly built-out community, residential growth remains slow in Rolling Hills as the supply of buildable land becomes exhausted and various constraints prohibit redevelopment of existing lots at higher densities (Source: General Plan - Housing Element).

Hazards do not discriminate, but the impacts in terms of vulnerability and the ability to recover vary greatly among the population. According to Peggy Stahl of the Federal Emergency Management Agency (FEMA) Preparedness, Training, and Exercise Directorate, 80% of the disaster burden falls on the public, and within that number, a disproportionate burden is placed upon special needs groups: women, children, minorities, and the poor. Vulnerable populations, including seniors, disabled citizens, women, and children may be disproportionately impacted by hazards.

Examining the reach of hazard mitigation policies to special needs populations may assist in increasing access to services and programs. FEMA's Office of Equal Rights addresses this need by suggesting that agencies and organizations planning for natural disasters identify special needs populations, make recovery centers more accessible, and review practices and procedures to remedy any discrimination in relief application or assistance.

The cost of hazard recovery can place an unequal financial responsibility on the general population when only a small proportion may benefit from governmental funds used to rebuild private structures. Discussions about hazards that include local citizen groups, insurance companies, and other public and private sector organizations can help ensure that all members of the population are a part of the decision-making processes.

According to the 2010 Census figures, the demographic makeup of the City is as follows:

Table: Planning Area Demographics
(Source: 2010 U.S. Census)

Racial/Ethnic Group	Rolling Hills (Population %)
White Non-Hispanic	74.1%
Hispanic	5.5%
Asian	16.3%
African American	1.6%
Native American	0.3%
Other	1.3%

Although the City does not have data on the number of disabled residents living in the planning area, the 2010 Census indicated that the population over 65 years in age is 27.6%, which is higher than the state's average of 11.4%

According to the 2014 American Community Survey compiled by the U.S. Census, the percentage of poverty in Rolling Hills is estimated at 2.1%, compared to the state's average of 15.9% (Source: www.quickfacts.census.gov).

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Land, Housing, and Development

Following is a discussion on the distribution of the development and housing types in the planning area. Since the adoption of the previously approved plan, some development has occurred in Rolling Hills, limited to either rebuilding or additions to existing single family homes or constructing new accessory structures. There has been no significant change in the overall development pattern in the City, however, as there is little vacant land for development and all of the city is zoned for single family homes on either one or two-acre minimum parcels. There are no non-residentially zoned parcels other than the Civic Center, which is occupied by the City Hall and Rolling Hills Community Association (RHCA) administration building. There has been no expansion of buildings at the Civic Center.

Development in Southern California from the earliest days was a cycle of boom and bust. The Second World War however dramatically changed that cycle. Military personnel and defense workers came to Southern California to fill the logistical needs created by the war effort. The available housing was rapidly exhausted and existing commercial centers proved inadequate for the influx of people. Immediately after the war, construction began on the freeway system, and the face of Southern California was forever changed. Home developments and shopping centers sprung up everywhere and within a few decades the central basin of Los Angeles County was virtually built out. This pushed new development further and further away from the urban center.

The City of Rolling Hills General Plan addresses the use and development of private land, which is exclusively residential. This plan is one of the City's most important tools in addressing environmental challenges including transportation, air quality; growth management; conservation of natural resources; clean water and open spaces.

The environment of most Los Angeles County cities is nearly identical with that of their immediate neighbors and the transition from one incorporated municipality to another is

seamless to most people. Seamless too are the exposures to the hazards that affect all of Southern California.

Table: Housing in the Planning Area
(Source: 2010 Census)

	Rolling Hills
Housing Type:	
Single-Family	100%
Multi-Residential (20+ units)	0.0%
Mobile homes	0.0%
Housing Statistics:	
Total Available Housing Units	716
Owner-Occupied Housing	95.8%
Average Household Size	2.81

Employment and Industry

The following table indicates the employment and industry statistics for the planning area.

Table: Planning Area Industry
(Source: 2014 American Community Survey, US Census)

Industry	Number	Percent %
Civilian employed Population (16 and over)		
Agriculture, forestry, fishing and hunting, and mining	1	.1%
Construction	16	2.3%
Manufacturing	71	10.2%
Wholesale Trade	36	5.2%
Retail Trade	12	1.7%
Transportation and Warehousing, and Utilities	8	1.1%
Information	13	1.9%
Finance and insurance, and real estate and rental and leasing	97	13.9%
Professional, scientific, and management, and administrative and waste management services	108	15.5%
Educational services, and health care and social assistance	262	37.6%
Arts, entertainment, and recreation, and accommodation and food services	21	3.0%
Other services, except public administration	30	4.3%
Public administration	22	3.2%

Table: Planning Area Occupation
(Source: 2014 American Community Survey, US Census)

Occupation	Number	Percent %
Civilian employed population (16 years and over)	697	
Management, business, science, and arts occupations	521	74.7%
Service occupations	52	7.5%
Sales and office occupations	118	16.9%
Natural resources, construction, and maintenance occupations	3	.4%
Production, transportation, and material moving occupations	3	.4%

Mitigation activities are needed at the business level to ensure the safety and welfare of workers and limit damage to industrial infrastructure. Employees are highly mobile, commuting from surrounding areas to industrial and business centers. This creates a greater dependency on roads, communications, accessibility, and emergency plans to reunite people with their families. Before a hazardous event, large and small businesses can develop strategies to prepare for hazards, respond efficiently, and prevent loss of life and property.

Transportation and Commuting Patterns

Private automobiles are the dominant means of transportation in Southern California and in the City of Rolling Hills. According to the City's General Plan – Circulation Element, direct transit service is not provided for the City of Rolling Hills since all of its roadways are private. However, there are numerous bus stops on the principal streets providing access to the entrances of Rolling Hills.

According to the 2014 Census – American Community Survey, the City has a population of 1,860. This is a -0.6 change from the 2000 Census. The mean travel time to work for the residents of the City of Rolling Hills is 31.7 minutes.

As stated in the City's General Plan, the City of Rolling Hills is served by the 405 and 110 Interstate freeways, connecting the city to adjoining parts of Los Angeles County. The City includes 26 miles of roads and 23 miles of horse trails.

Flood-Related Issues

Repetitive Loss Properties

According to FEMA documentation, the planning area does not include any repetitive loss properties.

NFIP Participation

The City of Rolling Hills does participate in FEMA's National Flood Insurance Program. In addition, the City Council passed Floodplain Ordinance #300 which specifically addresses the way in which the City ensures protection of structures and infrastructure from dangers

associated with flooding. When a prospective builder proposes a project, the Building and Safety Department (County of Los Angeles) confirms the location of the project on the NFIP map and, if in or near the floodplain, informs the applicant of the Floodplain Ordinance as shown below.

Chapter 8.36 - FLOODPLAIN MANAGEMENT REGULATIONS

Sections:

8.36.010 - Statutory authorization.

The Legislature of the State of California has in Government Code Sections 65302, 65560 and 65800 conferred upon local governments the authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. This chapter is enacted in order to establish the floodplain management regulations required under Title 44, Section 60 of the Code of Federal Regulations in order for the residents of Rolling Hills to be eligible to purchase flood insurance through the National Flood Insurance Program.

(Ord. 300 §2(part), 2006).

8.36.020 - Statement of purpose.

It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

A. Protect human life and health;

B. Minimize expenditure of public money for costly flood control projects;

C. Minimize the need for rescue and relief efforts associated flooding and generally undertaken at the expense of the general public;

D. Minimize prolonged business interruptions;

E. Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;

F. Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;

G. Ensure that potential buyers are notified that property is in an area of special flood hazard; and

H. Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

(Ord. 300 §2(part), 2006).

8.36.030 - Definitions.

Unless specifically defined below, words or phrases used in this chapter shall be interpreted so as to give them the meaning they have in common usage and to give this chapter its most reasonable application.

"Area of special flood hazard" means the land in the floodplain within a community subject to a one percent or greater chance of flooding in any given year.

"Base flood," means a flood, which has a one percent chance of being equaled or exceeded in any given year (also called the "100-year flood"). Base flood is the term used throughout this chapter.

Building. See "Structure."

"Development" means any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

"Floodplain management" means the operation of an overall program of corrective and preventive measures for reducing flood damage and preserving and enhancing, where possible, natural resources in the floodplain, including but not limited to emergency preparedness plans, flood control works, floodplain management regulations, and open space plans.

"Floodplain or flood-prone area" means any land area susceptible to being inundated by water from any source.

"Historic structure" means any structure that is:

1. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
2. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
3. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior.

"Manufactured home" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle."

"Manufactured home park or subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

"New construction," for floodplain management purposes, means structures for which the "start of construction" commenced on or after the effective date of floodplain management regulations adopted by this community, and includes any subsequent improvements to such structures.

One-hundred-year flood or 100-year flood. See "Base flood."

"Recreational vehicle" means a vehicle, which is:

1. Built on a single chassis;
2. Four hundred square feet or less when measured at the largest horizontal projection;
3. Designed to be self-propelled or permanently towable by a light-duty truck; and
4. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

"Start of construction" includes substantial improvement and other proposed new development and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within one hundred eighty days from the date of the permit. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

"Structure" means a walled and roofed building that is principally above ground; this includes a gas or liquid storage tank or a manufactured home.

"Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed fifty percent of the market value of the structure before the damage occurred.

"Substantial improvement" means any reconstruction, rehabilitation, addition, or other proposed new development of a structure, the cost of which equals or exceeds fifty percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures, which have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

1. Any project for improvement of a structure to correct existing violations or state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or
2. Any alteration of a "historic structure," provided that the alteration would not preclude the structure's continued designation as a "historic structure."

(Ord. 300 §2(part), 2006).

8.36.040 - Lands to which this chapter applies.

This chapter shall apply to all areas identified as flood-prone within the jurisdiction of the City of Rolling Hills.

(Ord. 300 §2(part), 2006).

8.36.050 - Basis for establishing flood-prone areas.

The Floodplain Administrator, or his or her designee, shall obtain, review, and reasonably utilize any base flood data available from other Federal or State Agencies or other source to identify flood-prone areas within the jurisdiction of the City of Rolling Hills. This data will be on file at the Rolling Hills Department of Planning, City Hall, No. 2 Portuguese Bend Road, Rolling Hills, California 90274.

(Ord. 300 §2(part), 2006).

8.36.060 - Compliance.

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this chapter and other applicable regulations. Violation of the requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a misdemeanor. Nothing herein shall prevent the City Council from taking such lawful action as is necessary to prevent or remedy any violation.

(Ord. 300 §2(part), 2006).

8.36.070 - Abrogation and greater restrictions.

This chapter is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this chapter and another chapter, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

(Ord. 300 §2(part), 2006).

8.36.080 - Interpretation.

In the interpretation and application of this chapter, all provisions shall be:

A. Considered as minimum requirements;

B. Liberally construed in favor of the governing body; and

C. Deemed neither to limit nor repeal any other powers granted under state statutes.

(Ord. 300 §2(part), 2006).

8.36.090 - Warning and disclaimer of liability.

The degree of flood protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This chapter does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This chapter shall not create liability on the part of the City Council, any officer or employee thereof, the County of Los Angeles as designee of the Floodplain Administrator, the State of California, or the Federal Insurance Administration, Federal Emergency Management Agency, for any flood damages that result from reliance on this chapter or any administrative decision lawfully made hereunder.

(Ord. 300 §2(part), 2006).

8.36.110 - Establishment of flood damage prevention permit.

A flood damage prevention permit shall be obtained for all proposed construction or other development in the community, including the placement of manufactured homes, so that it may be determined whether such construction or other development is within flood-prone areas.

(Ord. 300 §2(part), 2006).

8.36.120 - Designation of the Floodplain Administrator.

The City Manager, or his or her designee, is hereby appointed to administer, implement, and enforce this chapter by granting or denying flood damage prevention permits in accord with its provisions.

(Ord. 300 §2(part), 2006).

8.36.130 - Duties and responsibilities of the Floodplain Administrator.

The duties and responsibilities of the Floodplain Administrator, or his or her designee, shall include, but not be limited to the following:

A. Permit Review. Review all flood damage prevention permit applications to determine:

1. Permit requirements of this chapter have been satisfied;

2. All other required State and Federal permits have been obtained; and

3. The site is reasonably safe from flooding.

B. Review and Use of Any Other Base Flood Data. The Floodplain Administrator, or his or her designee, shall obtain, review, and reasonably utilize any base flood data available from other Federal or State Agency or other source.

(Ord. 300 §2(part), 2006).

8.36.140 - Standards of construction.

If a proposed building site is in a flood-prone area, all new construction and substantial improvements, including manufactured homes, shall:

A. Be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;

B. Be constructed:

1. With materials and utility equipment resistant to flood damage,

2. Using methods and practices that minimize flood damage,

3. With electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

(Ord. 300 §2(part), 2006).

8.36.150 - Standards for subdivisions or other proposed new development.

If a subdivision proposal or other proposed new development, including manufactured home parks or subdivisions, is in a flood-prone area, any such proposals shall be reviewed to assure that:

A. All such proposals are consistent with the need to minimize flood damage within the flood prone area;

B. All public utilities and facilities such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage; and

C. Adequate drainage is provided to reduce exposure to flood hazards.

(Ord. 300 §2(part), 2006).

8.36.160 - Standards for utilities.

A. All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate:

1. Infiltration of flood waters into the systems; and

2. Discharge from the systems into floodwaters.

B. On-site waste disposal systems shall be located to avoid impairment to them, or contamination from them during flooding.

(Ord. 300 §2(part), 2006).

8.36.170 - Severability.

This chapter and the various parts thereof are hereby declared to be severable. Should any section of this chapter be declared by the courts to be unconstitutional or invalid, such decision shall not affect the validity of the chapter as a whole, or any portion thereof other than the section so declared to be unconstitutional or invalid.

(Ord. 300 §2(part), 2006).

Changes in Development

Since the adoption of the 2008 Plan, there have been no significant alternation to the development pattern of the City in the hazard prone areas. This conclusion was reached after a thorough review of the General Plan and discussion with the Planning Team. Furthermore, the Planning Team concluded the overall vulnerability to identified hazards remained the same.

PART II: HAZARD ANALYSIS

Section 3: 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 hazardous events. Specifically, the five levels of a risk assessment are as follows:

Hazard Identification
Profiling Hazard Events
Vulnerability Assessment/Inventory of Existing Assets
Risk Analysis
Assessing Vulnerability/Analyzing Development Trends

1) Hazard Identification

This section describes the geographic extent, potential intensity, and the probability of occurrence of a given hazard. Maps are used in this plan to display hazard identification data. The City identified a range of natural hazards based on the State of California Multi-Hazard Mitigation Plan, County of Los Angeles All-Hazard Mitigation Plan, the City's General Plan and Emergency Operations Plan to identify all possible hazard sources. These hazards included: earthquake, land movement, wildfire, windstorm, drought, flooding, tsunami, terrorism, public health emergency, infestation, drought, climate change, civil disobedience, transportation emergency, and power failure. The Planning Team identified four hazards posing the greatest threat to the planning area. These hazards – earthquakes, land movement, wildfires, and drought – were identified through an extensive process involving research of existing documents and input from the Planning Team. The geographic extent of each of the identified hazards has been identified by the Team utilizing the maps and data contained in the General Plan and County's All-Hazards Mitigation Plan. Utilizing the Calculated Priority Risk Index (CPRI) ranking technique, the Planning Team concluded the following hazards posed a significant threat against the City:

Earthquake | Land Movement | Wildfire | Drought

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

Table: Calculated Priority Risk Index
(Source: FEMA G235 Emergency Planning Course, 2010)

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 Planning Area
(Source: Emergency Planning Consultants)

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Ranking
Wildfire	3	1.35	3	0.9	4	0.6	2	0.2	**3.05**
EQ: Newport-Inglewood Fault	2	0.9	3	0.9	4	0.6	1	0.1	**2.50**
EQ: Palos Verdes Fault	2	0.9	3	0.9	4	0.6	1	0.1	**2.50**
Land Movement	3	1.35	2	0.6	4	0.6	1	0.1	**2.65**
Drought	2	0.90	2	0.6	1	.15	4	0.4	**2.05**

2) Profiling Hazard Events

This process describes the causes and characteristics of each hazard and what part of the planning areas facilities, infrastructure, and environment may be vulnerable to each specific hazard. A profile of each hazard discussed in this plan is provided in the Hazard-Specific Analysis (Part II, Sections 4-8). The following table indicates a generalized perspective of the community's vulnerability of the various hazards according to extent (or degree), location, and probability.

Table: Vulnerability: Location, Extent, and Probability for Planning Area
(Source: City of Rolling Hills General Plan and County of Los Angeles All-Hazards Mitigation Plan)

Hazard	Location (Where)	Extent (How Big an Event)	Probability (How Often) *
Earthquake	Entire Planning 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]	Possibly
Land Movement	Entire Planning Area	Earthquake-induced and rain-induced landslide events possibly impacting dozens of structures.	Likely
Wildfire	Entire Planning Area	Severe FRAP Ratings	Likely
Drought	Entire Planning Area	According to USGS, California is in its fourth year of severe drought.	Possibly
* Probability is defined as: Unlikely 1:1,000 years, Possibly 1:100 years 1:1,000 years, Likely 1:10 years 1:100 years, Highly Likely 1:1 year			
[1] Uniform California Earthquake Rupture Forecast			

3) Vulnerability Assessment/Inventory of Existing Assets

This is a combination of hazard identification with an inventory of the existing (or planned) property development(s) and population(s) exposed to a hazard. Critical facilities are of particular concern because these locations provide essential equipment or provide services to the general public that are necessary to preserve important public safety, emergency response, and/or disaster recovery functions. The critical facilities have been identified and are illustrated in Table: Critical Facilities Vulnerable to Hazards.

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 (Section 8: Mitigation Strategies) 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 land uses and development trends within the community so that mitigation options can be considered in land use planning and future land use decisions. This Plan provides a comprehensive description of the character of the planning area in Section 2: Community Profile. This description includes the geography and

environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns. Analyzing these components of the planning area can help in identifying potential problem areas and can serve as a guide for incorporating the goals and ideas contained in this Plan into other community development plans.

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

Regardless of the data available for hazard assessments, there are numerous strategies the City can use to reduce risk. These strategies are described in the action items detailed in the Mitigation Actions Matrix (Section 8: Mitigation Strategies). 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.

Federal Requirements for Risk Assessment

Federal regulations for local mitigation plans (44 C.F.R. Section 201.6(c) (2)) require a risk assessment. This risk assessment requirement is intended to provide information that will help communities to identify and prioritize mitigation activities that will reduce losses from the identified hazards. The Federal criteria for risk assessment and information on how the Plan meets those criteria are outlined in Table: Federal Criteria for Risk Assessment below.

Table: Federal Criteria for Risk Assessment
(Source: 44 C.F.R. Section 201.6 (c) (2))

Section 322 Plan Requirement	How is this addressed?
Identifying Hazards	Each hazard section includes an inventory of the best available data sources that identify hazard areas. To the extent data are available; the existing maps identifying the location of the hazard were utilized. The Executive Summary and the Risk Assessment of the Plan include a list of the hazard maps.
Profiling Hazard Events	Each hazard section includes documentation of the history, causes, and characteristics of the hazard in the planning area.
Assessing Vulnerability: Identifying Assets	Where data is available, the vulnerability assessment for each hazard addressed in the Plan includes an inventory of all publicly owned land within hazardous areas. Each hazard section provides information on vulnerable areas within the planning area. Mitigation actions for each hazard can be found in Part III, Section 8: Mitigation Strategies.
Assessing Vulnerability: Estimating Potential Losses	The Risk Assessment identifies key critical facilities that provide services to the planning area. Assessments have been completed for the hazards addressed in the plan, and quantitative estimates were made for each hazard where data was available.
Assessing Vulnerability: Analyzing Development Trends	The Community Profile Section of this plan provides a description of the development trends in the planning area, including the geography and environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns.

Critical and Essential Facilities

Examples of facilities critical to government response activities (i.e., life safety, property, and environmental protection) could include: local government 9-1-1 dispatch centers, local government emergency operations centers, local police and fire stations, local public works facilities, local communications centers, schools (shelters), and hospitals. Also, facilities that, if damaged, could cause serious secondary impacts are also considered "critical." A hazardous materials facility is one example of this type of critical facility.

Essential facilities are those facilities either within or outside the planning area boundaries that are vital to the continued delivery of key City services or that may significantly impact the City's ability to recover from the disaster. These facilities include but are not limited to: schools (hosting shelters); buildings such as the jail, law enforcement center, public services building, community corrections center, the courthouse, juvenile services building, and other public facilities.

The following table identifies the critical and essential facilities that provide services to the planning area. It is important to note that very few of the facilities listed are located in the City of Rolling Hills. Should any of these facilities be damaged by any of the hazards listed in this Plan such that their functionality is significantly reduced, the City's ability to function and protect its residents will be greatly diminished.

Table: Critical Facilities Serving Rolling Hills Vulnerable to Hazards

Name of Facility	Address	Earthquake	Land Movement	Wildfire	Drought
California Water Service Reservoir	Palos Verdes Drive North/Palos Verdes Drive East (SW corner), Rolling Hills Estates	X	X	X	X
California Water Service Reservoir	3960 East Crest Road, Rancho Palos Verdes	X	X	X	X
California Water Service Reservoir	5837 West Crest Road, Rancho Palos Verdes	X	X	X	X
California Water Service Reservoir	4405 Palos Verdes Drive East, Rancho Palos Verdes	X	X	X	X
Cox Communications	43 Peninsula Center, Rolling Hills Estates	X		X	
FAA Radar Domes	East Crest Road, Rancho Palos Verdes	X		X	
Los Angeles County Communications Tower	5741 Crestridge Road, Rancho Palos Verdes	X	X	X	
Los Angeles County Fire Station No.53	6124 Palos Verdes Drive South, Rancho Palos Verdes	X	X	X	
Los Angeles County Fire Station No.56	12 Crest Road West, Rolling Hills	X	X	X	
Los Angeles County Fire Station No.83	83 Miraleste Plaza, Rancho Palos Verdes	X	X	X	
Los Angeles County Fire Station No.106	27413 Indian Peak Road, Rolling Hills Estates	X	X	X	
Los Angeles County She iff's Sta ion (serves Rolling Hills)	26123 Narbonne Avenue, Lomita	X	X	X	
Rancho Del Mar School	38 Crest Road West, Rolling Hills	X	X	X	X
Rolling Hills City Hall	2 Portuguese Bend Road, Rolling Hills	X	X	X	
Rolling Hills Community Association	1 Portuguese Bend Road, Rolling Hills	X	X	X	
Southern California Edison Substation	Crestridge Road, RPV	X	X	X	
Southern California Edison Substation	Tarragon Road, RPV	X	X	X	

Land and Development

Development in Southern California from the earliest days was a cycle of boom and bust. The Second World War however dramatically changed that cycle. Military personnel and defense workers came to Southern California to fill the logistical needs created by the war effort. The available housing was rapidly exhausted and existing commercial centers proved inadequate for the influx of people. Immediately after the war, construction began on the freeway system, and the face of Southern California was forever changed. Home developments and shopping centers sprung up everywhere and within a few decades the urbanized portions of Southern California were virtually built out. This pushed new development further and further away from the urban center.

The General Plan addresses the use and development of all private land in Rolling Hills. This plan is one of the City's most important tools in addressing environmental challenges including transportation and air quality; growth management; conservation of natural resources; clean water and open spaces. Although the planning area is distinct from most of the surrounding areas in Los Angeles County due to its unique topography and low density pattern of exclusively residential development, its exposure to hazards is largely the same as those that affect all of Southern California.

Impacts to Types of Structures

The General Plan-Land Use Element identifies a limited range of land uses compared to most California cities. The table below shows the vulnerability of the different land uses to the identified hazards.

Table: Impacts to Existing and Future Types of Structures
(Source: City of Rolling Hills General Plan – Land Use Element)

Category of Structure	Earthquake	Wildfire	Land Movement	Drought
Residential (single-family)	X	X	X	X
Public/Association-Owned Facilities	X	X	X	X
Education	X	X	X	X
Recreation	X	X	X	X
Vacant Land	X	X	X	X

Section 4: Earthquake Hazards

Previous Occurrences of Earthquake in the City of Rolling Hills

In terms of earthquakes, historically the planning area has been extremely lucky. Like the majority of the Los Angeles basin, the Palos Verdes Peninsula was largely uninhabited rangeland during the 7.9M Fort Tejon Earthquake in 1857. Articles in the Palos Verdes News indicate that the planning area sustained only minor property damage and no loss of life as a result of the major earthquakes that have occurred in the Los Angeles area since the area first began to develop rapidly following World War II.

Previous Occurrences of Earthquakes in Los Angeles County

The earliest report of any local earthquake-related damage comes from an article that appeared in the Palos Verdes News on April 10, 1968. The newspaper reported on two shocks, Magnitude 6 and Magnitude 7.25 in strength, respectively, that occurred a few days earlier that broke a water pipe in a drug store located in the nearby City of Palos Verdes Estates; consequently, flooding the store's basement and causing an estimated $4,000 to $5,000 in damage. On February 10, 1971, the Palos Verdes News reported that the Magnitude 6.6 San Fernando Earthquake resulted in 900 homes being without power in the Highridge area north of Crest Road in Rancho Palos Verdes for about an hour. Similarly, an article that appeared in the paper on October 3, 1987 reported that the Magnitude 5.9 Whittier Narrows Earthquake damaged a bank building in the Peninsula Shopping Center in Rolling Hills Estates, although the extent of the damage was not indicated. In addition, the article mentioned that cellular telephone service was disrupted most of the morning, but no power outages occurred.

The Magnitude 6.9 Northridge Earthquake of 1994 caused the most widespread, although still relatively minor damage within the planning area and surrounding area. On January 20, 1994, the Palos Verdes News reported that local damage consisted of fire and smoke damage to a liquor store on Western Avenue in Rancho Palos Verdes caused by liquor bottles falling from shelves and then igniting when a refrigeration unit sparked. In the same area, a long section of retaining wall along Western Avenue and Delasonde Drive collapsed onto the public sidewalk. In Rolling Hills Estates, scores of books fell from the shelves at the main library and several shops in the Peninsula Shopping Center in Rolling Hills Estates lost a day of business cleaning up fallen merchandise in the wake of the trembler. Additionally, in the nearby City of Palos Verdes Estates, a portion of the road at Via Valmonte at Via Azalea buckled, breaking a natural gas line under the street. (Palos Verdes News, 1937-2004). Again, there were no reports of any significant damage within the boundaries of Rolling Hills.

Local Conditions

The planning area is located in a seismically active area and near several of the many active and potentially active faults in Southern California. According to the Rolling Hills General Plan-Safety Element, the two faults posing the greatest threat to the planning area are the Palos Verdes Fault and the Newport-Inglewood Fault (see Map: Planning Area Fault Map).

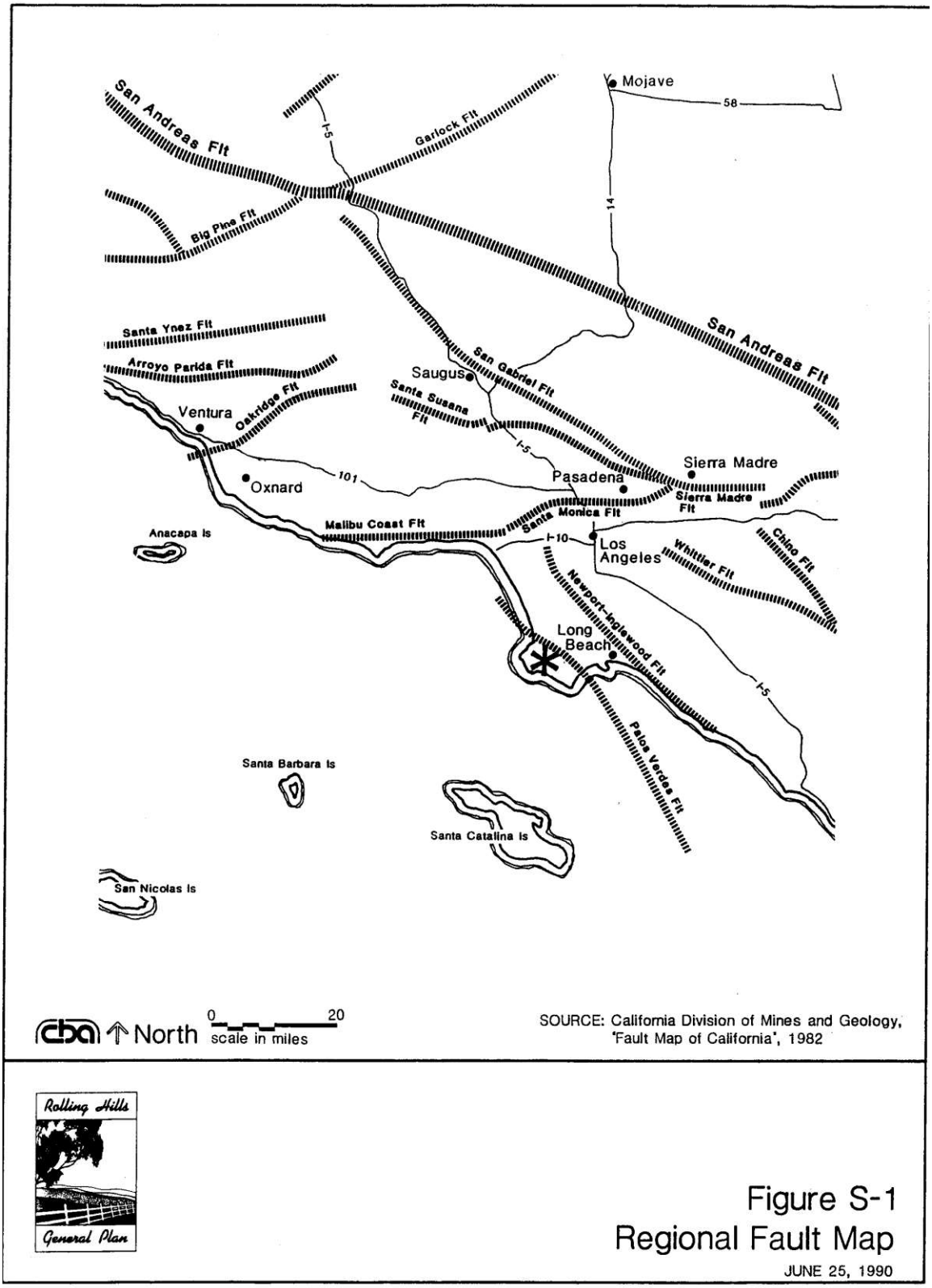
The active Palos Verdes Fault trends northwest-southeast and marks the eastern termination of the Palos Verdes Hills. The Palos Verdes Fault is potentially capable of producing the most intense ground acceleration in the City, due to its proximity (1+ mile). A worst-case earthquake

on the Palos Verdes Fault would produce seismic shaking with peak horizontal ground acceleration estimated at .53g (Richter Scale Magnitude 7.0).

The Newport-Inglewood Fault, located approximately 9+ miles from the City of Rolling Hills, is capable of producing a ground acceleration of .28g (Richter Scale Magnitude 6.9). These worst-case earthquakes (referred to as maximum credible earthquakes) may have shaking duration of up to 25 seconds.

Additional information on peak ground acceleration is shared later in this section under "Measuring and Defining Earthquakes". Please refer to the City's General Plan-Safety Element and the Technical Background Report for additional information.

Map: Planning Area Fault Map
(Source: City of Rolling Hills General Plan – Safety Element)



Rolling Hills General Plan

Figure S-1
Regional Fault Map
JUNE 25, 1990

Regulatory Background

The State regulates development within California to reduce or mitigate potential hazards from earthquakes or other geologic hazards. Development in potentially seismically active areas is also governed by the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazards Mapping Act.

Chapter 16A, Division IV of the California Building Code (CBC), titled "Earthquake Design" states that "The purpose of the earthquake provisions herein is primarily to safeguard against major structural failures or loss of life." The CBC and the Uniform Building Code (UBC) regulate the design and construction of excavations, foundations, building frames, retaining walls, and other building elements to mitigate the effects of seismic shaking and adverse soil conditions. The procedures and limitations for the design of structures are based on site characteristics, occupancy type, configuration, structural system, height, and seismic zonation. Seismic zones are mapped areas prescribed by the Unites States Geological Survey, that are based on proximity to known active faults and the potential for future earthquakes and intensity of seismic shaking. Seismic zones range from A to F, with areas mapped as Zone A being potentially subject to the highest accelerations due to seismic shaking and the shortest recurrence intervals. According to the 2014 City of Rolling Hills Building Code and the USGS, the planning area is within Seismic Zone D

The 1933 Long Beach Earthquake resulted in the Field Act, affecting school construction.

The 1933 Long Beach Earthquake resulted in the Field Act, affecting school construction. The 1971 Sylmar Earthquake brought another set of increased structural standards. Similar re-evaluations occurred after the 1989 Loma Prieta Earthquake and 1994 Northridge Earthquake. These code changes have resulted in stronger and more earthquake resistant structures.

The purpose of the Alquist-Priolo Earthquake Fault Zoning Act of 1972 (renamed in 1994) is "to regulate development near active faults so as to mitigate the hazard of surface fault rupture." The State Geologist (chief of the Division of Mines and Geology) is required to delineate Earthquake Fault Zones (formerly known as "Special Studies Zones") along known active faults. As defined by the California Division of Mines and Geology (DMG), an active fault is one that has had surface displacement within Holocene time (roughly the last 11,000 years) and/or has an instrumental record of seismic activity. Potentially active faults are those that show evidence of surface displacement during Quaternary time (roughly the last 2 million years), but for which evidence of Holocene movement has not been established. The DMG evaluates faults on an individual basis to determine if a fault will be classified as an Alquist-Priolo Earthquake Fault Zone. In general, faults must meet certain DMG criteria, including seismic activity, historic rupture, and geologic evidence to be zoned as an Earthquake Fault Zone. Cities and counties affected by the zones must regulate certain development within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. Typically, structures for human occupancy are not allowed within 50 feet of the trace of an active fault.

The Seismic Hazard Mapping Act was adopted in 1990 for the purpose of protecting public safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure caused by earthquakes. The Seismic Hazard Mapping Act requires that the State Geologist delineate the various seismic hazard zones. Cities, counties, or other permitting authorities are required to regulate certain development projects within the zones. They must withhold development permits for a site within a zone until the geologic conditions are investigated and

appropriate mitigation measures, if any, are incorporated into the development plans. In addition, sellers (and their agents) of real property within a mapped hazard zone must disclose that the property lies within such a zone at the time of sale.

Following major earthquakes, extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food and temporary shelter would be required for injured or displaced persons. In the event of a truly catastrophic earthquake, identification and burial of the dead would pose difficult problems. Mass evacuation may be essential to save lives, particularly in areas below dams and/or reservoirs. Many families could be separated, particularly if the earthquake should occur during working hours, and a personal inquiry or locator system would be essential to maintain morale.

Emergency operations could be seriously hampered by the loss of communications and damage to transportation routes within, and to and from, the disaster area and by the disruption of public utilities and services.

Extensive federal assistance could be required and could continue for an extended period. Efforts would be required to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities, and provide continuing care and welfare for the affected population, including temporary housing for displaced persons.

In general, the population is less at risk during non-work hours (if at home) as wood-frame structures are relatively less vulnerable to major structural damage than are typical commercial and industrial buildings. Transportation problems are intensified if an earthquake occurs during work hours, as significant numbers of residents who are employed outside the planning area would potentially be stranded and unable to return home to the planning area. An earthquake occurring during work hours would clearly create major transportation problems for those displaced workers.

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.

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. This rates the level of severity of an earthquake by the amount of damage and perceived shaking (Table: Modified Mercalli Intensity Scale).

Table: Modified Mercalli Intensity (MMI) Scale

MMI Value	Description of Shaking Severity	Description on Maps	Full Description
I			Not Felt
II			Felt by persons at rest, on upper floors, or favorably placed.
III			Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV			Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. In the upper range of IV, wooden walls and frame creak.
V	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clock stop, start, change rate.
VI	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked.
VII	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Small slides and caving in along sand or gravel banks. Concrete irrigation ditches damaged.
VIII	Very Strong	Moderate Damage	Steering of motorcars affected. Damage to masonry C, partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Cracks in wet ground and on steep slopes.
IX	Violent	Heavy Damage	General panic. Damage to masonry buildings ranges from collapse to serious damage unless modern design. Wood-frame structures rack, and, if not bolted, shifted off foundations. Underground pipes broken.
X	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land.
XI			Rails bent greatly. Underground pipelines completely out of services.
XII			Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

Historic Earthquakes in Southern California

Since seismologists started recording and measuring earthquakes, there have been tens of thousands of recorded earthquakes in Southern California, most with a magnitude below three. No community in Southern California is beyond the reach of a damaging earthquake. Table: Earthquake Events in the Southern California Region describes the historical earthquake events that have affected Southern California.

Historically, the planning area has generally been spared a major destructive earthquake. However, based on a search of earthquake databases of the United States Geological Survey (USGS) - National Earthquake Information Center (NEIC), several major earthquakes (Magnitude 6.0 or more) have been recorded within approximately 100 kilometers, or about 62 miles of the project area since 1769.

Table: Historical Earthquakes M6.0+ near Los Angeles County (Source: http://earthquake.usgs.gov/regional/sca/ca_eqs.php)

Date	Location	Maximum Magnitude (M)*
12/8/1812	Wrightwood	7.0
12/16/1858	San Bernardino Region	6.0
7/30/1894	Lytle Creek Region	6.0
4/21/l918	San Jacinto	6.9
7/23/1923	San Bernardino Region	6.0
3/11/1933	Long Beach	6.3
2/9/1971	San Fernando	6.5
1/17/1994	Northridge	6.9

To better understand the earthquake hazard, the scientific community has looked at historical records and accelerated research on those faults that are the sources of the earthquakes occurring in the Southern California region. Historical earthquake records can generally be divided into records of the pre-instrumental period and the instrumental period. In the absence of instrumentation, the detection of earthquakes are based on observations and felt reports, and are dependent upon population density and distribution. Since California was sparsely populated in the 1800s, the detection of pre-instrumental earthquakes is relatively difficult. However, two very large earthquakes, the Fort Tejon in 1857 (M7.9) and the Owens Valley in 1872 (M7.6) are evidence of the tremendously damaging potential of earthquakes in Southern California. In more recent times two M7.3 earthquakes struck Southern California, in Kern County (1952) and Landers (1992).

The damage from these four large earthquakes was limited because they occurred in areas that were sparsely populated at the time they happened. The seismic risk is much more severe today than in the past because the population at risk is in the millions, rather than a few hundred or a few thousand persons.

Impact of Earthquakes in the Planning Area

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

- Injury and loss of life;
- Public facility and residential structural damage;
- Disruption of and damage to public infrastructure;
- Secondary health hazards (e.g. mold and mildew);
- Damage to roads resulting in loss of mobility;
- Significant economic impact (e.g. property tax revenue) upon the community;
- Negative impact on residential property values

Severity

A major earthquake occurring in or near the planning area could cause many deaths and injuries, extensive property damage, fires, hazardous material spills, and other dangers. Aftershocks and the secondary effects of fire, hazardous material/chemical accidents, reservoirs, and waterways could aggravate the situation.

The time of day and season of the year would have a profound impact on the number of dead and injured and the amount of property damage. Such an earthquake could exceed the response capabilities of the City of Rolling Hills, the Los Angeles County Operational Area, and the State of California Office of Emergency Services. Support of damage control and disaster relief could be required from other local governments and private organizations, as well as the state and federal governments.

Extensive search and rescue operations could be required to assist trapped persons. Mass evacuation could be essential to save lives, particularly in areas downwind from hazardous material releases. Injured or displaced persons could require emergency medical care, food, and temporary shelter.

Many families could be separated, particularly if the earthquake occurs during working hours. A personal inquiry or locator system could be essential to maintain morale. Emergency operations could be seriously hampered by a loss of communications, damage to transportation routes, and/or disruption of public utilities and services.

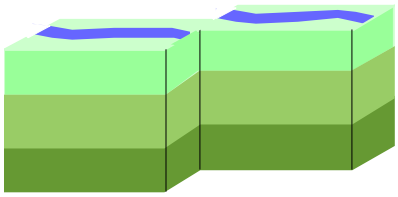
A major earthquake could disrupt, damage, or destroy computer facilities, which could curtail the operations of banks, insurance companies, and other elements of the financial community for several days or weeks.

The secondary economic impact on the City could be considerable in terms of lost employment and lost property tax base. A major earthquake could disrupt, damage, or destroy computer facilities, which could curtail the operations of banks, insurance companies, and other elements of the financial community for several days or weeks. This could affect the ability of local government, business, and residents to make payments and purchases. (Source: California Division of Mines and Geology, Special Publication 60, *Earthquake Planning Scenario for a Magnitude 8.3 Earthquake on the San Andreas Fault in Southern California,* 1982.)

Causes of Earthquakes in Southern California

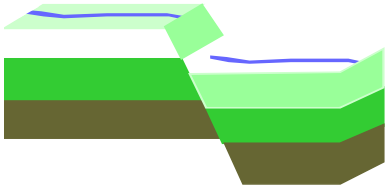
Earthquake Faults

A fault is a fracture between blocks of the earth's crust where either side moves relative to the other along a parallel plane to the fracture.



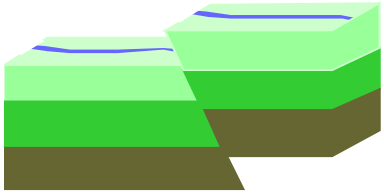
Strike-slip Faults

Strike-slip faults are vertical or almost vertical rifts where the earth's plates move mostly horizontally. From the observer's perspective, if the opposite block looking across the fault moves to the right, the slip style is called a right lateral fault; if the block moves left, the shift is called a left lateral fault.



Dip-slip Faults

Dip-slip faults are slanted fractures where the blocks mostly shift vertically. If the earth above an inclined fault moves down, the fault is called a normal fault, but when the rock above the fault a reverse fault.



Thrust Faults

Thrust faults have a reverse fault with a dip of 45 ° or less. Cal Tech has investigated the San Andreas Fault at Pallett Creek. "The record at Pallett Creek shows that rupture has recurred about every 130 years, on average, over the past 1500 years. But actual intervals have varied greatly, from less than 50 years to more than 300. The physical cause of such irregular recurrence remains unknown." Damage from a great quake on the San Andreas would be widespread throughout Southern California.

Earthquake Hazard Assessment

As shown earlier in this Section on Map: Planning Area Faults there are several major active faults exist in Los Angeles County, including the San Andreas, Newport Inglewood, Elsinore, San Joaquin Hills Fault, Whittier, and Norwalk. The closest active faults to the planning area are the Newport-Inglewood and Palos Verdes Faults. The largest active fault near the planning area is the San Andreas Fault, which is further than 50 miles northeast from the planning area.

Vulnerability Assessment

The effects of earthquakes span a large area, and large earthquakes occurring in many parts of the Southern California region would probably be felt throughout the region. However, the degree to which the earthquakes are felt, and the damages associated with them may vary. At risk from earthquake damage are large stocks of old buildings and bridges; many high-tech and hazardous materials facilities; extensive sewer, water, and natural gas pipelines; earth dams; petroleum pipelines; and other critical facilities and private property located in the county. The

relative or secondary earthquake hazards, which are liquefaction, ground shaking, amplification, and earthquake-induced landslides, are just as devastating as the earthquake.

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 planning area.

Fault Rupture

The potential for ground rupture due to fault movement is related to the seismic activity of known fault zones. Known active or potentially active faults that could be the site of ground rupture are limited to the Palos Verdes fault zone which traverses the extreme northeastern corner of the Palos Verdes Peninsula (Source: City of Rolling Hills General Plan, Safety Element). Compared with the more active recognized fault zones, the potential for ground rupture due to seismic activity in the City is considered low.

Earthquake-Induced Landslide Potential

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

Areas considered for earthquake-induced landslides are generally found in the hill and canyon areas of the planning area and are shown on the Seismic Intensity Maps that follow. The landslide potential zones were compiled from USGS. Mapped earthquake-induced landslide potential zones are intended to prompt more detailed, site specific geotechnical studies as required by the Seismic Hazard Mapping Act.

Soil liquefaction is a seismically induced form of ground failure, which has been a major cause of earthquake damage in southern California.

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 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, this ground may be subject to liquefaction, depending on the depth of the water table.

Soil liquefaction is a seismically-induced form of ground failure, which has been a major cause of earthquake damage in southern California. During the 1971 San Fernando and 1994 Northridge Earthquakes, significant damage to roads, utility pipelines, buildings, and other structures in the Los Angeles area were caused by liquefaction. Research and historical data indicate that loose, granular materials situated at depths of less than 50 feet with fine (silt and clay) contents of less than 30 percent, which are saturated by a relatively shallow groundwater table are most susceptible to liquefaction. These geological and groundwater conditions exist in parts of southern California and the planning area, typically in valley regions and alleviated floodplains.

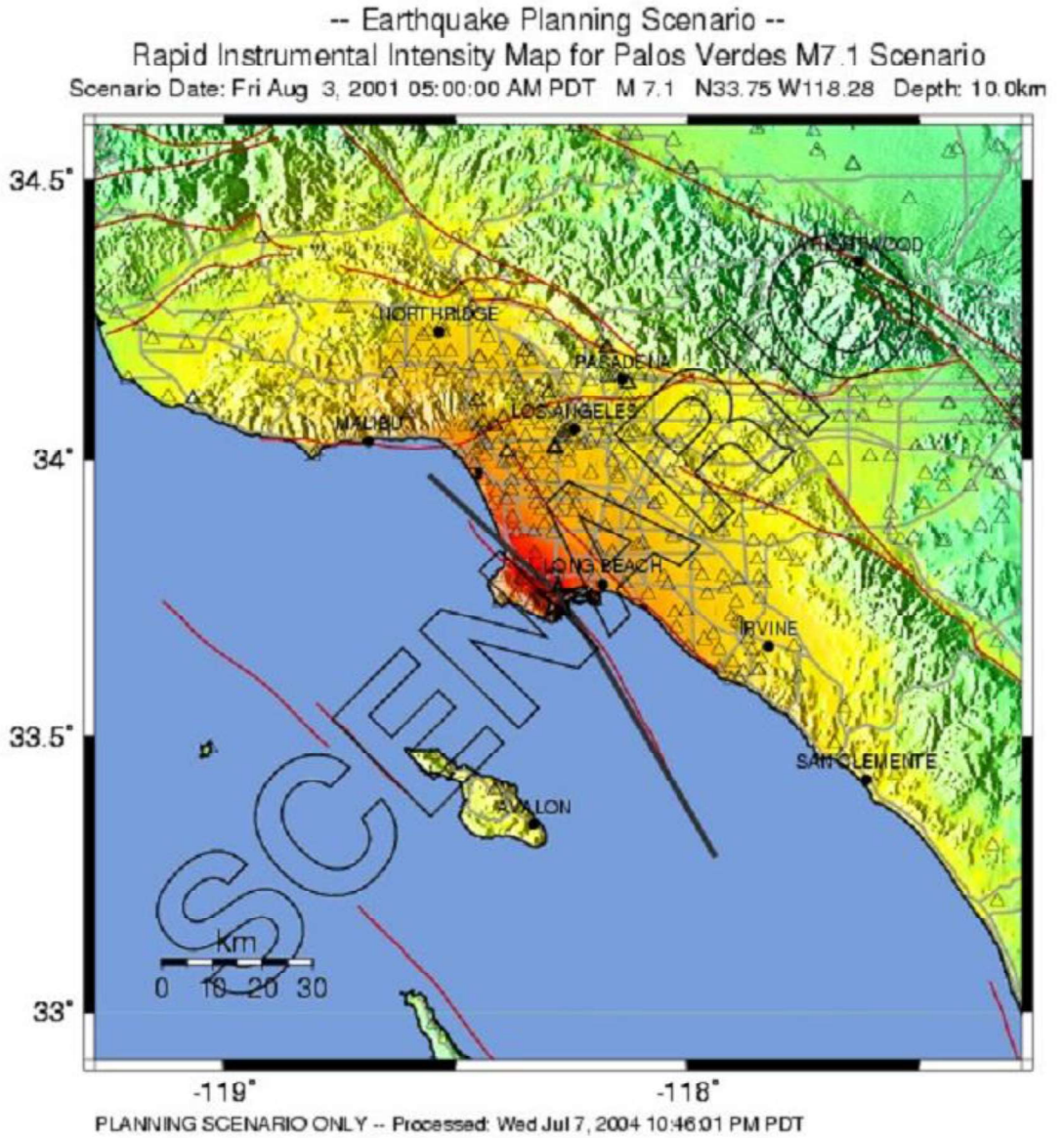
For liquefaction to occur, three general conditions must be met. The first condition – strong ground shaking of relatively long duration – can be expected to occur in the planning area as a result of an earthquake on any of the several active faults in the region. The second condition – loose, or unconsolidated, recently deposited sediments consisting primarily of silt and sand – occurs in a large portion of the valley floors, and in the larger canyon bottoms prevalent throughout Los Angeles County. The third condition is water saturated sediments within about 50 feet of the surface.

In accordance with the Seismic Hazard Mapping Act, the California Division of Mines and Geology has evaluated liquefaction susceptibility for most of the planning area. Maps: Seismic Hazard Zones graphically depict the results of these studies.

Structure Failure

The planning area is fortunate that most of its buildings have been built under recent building codes and design criteria. In fact, a substantial amount of construction has occurred in the planning area under design standards that take into account some of the lessons learned from the 1971 Sylmar Earthquake.

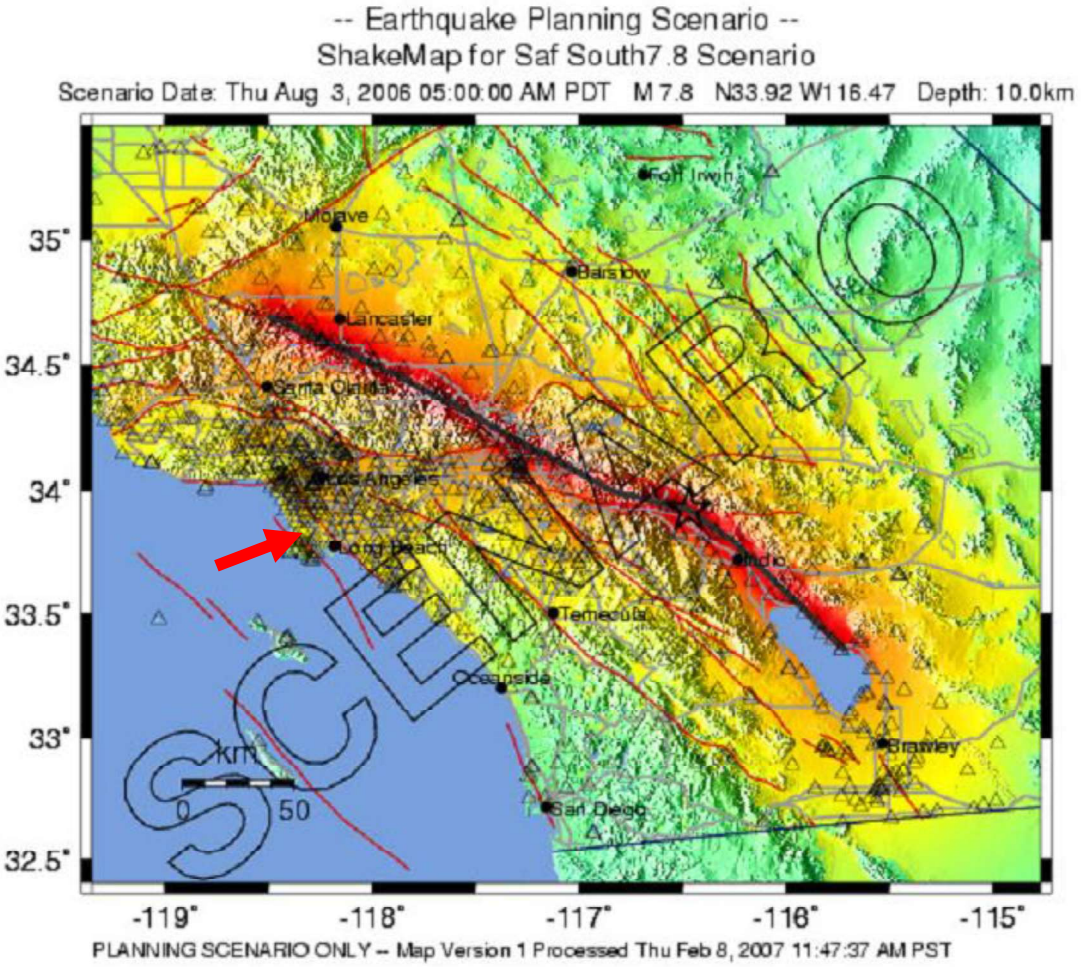
Map: Seismic Shaking Intensities for the Palos Verdes Fault – Magnitude 7.1
(Source: State of California Department of Conservation)



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

S18 Palos-Verdes Fault Scenario M 7.1

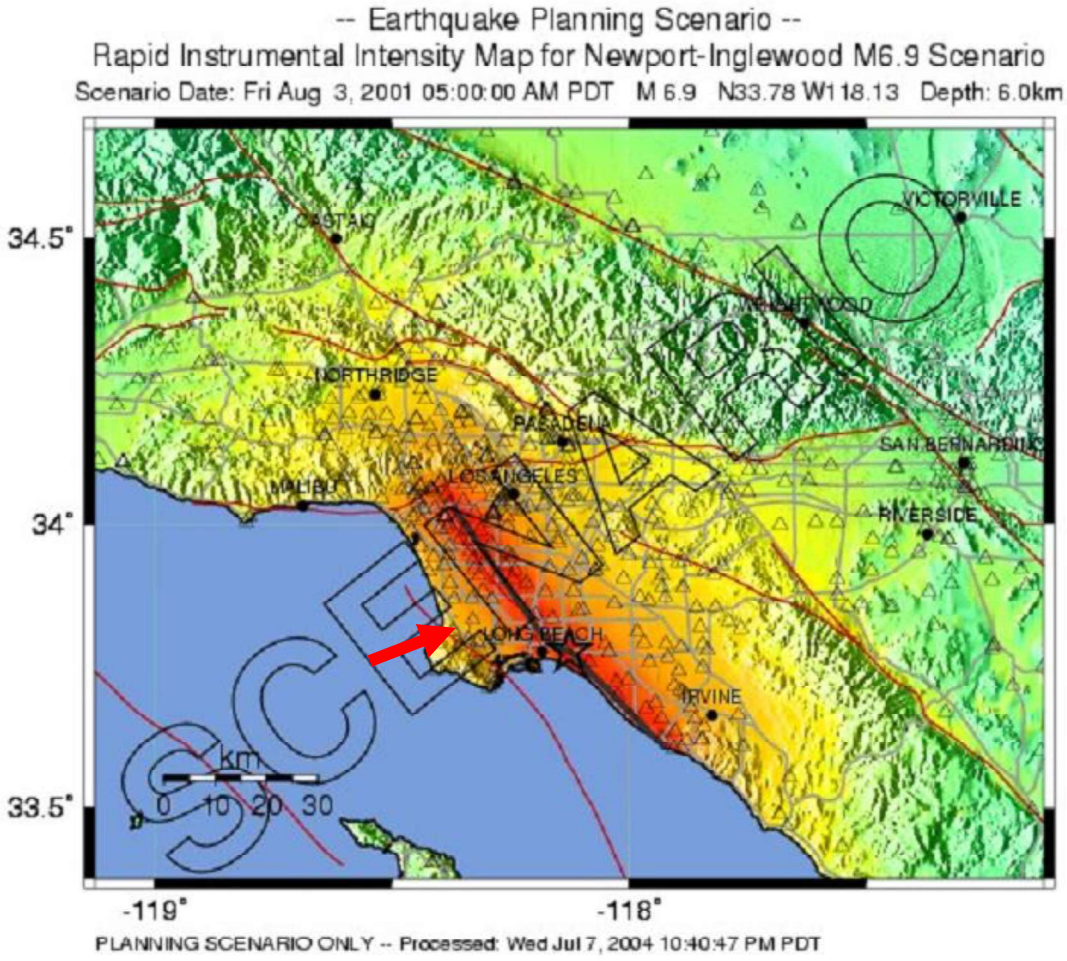
Map: Seismic Shaking Intensities for the San Andreas Fault – Magnitude 7.8
(Source: State of California Department of Conservation)



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

S2 San Andreas Fault - Southern Scenario M 7.8

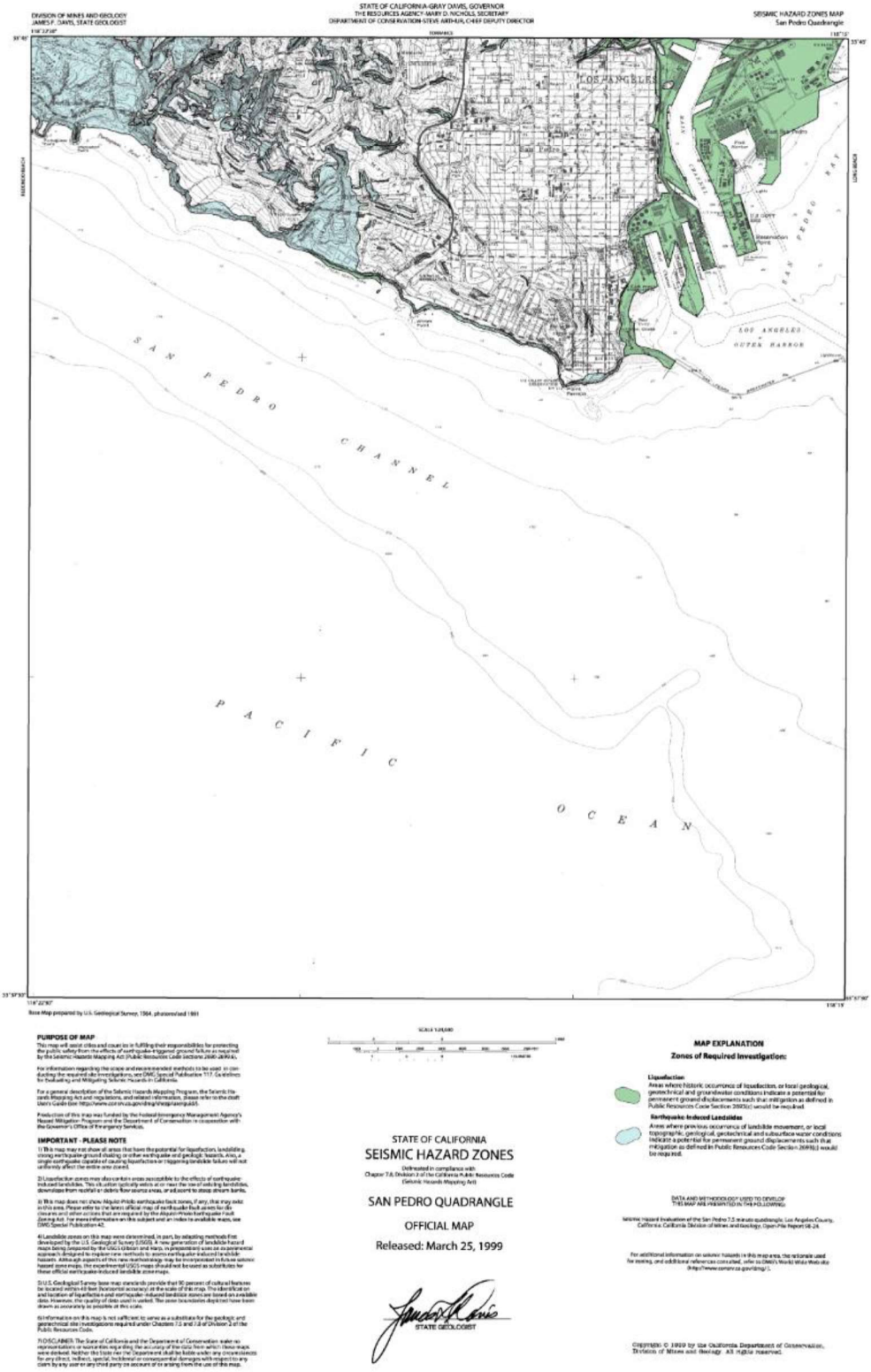
Map: Seismic Shaking Intensities for the Newport-Inglewood Fault – Magnitude 6.9
(Source: State of California Department of Conservation)



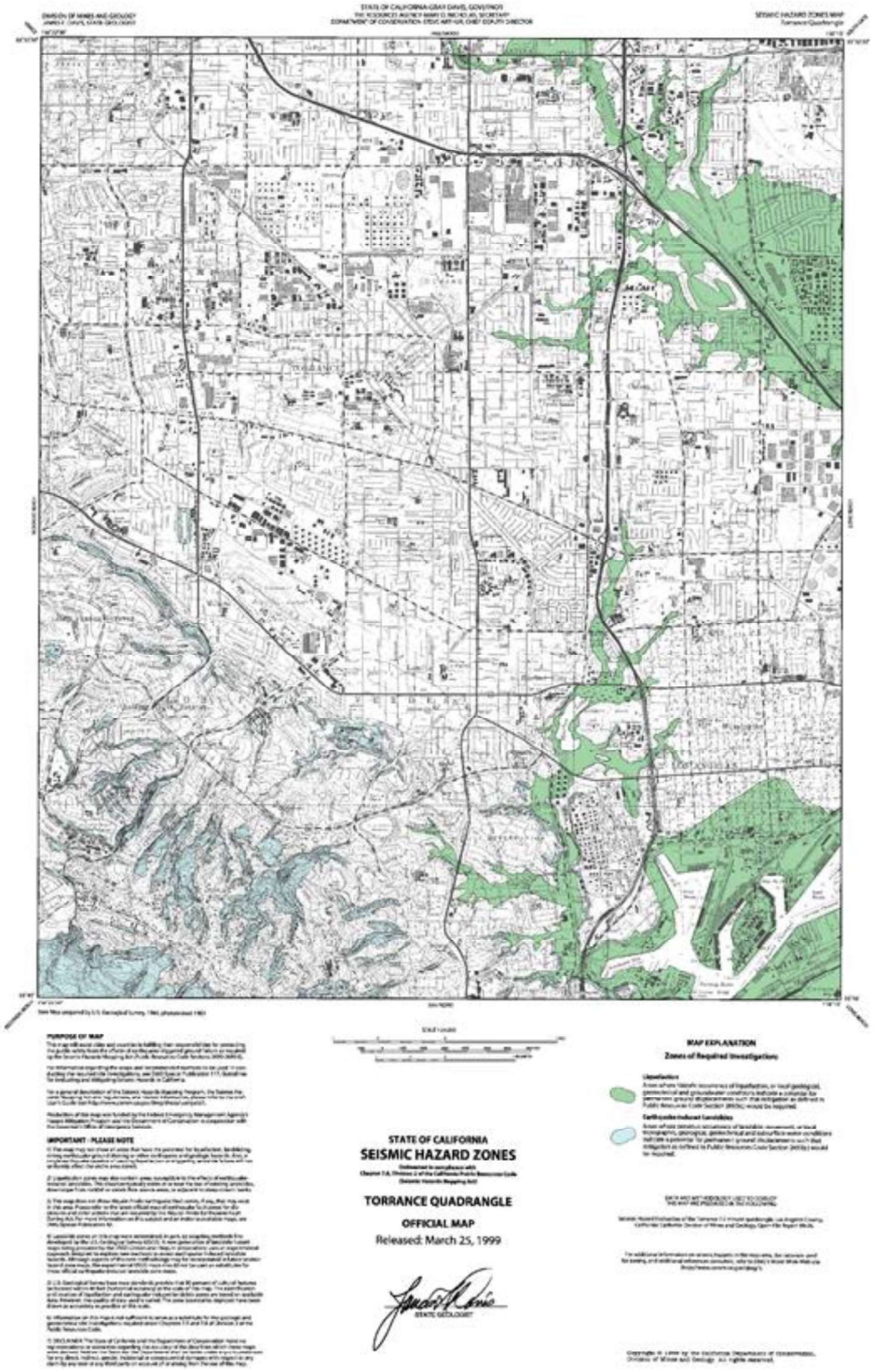
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

S17 Newport-Inglewood Fault Scenario M 6.9

Map: Seismic Hazard Zones – San Pedro Quadrangle
(Source: State of California Department of Conservation)



Map: Seismic Hazard Zones – Torrance Quadrangle
(Source: State of California Department of Conservation)

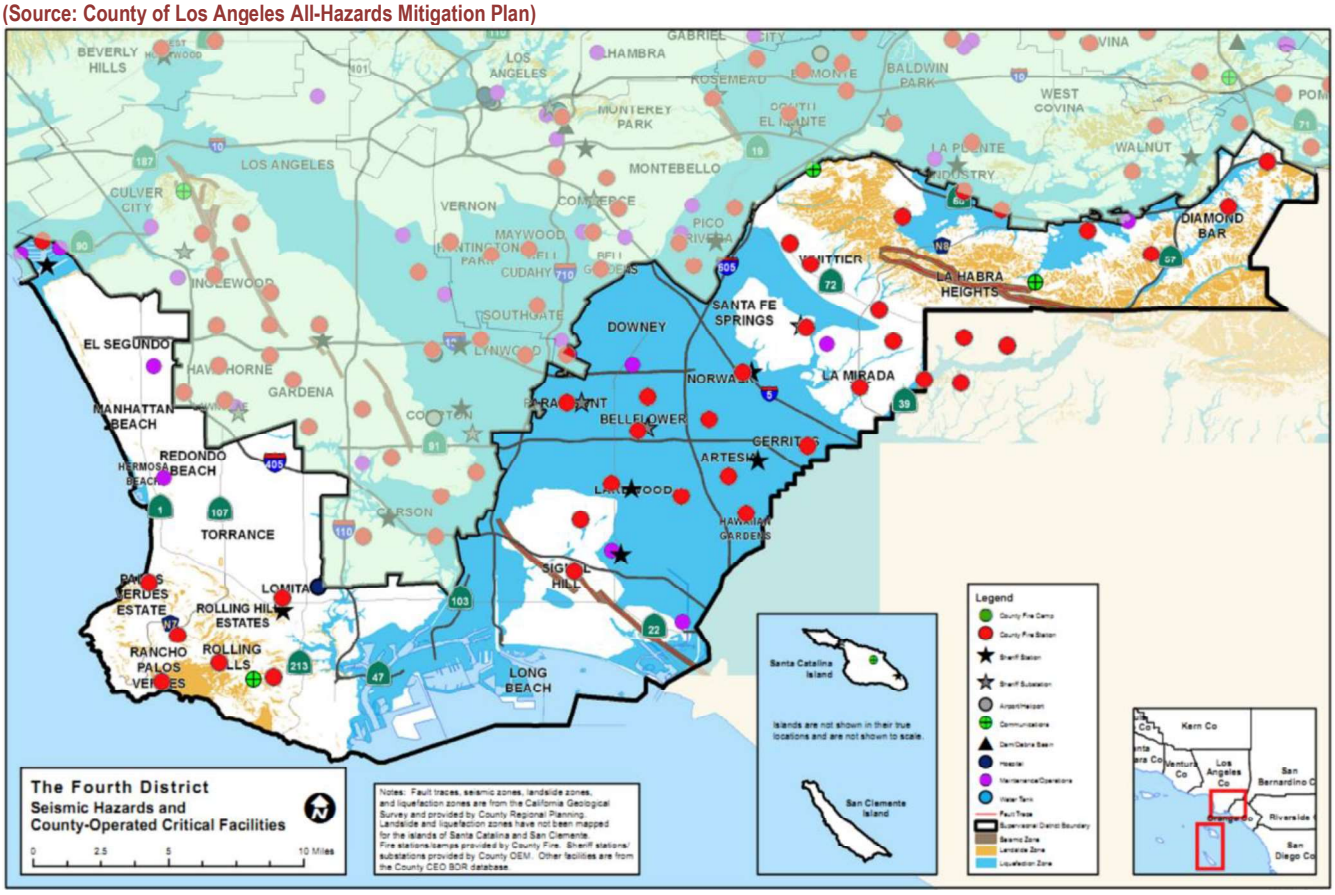


Risk Analysis

Risk analysis is the third phase of a hazard assessment. Risk analysis involves estimating the damage and costs likely to be experienced in a geographic area over a period of time. Factors included in assessing earthquake risk, include population and property distribution in the hazard area, the frequency of earthquake events, landslide susceptibility, buildings, infrastructure, and disaster preparedness of the region. This type of analysis generates estimates of the damages to the planning area due to an earthquake event in a specific location. FEMA's software program, HAZUS, uses mathematical formulas and information about building stock, local geology and the location and size of potential earthquakes, economic data, and other information, to estimate losses from a potential earthquake.

The HAZUS maps generated by Los Angeles County's Office of Emergency Management GIS were prepared for the County's 2014 All-Hazards Mitigation Plan and included below. Refer online to the County's OEM website to review the entire All-Hazards Mitigation Plan and the associated HAZUS reports.

Map: HAZUS Seismic Hazards and County-Operated Critical Facilities (Board of Supervisorial District 4)
(Source: County of Los Angeles All-Hazards Mitigation Plan)



Community Earthquake Issues

What is Susceptible to Earthquakes?

Earthquake damage occurs because humans have built structures that cannot withstand severe shaking. Buildings, airports, schools, and lifelines (highways and utility lines) suffer damage in earthquakes and can cause death or injury to humans. The welfare of homes, major businesses, and public infrastructure is very important. Addressing the reliability of buildings, critical facilities, and infrastructure, and understanding the potential costs to government, businesses, and individuals as a result of an earthquake, are challenges faced by the City.

Dams

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

Because of the current design and construction practices and ongoing programs of review and modification, catastrophic dam failure is considered unlikely. However, it is expected that many flood control channels could suffer damage. Also, pumping stations in coastal communities are expected to fail due to liquefaction.

According to the Rolling Hills General Plan there are no dams or reservoirs posing a threat to the planning area.

Buildings

The built environment is susceptible to damage from earthquakes. Buildings that collapse can trap and bury people. Lives are at risk, and the cost to clean up the damages is great. In most California communities, including the planning area, some buildings were built before 1933 when building codes were not as strict. In addition, retrofitting is not required except under certain conditions and can be expensive. Therefore, the number of buildings at risk remains high. The California Seismic Safety Commission makes annual reports on the progress of the retrofitting of unreinforced masonry buildings. Fortunately, there are very few buildings in the planning area that were constructed prior to 1933. The bulk of development that has occurred in both Cities took place after World War II.

Because the planning area is comprised primarily of low density, single family residential dwellings, it is anticipated that most dwellings would not suffer severe structural damage unless they are in an area of instable soil. However, the combination of severity and length of the shaking could still produce dramatic effects.

Infrastructure and Communication

Residents in the planning area commute frequently by automobiles and out of the city by public transportation such as buses. An earthquake can greatly damage bridges and roads, hampering emergency response efforts and the normal movement of people and goods.

Damaged infrastructure strongly affects the economy of the community because it disconnects people from work, school, food, and leisure, and separates businesses from their customers and suppliers.

Bridge Damage

Even modern bridges can sustain damage during earthquakes, leaving them unsafe for use. Some bridges have failed completely due to strong ground motion. Bridges are a vital transportation link - with even minor damages, making some areas inaccessible. Because bridges vary in size, materials, location and design, any given earthquake will affect them differently. Bridges built before the mid-1970' s have a significantly higher risk of suffering structural damage during a moderate to large earthquake compared with those built after 1980 when design improvements were made.

There are no bridges located within the planning area. However, there are several bridges that provide access to the planning area which are state, county or privately owned (including railroad bridges). Much of the interstate highway system was built in the mid to late 1960's. California Department of Transportation (Caltrans) has retrofitted most bridges on the freeway systems; however, there are still some county maintained bridges that are not retrofitted. The FHWA requires that bridges on the National Bridge Inventory be inspected every 2 years. Caltrans checks when the bridges are inspected because they administer the Federal funds for bridge projects.

Damage to Lifelines

Lifelines are the connections between communities and outside services. They include water and gas lines, transportation systems, and electricity and communication networks. Ground shaking and amplification can cause pipes to break open, power lines to fall, roads and railways to crack or move, and radio and telephone communication to cease. Disruption to transportation makes it especially difficult to bring in supplies or services. Lifelines need to be usable after earthquake to allow for rescue, recovery, and rebuilding efforts and to relay important information to the public.

Disruption of Critical Services

Critical facilities include police stations, fire stations, hospitals, shelters, and other facilities that provide important services to the community. According to the City's Multi-Hazard Functional Plan and other emergency operations plans in the region, severe shortages are projected for hospital beds, communications systems, electrical power, fire resources, natural gas, petroleum fuels, railroad services, sanitation systems, and water supply. These facilities and their services need to be functional after an earthquake event to provide services to the City.

Businesses

Seismic activity can cause great loss to businesses, both large-scale corporations and small retail shops. When a company is forced to stop production for just a day, the economic loss can be tremendous, especially when its market is at a national or global level. Seismic activity can create economic loss that presents a burden to large and small shop owners who may have difficulty recovering from their losses.

Forty percent of businesses do not reopen after a disaster, and another twenty-five percent fail within one year, according to FEMA. Similar statistics from the United States Small Business

Administration indicate that over ninety percent of businesses fail within two years after being struck by a disaster.

Individual Preparedness

Because the potential for earthquake occurrences, and earthquake related property damage, is relatively high in Los Angeles County, increasing individual preparedness is a significant need. Strapping down heavy furniture, water heaters, and expensive personal property, as well as being earthquake-insured, and anchoring buildings to foundations, are just a few steps individuals can take to prepare for an earthquake.

Death and Injury

Death and injury can occur both inside and outside of buildings due to collapsed buildings, falling equipment, furniture, debris, and structural materials. Downed power lines and broken water and gas lines can also endanger human life.

Fire

Downed power lines or broken gas mains can trigger fires. When fire stations suffer building or lifeline damage, quick response to extinguish fires is less likely. Furthermore, major incidents demand a larger share of resources, and initially smaller fires and problems receive little or insufficient resources in the initial hours after a major earthquake event.

Loss of electricity may cause a loss of water pressure in some communities, further hampering firefighting ability.

Of all businesses which close following a natural disaster, more than forty-three percent never reopen, and an additional twenty-nine percent close for good within the next two years.

Debris

After damage to a variety of structures, much time is spent cleaning up brick, glass, wood, steel or concrete building elements, office and home contents, and other materials. Developing a strong debris management strategy is essential in post-disaster recovery. Disasters do not exempt the Cities in the planning area from compliance with the state's AB 939 solid waste reduction regulations.

Existing Mitigation Activities

Existing mitigation activities include current mitigation programs and activities that are implemented by county, regional, state, or federal agencies or organizations.

City Codes

Implementation of earthquake mitigation policy most often takes place at the local government level. The City Building and Safety Department enforces seismic building design standards contained in Section 1604 (General Design Requirements) of the 2014 City of Rolling Hills Building Code:

The Planning Department enforces the zoning and land use regulations relating to earthquake hazards.

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

Coordination Among Building Officials

The City Building Codes set the minimum design and construction standards for new buildings. In 2014 the City of Rolling Hills adopted the most recent seismic standards in its building code, which requires that new and remodeled buildings be built at the current seismic standard.

Identify the Applicable Code Sections that Apply to Earthquake Hazard Mitigation

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

California Earthquake Mitigation Legislation

California is painfully aware of the threats it faces from earthquakes. Dating back to the 19th century, Californians have been killed, injured, and lost property as a result of earthquakes. As the State's population continues to grow, and urban areas become even denser, the risk will continue to increase. For decades the Legislature has passed laws to strengthen the built environment and protect the residents.

Table: Sampling of Earthquake Laws in California
(Source: http://www.leginfo.ca.gov/calaw.html)

Code Section	Description
Government Code Section 8870-8870.95	Creates Seismic Safety Commission.
Government Code Section 8876.1-8876.10	Established the California Center for Earthquake Engineering Research.
Public Resources Code Section 2800-2804.6	Authorized a prototype earthquake prediction system along the central San Andreas fault near the City of Parkfield.
Public Resources Code Section 2810-2815	Continued the Southern California Earthquake Preparedness Project and the Bay Area Regional Earthquake Preparedness Project.
Health and Safety Code Section 16100-16110	The Seismic Safety Commission and State Architect will develop a state policy on acceptable levels of earthquake risk for new and existing state-owned buildings.
Government Code Section 8871-8871.5	Established the California Earthquake Hazards Reduction Act of 1986.
Health and Safety Code Section 130000-130025	Defined earthquake performance standards for hospitals.

Code Section	Description
Public Resources Code Section 2805-2808	Established the California Earthquake Education Project.
Government Code Section 8899.10-8899.16	Established the Earthquake Research Evaluation Conference.
Public Resources Code Section 2621-2630	Established the Alquist-Priolo Earthquake Fault Zoning Act.
Government Code Section 8878.50-8878.52	Created the Earthquake Safety and Public Buildings Rehabilitation Bond Act of 1990.
Education Code Section 35295-35297	Established emergency procedure systems in kindergarten through grade 12 in all the public or private schools.
Health and Safety Code Section 19160-19169	Established standards for seismic retrofitting of unreinforced masonry buildings.
Health and Safety Code Section 1596.80-1596.879	Required all child day care facilities to include an Earthquake Preparedness Checklist as an attachment to their disaster plan.

Earthquake Education

Earthquake research and education activities are conducted at several major universities in the Southern California region, including Cal Tech, USC, UCLA, UCI, and UCSB. The local clearinghouse for earthquake information is the Southern California Earthquake Center (SCEC) located at the University of Southern California, Los Angeles, CA 90089, Telephone: (213) 740-5843, Fax: (213) 740-0011, Email: SCEinfo@usc.edu, Website: http://www.scec.org. SCEC is a community of scientists and specialists who actively coordinate research on earthquake hazards at nine core institutions, and communicate earthquake information to the public. SCEC is a National Science Foundation (NSF) Science and Technology Center and is co-funded by the United States Geological Survey (USGS).

Section 5: Land Movement

Previous Occurrences of Land Movement in the City of Rolling Hills

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.

The following are documented landslides in, adjoining, or near the planning area:

1956 Portuguese Bend Landslide

The first and largest landslide to occur in the vicinity of the planning area was the Portuguese Bend Landslide in the adjoining City of Rancho Palos Verdes. 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.

1974 Abalone Cove Landslide (Reactivated)

Reactivation of the 80-acre Abalone Cove Landslide, also in the adjoining city of Rancho Palos Verdes 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).

1979 Klondike Canyon Landslide

A third landslide near but outside the boundaries of 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, again in the City of Rancho Palos Verdes. 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.

1980 Flying Triangle Landslide

The Flying Triangle landslide occupies an area of approximately 70 acres on the south side of the crest of Palos Verdes Hills overlooking Portuguese Bend. It was observed to be moving in March1980, but may have initiated movement as early as 1974. The landslide represents reactivation of a relatively large complex compound ancient landslide of probable Pleistocene age unrelated to the infamous Portuguese Bend landslide. The cause of movement is directly related to a period of unusual heavy precipitation during the early 1980's, in common with activation of many other ancient landslides along the coastline of Los Angeles County.

Most of the homes in the Flying Triangle landslide that experienced severe damage were damaged during the early stages of landslide movement. It is understood that the present rate of movement is slower than in the late 1970's or 1980's. Private roads are continually being damaged and repaired within the active landslide and many utility lines have been placed above the ground with flex-joints to allow for the continual landslide movement. The landslide area within the Flying Triangle has rendered a large amount of land within the City's southwest area unsuitable for residential development, and is subject to ongoing changes in topography (Source: General Plan Land Use-9).

The City of Rolling Hills adopts the Los Angeles County Building Codes for any development within the City, with minor modifications, when necessary to meet local goals and constraints. Any development in the Flying Triangle is subject to the County's Building Code relative to Geotechnical Hazards Zones. Pursuant to the Los Angeles County Building Code very limited development is permitted in the Geotechnical Hazards Zones.

The City enforces strict grading regulations for all areas in the City. Property owners are required to prove soils and geologic stability of the parcel upon which they are planning to construct, based on requirements of the Los Angeles County Building Code.

No mapping of the hazard area has been performed in the City since 1980, when the Flying Triangle landslide area was identified. However, as parcels are being developed throughout the City, data is collected on soils and geology since each new development requires that soils and geologic conditions be established and that the development site is demonstrated to be stable.

1997/1999 Indian Peak Road/Ocean Trails Golf Course

Unlike the slower moving landslides in the Portuguese Bend area, the Palos Verdes Peninsula area more 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 the neighboring city of 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 in Rancho Palos Verdes slid into the ocean, just a week prior to the course's scheduled grand opening, taking approximately 12 acres of land with it. The slide was stabilized and remediated and in January, 2006 reopened as "Trump National Golf Club" with a full 18-hole course.

2005 Poppy Trail Landslide

On March 5, 2005 a 300-foot long portion of a steep hillside at No. 1 Poppy Trail Road sheared of and slid downhill, terminating just below the roadway easement for Poppy Trail Road. The slide buried a portion of the road, closing off ingress and egress for nine residential lots. The area covered by the slide was subsequently reshaped and made into a temporary road, and the hillside was "winterized". In April 2010, an agreement was reached and approved between various affected parties. As a condition of the Settlement Agreement, the City of Rolling Hills and the Rolling Hills Community Association approved a subdivision map creating two lots, where one pre-existed. The landslide condition was remediated, and the lots were readied for sale.

Previous Occurrences of Land 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.

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 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

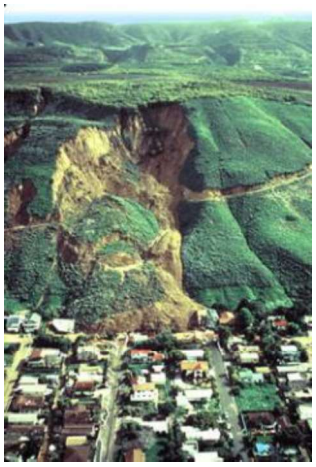
Above normal rainfall triggered damaging debris flows, deep-seated landslides, and flooding. Several deep-seated landslides were triggered by the storms, the most notable was the La Conchita landslide, which in combination with a local debris flow, destroyed or badly damaged 11 to 12 homes in the small 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.

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.

Landslide 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.

"Failure of a slope occurs when the force that is pulling the slope downward (gravity) exceeds the strength of the earth materials that compose the slope. They move slowly, (millimeters per year) or move quickly and disastrously, as is the case with debris-flows. Debris-flows travels down a hillside of speeds up to 200 miles per hour (more commonly, 30 – 50 miles per hour), depending on the slope angle, water content, and type of earth and debris in the flow. These flows are initiated by heavy, usually sustained, periods of rainfall, but sometimes happen as a result of short bursts of concentrated rainfall in susceptible areas. Burned areas charred by wildfires are particularly susceptible to debris flows, given certain soil characteristics and slope conditions."

What is a Debris Flow?

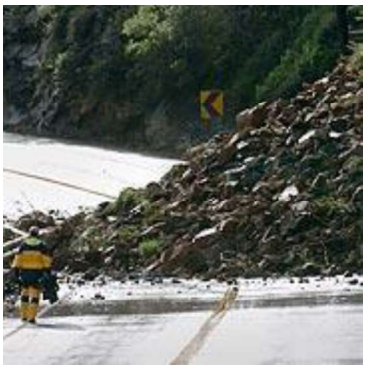
A debris or mud flow is a river of rock, earth and other materials, including vegetation that is saturated with water. This high percentage of water gives the debris flow a very rapid rate of movement down a slope. Debris flows often with speeds greater than 20 mile per hour, and often move much faster.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

Local Conditions

Landslides are a common hazard in California. Weathering and the decomposition of geologic materials produces conditions conducive to landslides, and human activity, further exacerbates many landslide problems.

Many landslides are difficult to mitigate, particularly in areas of large historic movement with weak underlying geologic materials. As communities continue to modify the terrain and influence natural processes, it is important to be aware of the physical properties of the underlying soils as they, along with climate, create landslide hazards. Even with proper planning, landslides continue to threaten the safety of people, property, and infrastructure, but without proper planning, landslide hazards are even more common and more destructive.

The increasing scarcity of buildable land, particularly in urban areas, increases the tendency to build on geologically marginal land. Additionally, hillside housing developments in Southern California are prized for the view lots that they provide.



Rock falls occur when blocks of material come loose on steep slopes. Weathering, erosion, or excavations, such as those along highways, cause falls where the road has been cut through bedrock. They are fast moving with the materials free falling or bouncing down the slope. In falls, material is detached from a steep slope or cliff. The volume of material involved is generally small, but large boulders or blocks of rock can cause significant damage.

Earth flows are plastic or liquid movements in which land mass (e.g. soil and rock) breaks up and flows during movement. Earthquakes often trigger flows. Debris flows normally occur when a landslide moves down slope as a semi-fluid mass scouring, or partially scouring soils from the slope along its path. Flows are, typically, rapidly moving, and tend to increase in volume as they scour out the channel. Flows often occur during heavy rainfall, can occur on gentle slopes, and move rapidly for large distances.

Landslides are often triggered by periods of heavy rainfall. Earthquakes, subterranean water flow, and excavations can also trigger landslides. Certain geologic formations are more susceptible to landslides than others. Human activities, including locating development near steep slopes, can increase susceptibility to landslide events. Landslides on steep slopes are more dangerous because movements are rapid.

Although landslides are a natural geologic process, the incidence of landslides and the impact on people are exacerbated by human activities. Grading for road construction and development increases slope steepness. Grading and construction decreases the stability of a hill slope by adding weight to the top of the slope, removing support at the base of the slope, and increasing water content. Other human activity affecting landslides include: 1) excavation, 2) drainage and groundwater alterations, and 3) changes in vegetation.

Wildland fires in hills covered with chaparral are often a precursor to debris flows in burned out canyons. The extreme heat of a wildfire creates a soil condition in which the earth becomes impervious to water by creating a waxy-like layer just below the ground surface. Since the water cannot be absorbed into the soil, it rapidly accumulates on slopes, often gathering loose

particles of soil into a sheet of mud and debris. Debris flows often originates miles away from where it eventually lands, approaching at a high rate of speed with little warning.

Natural processes can cause landslides or re-activate historical landslide sites. The removal or undercutting of shoreline-supporting material along bodies of water by currents and waves produces countless small slides each year. Seismic tremors can trigger landslides on slopes historically known to have landslide movement. Earthquakes also cause additional failure (lateral spreading) that occurs on gentle slopes above steep streams and riverbanks.

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
- 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

Impacts of Development

Although landslides are a natural occurrence, human impact can substantially affect the potential for landslide failures in the planning area. Proper planning and geotechnical engineering will reduce the threat of safety of people, property, and infrastructure.

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 the potential for erosion of surficial soils, and debris flows. 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.

Landslide Hazard Assessment

Hazard Identification

Identifying hazardous locations is an essential step towards implementing more informed mitigation activities.

Landslides are the most serious geological hazard facing the residential community of Rolling Hills. Residences in the Flying Triangle area of Rolling Hills were originally built upon pre-existing, unrecognized, or recognized, but un-stabilized landslide. Geologically, most of the landslides within the City occur in the Altamira Shale Member of the Monterey Formation. Landslide rupture surfaces are commonly along plastic clay beds or seams within clayey shale or siltstone units (Source: General Plan Safety Element-13). Refer to the Earthquake-Induced Landslide Area Maps located in the Earthquake Section of this plan.

Slope modification during grading can render slopes unstable. Slope instability occurs when bedding planes intersect the slope face of either natural slopes or designed cut slopes. Site specific investigations are necessary to determine potential slope instability problems at specific sites.

Landslides are considered “potentially active”, meaning they could be reactivated in the future, either by excessive rainfall, introduction of artificial water in the slope (landscaping irrigation/broken water or septic systems), or improper site design or grading practices. Grading activities must consider constraints as a condition of project approval. The County of Los Angeles Public Works Department and a private engineering and public works company act as reviewer for the City of Rolling Hills to ensure all potential geologic problems are addressed.

Vulnerability and Risk

Vulnerability assessment for landslide will assist in predicting how different types of property and population groups will be affected by a hazard. Data that includes specific landslide-prone and debris flow locations in the city can be used to assess the population and total value of property at risk from future landslide occurrences.

Rolling Hills, as a hillside coastal region community, may be described as having some of the most severe terrain of any jurisdiction in Los Angeles County. Slopes of 25 to 50 percent are present in virtually every remaining undeveloped parcel in the City (Source: General Plan Housing Element-34).

While a quantitative vulnerability assessment (an assessment that describes number of lives or amount of property exposed to the hazard) has not yet been conducted for the City of Rolling Hills landslide events, there are many qualitative factors that point to potential vulnerability. Landslides can impact major transportation arteries, blocking residents from essential services.

Past landslide events have caused major property damage and significantly impacted city residents, and mapping city landslide and debris flow areas would help in preventing future loss.

Factors included in assessing landslide risks include population and property distribution in the hazard area, the frequency of landslide or debris flow occurrences, slope steepness, soil characteristics, and precipitation intensity. This type of analysis could generate estimates of the damages to the city due to a specific landslide or debris flow event. At the time of publication of this plan, data was insufficient to conduct a risk analysis and the software needed to conduct this type of analysis was not available.

Attachment: Rolling Hills Public Information Handout
(Source: City of Rolling Hills website)

EMERGENCY SURVIVAL PROGRAM
COUNTY OF LOS ANGELES

ESP LANDSLIDES AND MUDSLIDES

The ground can move without a quake!

When most people think about ground movement, they probably envision images of the ground below them moving from side to side, or up and down, during an earthquake.

It is important that residents who live on steep hillsides and in canyons be prepared for landslides. Areas that don't have grass, trees, shrubs and plants, such as after a fire, are more likely to have landslides. This includes sliding, falling and flowing soil, rock, mud, brush and trees, especially during or after heavy rains.

Slow-moving landslides can cause significant property damage, but they usually don't cause injury or death. Mudslides, however, are much more dangerous. According to the California Geological Survey, mudslides can easily exceed speeds of 10 miles per hour and often flow at rates of more than 20 mph. Because mudslides travel much faster than landslides, they can cause deaths, injuries and significant property damage.

Wherever you live, work, or play, take the actions on the reverse side of this Focus Sheet to help reduce your risk of death, injury and property losses from landslides, mudslides and other types of ground failure.

Check these websites

www.espfocus.org (Emergency Survival Program)
www.calema.ca.gov (California Emergency Management Agency)

Community Landslide Issues

What is Susceptible to Landslides?

Landslides can affect utility services, transportation systems, and critical lifelines. The planning area may suffer immediate damages and loss of service. Disruption of infrastructure, roads, and critical facilities also have a long-term effect on the economy. Utilities, including potable water, wastewater, telecommunications, natural gas, and electric power are all essential to service community needs. Loss of electricity has the most widespread impact on other utilities and on the whole community. Natural gas pipes are also at risk of breakage from landslide movements as small as ½ inch for plastic pipes and ¾ inch for steel pipes.

Roads

Losses incurred from landslide hazards in the City of Rolling Hills have been associated with roads. The City contracts with the Los Angeles County Public Works Department for responding to slides that inhibit the flow of traffic or are damaging a road. The Rolling Hills Community Association provides road maintenance for addressing slow movement road damage. In the 1980 Flying Triangle Landslide, the Rolling Hills Community Association incurred $300,000 loss for street repairs in this area.

It is not cost effective to mitigate all slides because of limited funds and the fact that some historical slides are likely to become active again even with mitigation measures.

Lifelines and Critical Facilities

Lifelines and critical facilities should remain accessible, if possible, during a natural hazard event. The impact of closed transportation arteries are increased if the closed road or bridge is critical for hospitals and other emergency facilities. Losses of power and phone service are also potential consequences of landslide events. Due to heavy rains, soil erosion in hillside areas can be accelerated, resulting in loss of soil support beneath high voltage transmission towers in hillsides and remote areas.

Landslide Mitigation Activities

Landslide mitigation activities include current mitigation programs and activities that are implemented by Rolling Hills Community Association, Los Angeles County and the City. (See Mitigation Actions Matrix in Part III, Section 8.)

Landslide Building/Zoning Codes

The City of Rolling Hills Building/Zoning Codes include controls on development on steep slopes. No development can take place on slopes greater than 2:1, or a 50% slope (RHMC 15.04.130 Maximum cut slope) nor can any structure be located on the sides or bottoms of canyons or natural drainage courses (RHMC 17.167.100 Maximum buildable slope). As stated previously, prior to any development, the applicants must prove stability of the lot proposed for development. Soils, geology, and hydrology studies area required to be performed, reviewed, and approved by the appropriate divisions of the City's consulting Building and Safety officials.

The City of Rolling Hills implements strict development requirements. Only 40% of the net lot area may be disturbed. Disturbances is defined as any activity on the lot, which will result in grading of slopes and area for the building pads and includes any non-graded area where

impervious surfaces will remain or are proposed to be added. Structural lot coverage, including all the structures on the property such as residence, garage, swimming pool, sports court and any other use may not cover more than 20% of the net lot area. The total structural coverage, which includes all the structures and impervious surfaces, may not cover more than 35% of the net lot area. These restrictions apply to construction throughout the City.

The Los Angeles County Building Code requirements in the Geotechnical Hazard Areas stipulate that the building official may not issue building permits if he/she finds that the property outside of the site proposed for development could be damaged by activation or acceleration of a geotechnical hazardous condition and such activation or acceleration could be attributed to the proposed work. Therefore, very limited development may occur in the Flying Triangle area of the City. Section 110 of the 2012 County of Los Angeles Building Code addresses prohibited uses of building sites in Geotechnical Hazards areas. Pursuant to the code repairs and minor alteration or reconstruction of existing structures in the Flying Triangle may be allowed. Certain types of new structures considered non-habitable, such as garage or a stable may also be permitted. Before a permit is issued, the owner must record a statement that the owner is aware that the subject property is subject to a physical hazard of a geotechnical nature and an agreement relieving the County and the City of any liability for any damages or loss which may result from issuance of such a permit.

Hazard Mapping

No mapping of the hazard area is known to have been performed in the City since 1980, when the Flying Triangle landslide area was identified. However, as parcels are being developed throughout the City, data is collected on soils and geology since each developed requires that solid and geologic conditions be established, to determine if construction can take place.

Impact of Landslides in the Planning Area

Landslides and their impacts will vary by location and severity of any given Landslide event and will likely only affect certain areas of the county during specific times. Based on the risk assessment, it is evident that landslides will continue to have potentially devastating economic impacts to certain areas of the planning area. Impacts that are not quantified, but can be anticipated in future events, include:

- Injury and loss of life
- Public facility 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 residential property values
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

Section 6: Wildfire Hazards

Previous Occurrences of Wildfire in the City of Rolling Hills

Since its incorporation in 1957 the City of Rolling Hills has only declared a local emergency on two occasions, in both cases related to brush fires. On June 25th 1973, the City Council of Rolling Hills declared a local emergency due to a brush fire that occurred on June 22, destroying ten homes within the "Flying Triangle" and "Southfield" areas. On September 14, 2009 the City Council declared a local emergency due to a brush fire that occurred on August 27, 2009 in the south east portion of the City.

With its many steep canyons and open scrub-covered hillsides, the Palos Verdes Peninsula area has always been vulnerable to the hazards associated with brush fires.

The earliest newspaper report of a wildfire on the Palos Verdes Peninsula was in October 1923, in which the Los Angeles Examiner reported a brush fire in the Palos Verdes Hills that burned an estimated 4,000 acres. Although no people were injured or killed and no structures were destroyed, a considerable amount of livestock perished in the fire, including 18 horses. In September 1945, the Peninsula News reported on a grass fire near Crest Road (in probably what is now the City of Rolling Hills) that destroyed one home and caused an estimated $50,000 worth of property damage. In June 1967, the Peninsula News reported that 45 acres had burned in the Portuguese Bend area located in what is now the city of Rancho Palos Verdes. Although no residences were damaged in this incident, "considerable farm land was destroyed as fire trucks and other equipment had to cross the fields in order to fight the flames."

The most destructive wildland fire that burned the Palos Verdes Peninsula to date occurred in June 1973. As reported in the Peninsula News, a fire that was started accidentally on Friday, June 22, 1973 by two youths playing with fireworks in Rancho Palos Verdes spread east into the "Flying Triangle" and "Southfield" areas of Rolling Hills where it destroyed 10 homes and 5 barns. The fire shifted west and burned into the Portuguese Bend area of Rancho Palos Verdes and destroyed 3 more homes. In all, the 1973 fire consumed a total of 900 acres and raged for 28 hours before it was finally extinguished. Fortunately, no human lives were lost. All told, the disaster caused $1.3 million in private property damage in Rolling Hills and an additional $130,000 worth of damage in Rancho Palos Verdes.

The most recent fire in the planning area was on August 27 and 28, 2009, when a wildfire burned through approximately 230 total acres. The fire is believed to have originated in the Portuguese Bend Nature Reserve in Rancho Palos Verdes where 165 acres were charred. The remaining 65 acres were burned in Rolling Hills. Dozens of homes were threatened and approximately 1,200 residents were forced to evacuate, the majority in the adjoining City of Rancho Palos Verdes. Although some structures were reported damaged, no homes were lost and there were no reported injuries to residents or firefighters. (Source: Daily Breeze blog: South Bay History, Sam Gnerre, posted November 7, 2014)

In urban areas, the effectiveness of fire protection efforts is based upon several factors, including the age of structures, efficiency of circulation routes that ultimately affect response times and availability of water resources to combat fires. In wildland areas, taking the proper precautions, such as the use of fire-resistant building materials, a pro-active Fire Prevention inspection program, and the development of defensible space around structures where

combustible vegetation is controlled, can protect developed lands from fires and, therefore, reduce the potential loss of life and property.

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

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

Why are Wildfires a Threat to California?

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. Los Angeles County's topography, consisting of a semi-arid coastal plain 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. According to the California Division of Forestry (CDF), there were over seven thousand reportable fires in California in 2003, with over

one million acres burned. According to CDF statistics, in the October 2003 Firestorms, over 4,800 homes were destroyed and 22 lives lost.

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.

Previous Occurrences of Wildfire in Los Angeles County

Large fires have been part of the Southern California landscape for millennia. Written documents reveal that during the 19th century human settlement of southern California altered the fire regime of coastal California by increasing the fire frequency. This was an era of very limited fire suppression, and yet like today, large crown fires covering tens of thousands of acres were not uncommon. One of the largest fires in Los Angeles County (60,000 acres) occurred in 1878.

Table: 20 Largest California Wildland Fires (By Acreage Burned)
(Source: CAL FIRE)

20 Largest California Wildland Fires (By *Acreage Burned)

	FIRE NAME/CAUSE	DATE	COUNTY	*ACRES*	STRUCTURES	DEATHS
1	CEDAR *(HUMAN)*	October 2003	SAN DIEGO	273,246	2,820	15
2	ZACA *(HUMAN)*	July 2007	SANTA BARBARA	240,207	1	0
3	MATILIJA *(UNDETERMINED)*	September 1932	VENTURA	220,000	0	0
4	WITCH *(POWERLINES)*	October 2007	SAN DIEGO	197,990	1,650	2
5	KLAMATH THEATER COMPLEX *(LIGHTNING)*	June 2008	SISKIYOU	192,038	0	2
6	MARBLE CONE *(LIGHTNING)*	July 1977	MONTEREY	177,866	0	0
7	LAGUNA *(POWERLINES)*	September 1970	SAN DIEGO	175,425	382	5
8	BASIN COMPLEX *(LIGHTNING)*	June 2008	MONTEREY	162,818	58	0
9	DAY FIRE *(HUMAN)*	September 2006	VENTURA	162,702	11	0
10	STATION FIRE *(HUMAN)*	August 2009	LOS ANGELES	160,557	209	2
11	MCNALLY *(HUMAN)*	July 2002	TULARE	150,696	17	0
12	STANISLAUS COMPLEX *(LIGHTNING)*	August 1987	TUOLUMNE	145,980	28	1
13	BIG BAR COMPLEX *(LIGHTNING)*	August 1999	TRINITY	140,948	0	0
14	CAMPBELL COMPLEX *(POWERLINES)*	August 1990	TEHAMA	125,892	27	0
15	WHEELER *(ARSON)*	July 1985	VENTURA	118,000	26	0
16	SIMI *(UNDER INVESTIGATION)*	October 2003	VENTURA	108,204	300	0
17	HWY. 58 *(VEHICLE)*	August 1996	SAN LUIS OBISPO	106,668	13	0
18	IRON ALPS COMPLEX *(LIGHTNING)*	June 2008	TRINITY	105,805	2	10
19	CLAMPITT *(POWERLINES)*	September 1970	LOS ANGELES	105,212	86	4
20	BAR COMPLEX *(LIGHTNING)*	July 2006	TRINITY	100,414	0	0

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

9/28/2009

Table: 20 Largest California Wildland Fires (By Structures Destroyed)
(Source: CAL FIRE)

Top 20 Largest California Wildfires

	FIRE NAME *(CAUSE)*	DATE	COUNTY	*ACRES*	STRUCTURES	DEATHS
1	**CEDAR** *(Human Related)*	October 2003	San Diego	**273,246**	2,820	15
2	**RUSH** (*Lightning*)	August 2012	Lassen	**271,911 CA / 43,666 NV**	0	0
3	**RIM** *(Human Related)*	August 2013	Tuolumne	**257,314**	112	0
4	**ZACA** *(Human Related)*	July 2007	Santa Barbara	**240,207**	1	0
5	**MATILIJA** *(Undetermined)*	September 1932	Ventura	**220,000**	0	0
6	**WITCH** *(Powerlines)*	October 2007	San Diego	**197,990**	1,650	2
7	**KLAMATH THEATER COMPLEX** *(Lightning)*	June 2008	Siskiyou	**192,038**	0	2
8	**MARBLE CONE** *(Lightning)*	July 1977	Monterey	**177,866**	0	0
9	**LAGUNA (POWERLINES)**	September 1970	San Diego	**175,425**	382	5
10	**BASIN COMPLEX** *(Lightning)*	June 2008	Monterey	**162,818**	58	0
11	**DAY FIRE** *(Human Related)*	September 2006	Ventura	**162,702**	11	0
12	**STATION FIRE** *(Human Related)*	August 2009	Los Angeles	**160,557**	209	2
13	**McNALLY** *(Human Related)*	July 2002	Tulare	**150,696**	17	0
14	**STANISLAUS COMPLEX** *(Lightning)*	August 1987	Tuolumne	**145,980**	28	1
15	**BIG BAR COMPLEX** *(Lightning)*	August 1999	Trinity	**140,948**	0	0
16	**HAPPY CAMP COMPLEX** *(Lightning)*	August 2014	Siskiyou	**134,056**	6	0
17	**CAMPBELL COMPLEX** *(Powerlines)*	August 1990	Tehama	**125,892**	27	0
18	**ROUGH** *(Lightning)*	July 2015	Fresno	**119,069**	4	0
19	**WHEELER** *(Arson)*	July 1985	Ventura	**118,000**	26	0
20	**SIMI** *(Under Investigation)*	October 2003	Ventura	**108,204**	300	0

***Rough Fire information will change until the fire is contained.**

*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.

9/11/2015

Table: Acreage Burned in Los Angeles County 2004-2010

Year	Unincorporated Los Angeles County	Other Jurisdictions	All Jurisdictions
2004	34,353.58	361.80	34,715.38
2005	5,221.09	23,834.87	29,055.96
2006	7,355.35	163.66	7,519.01
2007	116,893.76	2,231.35	119,125.11
2008	30,714.17	401.92	31,116.09
2009	162,265.62	870.78	163,136.40
2010	1,513.99	45.02	1,559.01
Totals	**358,317.56**	**27,909.40**	**386,226.96**

Source: Los Angeles County Fire Department, Information Management Section, 2010.

Table: Los Angeles County Wildfire Incidents 2007-2010

Fire Name	Year	Acres Burned	Structures	
			Damaged	*Destroyed*
Buckweed/ Agua Dulce	2007	38,356	30	43
Canyon	2007	4,500	14	8
Magic	2007	2,824	0	0
Ranch	2007	58,401	2	10
Meadow Ridge	2007	20	0	0
October	2007	100	0	0
Sayre	2008	11,262	0	634
Sesnon	2008	14,703	11	78
Marek	2008	4,824	10	42
Osito	2009	304	0	0
Morris	2009	2,168	0	0
Station	2009	160,577	57	209
Crown	2010	14,000	6	10
Briggs	2010	530	0	0
Totals		**312,569**	**130**	**1,034**

Source: Cal Fire Fire Incident Reports

*Data on structures damaged and destroyed was not available for all wildfires, just for the ones listed above.

The 2003 Southern California Fires

The fall of 2003 marked the most destructive wildfire season in California history. Between October 21 and November 4, 12 separate fires raged across Southern California in Los Angeles, Riverside, 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.

Altogether 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. (Source: State of California, *Governor's Blue Ribbon Panel Fire Commission Report to the Governor*, 2004)

The 2007 Southern California Fires

Just four years after the "Fire Siege of 2003" in 2007, again in late October, 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. During this siege, 17 people lost their lives, ten were killed by the fires outright, three were killed while evacuating, four died from other fire siege related causes, and 140 firefighters, and an unknown number of civilians were injured. A total of 3,069 homes and other buildings were destroyed, and hundreds more were damaged. Hundreds of thousands of people were evacuated at the height of the siege. The fires burned over half a million acres, including populated areas, wildlife habitat and watershed. Portions of the electrical power distribution network, telecommunications systems, and even some community water sources were destroyed. Transportation was disrupted over a large area for several days, including numerous road closures. Both the Governor of California and the President of the United States personally toured the ongoing fires. Governor Schwarzenegger proclaimed a state of emergency in seven counties before the end of the first day. President Bush quickly declared a major disaster. While the total impact of the 2007 fire siege was less than the disastrous fires of 2003, it was unquestionably one of the most devastating wildfire events in the history of California. (Source: http://www.fire.ca.gov/fire_protection/downloads/siege/2007/Overview_Introduction.pdf)

CAL FIRE 2011 Wildland Fire Summary

	Number of Fires	Acres Burned
2011	3,056	51,889
2010	2,961	23,191
5 Yr. Avg. (2007-2011)	4,226	196,554

These figures include fires and acres burned within CAL FIRE jurisdiction of State Responsibility Area

Fire Suppression Cost (Split over two fiscal years):
Fiscal Year July 2010 - June 2011: $90.1 million
Fiscal Year July 2011 - June 2012: (estimated) $131 million

Dollar Damage Costs: $7.2 million

Structures Destroyed*: 137 destroyed

The Top Five Fires by Acreage Burned**

Fire Name	County	Start Date	Acres Burned	Strutures Destroyed	Fire Cause
Comanche Cmplx	Kern	9/10/2011	**29,338**	0	Lightning
Breckenridge Cmplx	Kern	9/10/2011	**25,213**	0	Lightning
Canyon	Kern	9/4/2011	**14,585**	100	Equipment
Eagle	San Diego	7/21/2011	**14,100**	0	Arson
Keene Cmplx	Kern	9/10/2011	**10,470**	0	Lightning

Top Five Fire by Structures Destroyed*

Fire Name	County	Start Date	Structures Destroyed	Acres Burned	Fire Cause
Canyon	Kern	9/4/2011	**100**	14,585	Equipment
Ruth	Trinity	9/23/2011	**31**	1,460	Debris Burning
Center	Inyo	3/18/2011	**19**	850	Undetermined
Wagon Wheel	Los Angeles	9/5/2011	**8**	500	Miscellaneous
Granite	Tulare	7/9/2011	**7**	780	Undetermined

*These are structures destroyed on major incidents and may not include structures destroyed on initial attack fires.

**These fires are the top five fires in the state, regardless of whether they were state, federal, or local responsibility.

Fire statistics provided by CAL FIRE - Office of the State Fire Marshal, CAIRS Section, using the CAIRS database and Wildfire Activity Statistics.

April 2012
www.fire.ca.gov

Wildfire Characteristics

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

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

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

"When Lewis and Clark explored the Northwest, the forests were relatively open, with 20 to 25 mature trees per acre. Periodically, lightning would start fires that would clear out underbrush and small trees, renewing the forests. Today's forests are completely different, with as many as 400 trees crowded onto each acre, along with thick undergrowth. This density of growth makes forests susceptible to disease, drought and, severe wildfires. Instead of restoring forests, these wildfires destroy them and it can take decades to recover. This radical change in our forests is the result of nearly a century of well-intentioned but misguided management." (Source: Overgrown Forests Require Preventive Measures, By Gale A. Norton (Secretary of the Interior), USA Today Editorial, August 21, 2002)

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' 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.

"Fire has been important in the life cycle of chaparral communities for over 2 million years; however, the true nature of the "fire cycle" has been subject to interpretation. In a period of 750 years, it generally thought that fire occurs once every 65 years in coastal drainages and once every 30 to 35 years inland."

"The vegetation of chaparral communities has evolved to a point it requires fire to spawn regeneration. Many species invite fire through the production of plant materials with large surface-to-volume ratios, volatile oils, and through periodic die-back of vegetation. These species have further adapted to possess special reproductive mechanisms following fire. Several species produce vast quantities of seeds which lie dormant until fire triggers germination. The parent plant, which produces these seeds, defends itself from fire by a thick layer of bark that allows enough of the plant to survive so that the plant can crown sprout following the blaze. In general, chaparral community plants have adapted to fire through the following methods: a) fire induced flowering; b) bud production and sprouting subsequent to fire; and c) in-soil seed storage and fire stimulated germination; and d) on plant seed storage and fire stimulated dispersal." (Source: Overgrown Forests Require Preventive Measures, By Gale A. Norton (Secretary of the Interior), USA Today Editorial, August 21, 2002)

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

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.

California is experiencing a historic drought condition statewide. On January 17, 2014, Governor Brown proclaimed a State of Emergency and subsequently, three months later issued Executive Orders establishing statewide mandatory water reductions. On May 9, 2016, Governor Brown issued another Executive Order that replaced the reduction mandates with longer term water conservation measures.

Development

Growth and development in scrubland and forested areas is increasing the number of human-caused fires 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.

Wildfire Hazard Assessment

Hazard Identification

Extreme weather conditions such as high temperature, low humidity, and/or winds of extraordinary force causes an ordinary fire to expand into one of massive proportions.

Wildfire hazard areas are commonly identified in regions of the wildland/urban interface. Ranges of the wildfire hazard are further determined by the ease of fire ignition due to natural or human conditions and the difficulty of fire suppression. The wildfire hazard is also magnified by several factors related to fire suppression/control such as the surrounding fuel load, weather, topography, and property characteristics.

Generally, hazard identification rating systems are based on weighted factors of fuels, weather and topography. In order to determine the "base hazard factor" of specific wildfire hazard sites and interface regions, several factors must be taken into account. Categories used to assess the base hazard factor include:

- Topographic location, characteristics and fuels
- Site/building construction and design
- Site/region fuel profile (landscaping)
- Defensible space
- Accessibility
- Fire protection response
- Water availability

Risk Analysis

Southern California residents are served by a variety of local fire departments as well as county, state and federal fire resources. Data that includes the location of interface areas in the county can be used to assess the population and total value of property at risk from wildfire and direct these fire agencies in fire prevention and response.

Key factors included in assessing wildfire risk include ignition sources, building materials and design, structural density, slope, vegetative fuel, fire occurrence and weather, as well as occurrences of drought.

The National Wildland/Urban Fire Protection Program has developed the Wildland/Urban Fire Hazard Assessment Methodology tool for communities to assess their risk to wildfire. For more information on wildfire hazard assessment refer to http://www.Firewise.org.

Fire hazards of concern in the planning area are those associated with structures and brush, as well as earthquake induced fires. Fire potential is typically greatest in the months of August, September, and October, when dry vegetation, combined with offshore dry Santa Ana winds, create a high potential for spontaneous fires. The hillsides and steep slopes facilitate rapid fire spread.

Local Conditions

Fire hazards threaten lives, property, and natural resources, and impact vegetation and wildlife habitats. Following are excerpts taken from the 1990 General Plan – Safety Element concerning the "fire hazard" faced by the City of Rolling Hills:

"The City of Rolling Hills is vulnerable to small wildland fire hazards. Brush fires pose the primary threat, especially where residential development lies above chaparral filled canyons. The fuel in the canyons, if ignited, could threaten residences upslope with wind-carried cinders and direct ignition from uncontrolled fires. In the early 1970's serious fires occurred which destroyed homes in the area, illustrating the potential for extensive damage.

The coastal sage plant community present in the canyon areas has historically shown a high susceptibility to brush fires in Los Angeles County. Although the fire frequency tends to be highest in grassy areas, the coastal sage in the canyons and hillslope areas of the City present the greatest danger of high intensity fires i.e., the most difficult to contain, and a spreading rate that quickly exceeds the response rate. Fire danger in the City of Rolling Hills is most critical during the late summer and fall months, especially when Santa Ana weather conditions prevail. Plant fuels posing the greatest threat during this period will be those located on the south-facing slopes.

The City of Rolling Hills is exposed to brush fire hazards from both outside and within the City's jurisdiction. Brush fire hazards along border areas of the City consist of the following: 1) the southern boundary with Rancho Palos Verdes, within the Klondike Canyon-Flying Triangle area and eastward, downslope of the Southfield Drive area, 20 the eastern boundary with Rancho Palos Verdes in the George F. Canyon area, 3) the Portuguese Canyon area, and 4) the western boundary with Rolling Hills Estates. (Source City of Rolling Hills General Plan Safety Element).

Combined with the several canyons cutting through the City, the entire jurisdiction falls within the "Very High Fire Hazard Severity Zone", or VHFHSZ. (Source: Los Angeles County Fire Department).

The frequency of large brush fires in chaparral canyon areas on the Palos Verdes Peninsula is relatively low, although the City experienced a serious fire destroying 13 homes in 1973. While the low density of development in Rolling Hills reduces the chances for fire spread, a conflagration could develop should a fire ignite within any of the fire hazard areas in the City. A potential source of fire ignition is lightning, however, this is considered to be a highly improbably scenario on the Peninsula. (Source: 1990 General Plan, Safety Element)

Electrical power lines may also pose a fire hazard, in the remote possibility that the lines are not automatically de-energized when knocked down by high winds or an earthquake. The majority of fires are caused by the accidental or deliberate actions of man. Considering that this is an essentially unpredictable parameter, and that he proximity of residences to dense brush filled canyons makes them extremely vulnerable, suggests that the risk is great enough to warrant stringent measures that are required under the VHFHSZ standards. Such measures might address adequate brush clearance, removal of flammable rubbish stored on the premises, or utilization of fire retardant or noncombustible roof construction, which are among the most significant factors that increase the fire hazard. (Source: 1990 General Plan Safety Element)

Two other potential vulnerabilities of the City that are issues appropriate for the Safety Element are the lack of accessibility that exists in some sections of the community and the typical wooden construction used in residential development. Some homes and, particularly newer remote development taking place in the City, are more vulnerable to fire damage than others because of their relative seclusion. In some instances, road width requirements may be inadequate for maneuvering fire prevention equipment along narrow private roads. Although it has not been a problem this condition may impede fire prevention response activities. The residential construction of the City of Rolling Hills also exposes a vulnerability to earthquake-induced fires. Areas with wood construction need protection from fire as, or more than, protection from ground shaking or faulting. (Source: 1990 General Plan Safety Element)

Issues and Opportunities – Fire Hazards

1) Fire retardant roofs are justified within the City of Rolling Hills because of the potentially hazardous situation posed by brush fires in canyon areas both within the City and in bordering undeveloped hillslope areas. The Rolling Hills Building Code, under the VHFHSZ standards, requires that roof coverings of both new and altered homes be certified "Class A" assemblies. This is the highest standard of fire retardant design and material for residential roofs.

2) Fire retardant construction and fire buffer zones are appropriate building regulation options for reducing the threat of fire hazards. All new home construction as well as

additions and alterations are subjected to review for application of fire resistive VHFHSZ standards among which include stringent design and material standards for eaves and rafter tails as well as exterior finishes.

3) The potential for impeded fire response because of remoteness of certain residences and narrow private roads suggests that residents should have the capacity for self-reliant fire prevention strategies and firefighting equipment, such as additional brush clearance zones, improved peak load water supply capability, high pressure hoses, and fire extinguishers and/or sprinkler systems. The fire codes applicable to the planning area, being in the VHFHSZ area include requirements such as up to 200-foot brush and flammable material clearances from structures to create defensible space, and a requirement (subject to certain design and site conditions) for new swimming pools to include installation of a "draft hydrant". In addition, standards for driveway widths and turn-around areas are strictly enforced during the development review process to enhance fire-fighting equipment and vehicle access.

Community Wildfire Issues

What is Susceptible to Wildfires?

The entire planning area has been designated as a "Very High Fire Hazard Severity Zone" by the Los Angeles County Fire Department. Accordingly, the City of Rolling Hills through its contract with the Los Angeles County Fire Department requires and enforces the following precautionary measures to create defensible space for all properties in the City:

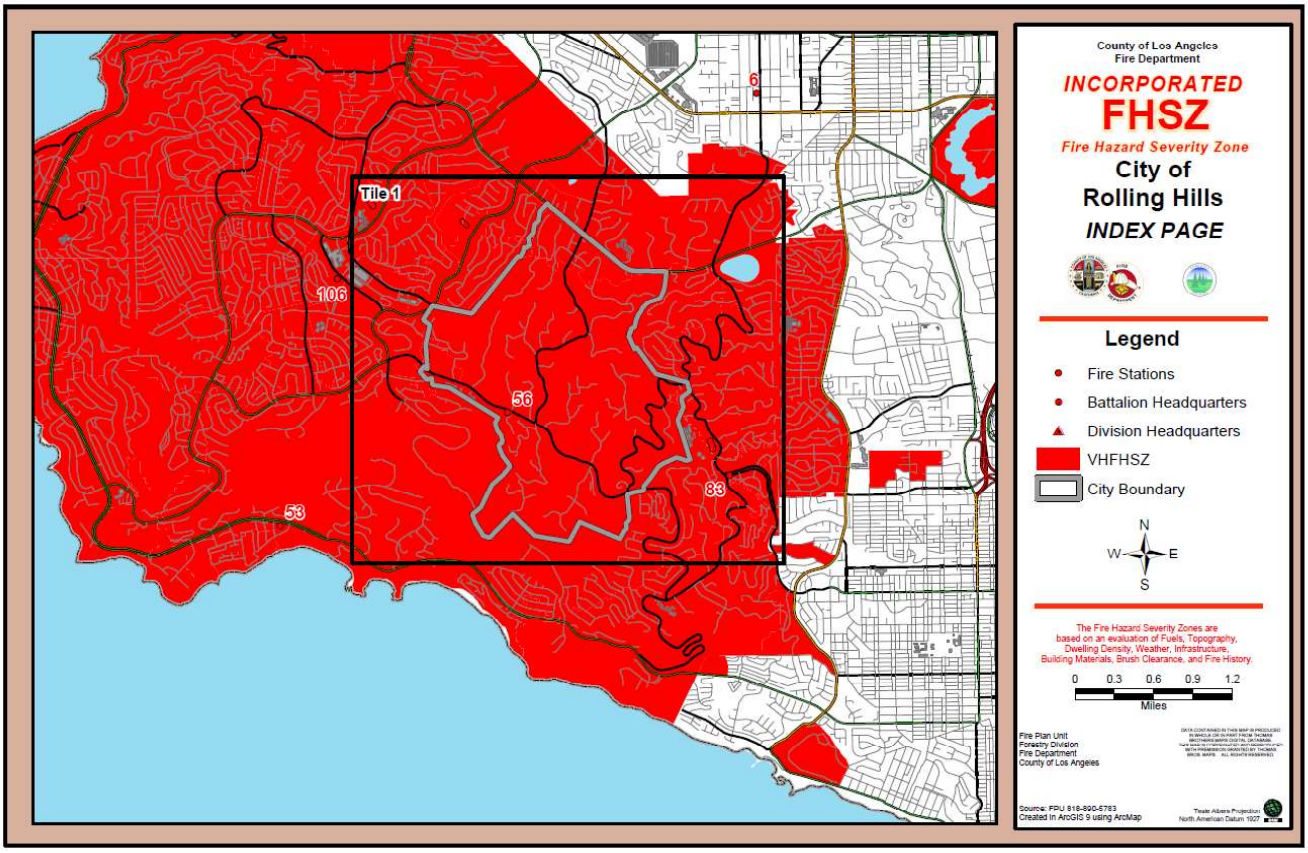
- Maintenance around and adjacent to the dwelling or structure of a firebreak made by removing and clearing away, for a distance of not less than 30 feet on each side thereof or to the property line, whichever is nearer, all flammable vegetation or other combustible growth.
- Maintenance around and adjacent to the occupied dwelling or occupied structures of additional fire protection or firebreaks made by removing all brush, flammable vegetation, or combustible growth that is located from 30 feet to 100 feet and up to 200 feet from the occupied dwelling or occupied structure.
- Removal of portions of any trees that extend within 10-feet of the outlet of any chimney or stovepipe.
- Maintenance of any tree adjacent to or overhanging any building free of dead or dying wood.
- Maintenance of roofs free of leaves, needles, or other dead vegetative growth.
- Provision and maintenance at all time of a screen over the outlet of every chimney or stovepipe that is attached to any fireplace, stove, or other device that burns any solid or liquid fuel. The screen shall be constructed and installed per the California Building Standards Code.

In addition, the City of Rolling Hills has one of the strictest rules for roof covering. The Rolling Hills Zoning Ordinance requires as follows: "Roofing Material. Roof covering for all buildings shall be Class "A" (having satisfied the fifteen-year weathering test and certified as such by Underwriting Laboratories or an equivalent recognized test agency). Class "A" roof assembly utilizing wood or treated wood material and reflective type roofing shall not be permitted. Notwithstanding the foregoing, any new addition to, repair or re-roofing of a structure may match the existing roof covering, provided that the roof addition or the area to be re-roofed or repaired

does not exceed two hundred square feet in size. Any new roof addition, repair or re-roofing, which exceeds two hundred square feet shall comply with the requirements of this section."

Under its discretionary review process for reviewing new development, the City requires that to the maximum extent practicable all landscaping to be drought and fire resistant, that any new trees introduced shall not be taller at maturity than the roof ridge of the structures on the lot. This requirement may not prevent a fire from spreading from a tree to the residence, but it would be very difficult for the fire to spread to another residence, as the City's development consists of single-family residences only on large lots with relatively large distances between structures.

Map: City of Rolling Hills - Fire Hazard Severity Zone
(Source: Los Angeles County Fire Department)



Impact of Wildfires in the Planning Area

Wildfires and their impact vary by location and severity of any given wildfire event, and will likely only affect certain areas of during specific times. Based on the risk assessment, it is evident that wildfires will have potentially devastating economic impact to certain areas of the planning area. Impact that is not quantified, but can be anticipated in future events, includes:

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

Severity

The primary effects of fire, such as loss of life, injury, destruction of buildings and wildlife, are generally well known. Fire also has a number of secondary effects, such as strained public utilities, depleted water supplies, downed power lines, disrupted telephone systems, and closed roads. In addition, flood control facilities are overtaxed by the increased flow from bare hillsides, and the resulting debris that washes down. Affected recreation areas may have to close or restrict operations. Moreover, buildings destroyed by fire are usually eligible for property tax reassessment, which reduces revenue to local government.

A fire is usually extinguished within a few days, but its effects last much longer. Grassland re-sprouts the following spring, a chaparral community regenerates in three to five years, and oak woodland with most of its seedlings and saplings destroyed will start a new crop within five to ten years. Coniferous timber stands are most susceptible to long-term damage, taking as much as 50 to 100 years to re-establish a forest.

Fire destroys surface vegetation, leaving the soil bare and subject to erosion, when the rains begin in the fall and winter. Raindrops hit the surface with undiminished impact, splashing particles of soil loose that move downhill and are carried away by running water. Fire also destroys most of the roots that hold the soil in place, allowing running water to wash the soil away. Mudslides and mudflows can result from these processes.

Growth and Development in the Interface

The hills and mountainous areas of Southern California are considered to be interface areas. The development of homes and other structures is encroaching onto the wildlands and is expanding the wildland/urban interface. The interface neighborhoods are characterized by a diverse mixture of varying housing structures, development patterns, ornamental and natural vegetation, and natural fuels.
In the event of a wildfire, vegetation, structures, and other flammables can merge into unwieldy and unpredictable events. Factors important to the fighting of such fires include access, firebreaks, proximity of water sources, distance from a fire station, and available firefighting personnel and equipment. Reviewing past wildland/urban interface fires shows that many structures are destroyed or damaged for one or more of the following reasons:

- Combustible roofing material
- Wood construction
- Structures with no defensible space
- Fire department has poor access to structures
- Subdivisions located in heavy natural fuel types
- Structures located on steep slopes covered with flammable vegetation
- Limited water supply
- Winds over 30 miles per hour

Road Access

Generally, road access is a major issue for all emergency service providers. In many areas, there is not adequate space for emergency vehicle turnarounds in single-family residential neighborhoods, obstructing emergency workers because they cannot access houses. Fire trucks are large, and firefighters are challenged by narrow roads and limited access. When there is inadequate turn around space, the fire fighters can only work to remove the occupants, but cannot safely remain to save the threatened structures.

Water Supply

Fire fighters in more remote or secluded areas are faced by limited water supply and lack of hydrant taps. In the most rural areas there may be issues regarding are relatively small diameter pipe water systems that may be inadequate for providing sustained firefighting flows.

Interface Fire Education Programs and Enforcement

Fire protection in urban/wildland interface areas may rely heavily more on the landowner's personal initiative to take measures to protect his or her own property. Therefore, public education and awareness plays a greater role in interface areas. In those areas with strict fire codes, property owners who resist maintaining the minimum brush clearances can be cited for failure to clear brush.

In 2015 the City Council formed a City Council Fire Fuel Reduction Committee, and in March, 2016 the Committee acted to initiate a Community Wildfire Protection Plan (CWPP). The purpose of a CWPP is to guide future actions of the Los Angeles County Fire Department, the City Council and residents, in their efforts to reduce wildfire risks and hazards in Rolling Hills. The CWPP, when completed will help protect the community from the effects of wildfire through outreach, education, strategic planning and action. The CWPP will aim to accomplish the

following objectives: 1) Identify specific strategies to reduce structure ignitability while at the same time protecting the environmental integrity of the City; and 2) Identify priority projects to reduce risks and hazards from wildfire at the neighborhood or community scale.
In developing the Plan, residents will have a significant role by providing feedback through public forums. The process will be interactive, as residents will provide recommendations on wildlife mitigation priorities. It is estimated that the Plan will take two years to complete, including four community meetings. The Los Angeles County Fire Department has taken the lead in developing the CWPP, and City staff will support by coordinating public meetings, with assistance from the Rolling Hills Community Association. It is anticipated that there will be a total of four such community meetings, the first of which was held July 14, 2016.

Need for Mitigation Programs

Continued development into the interface areas has growing impact on the wildland/urban interface. Periodically, the historical losses from wildfires in Southern California are catastrophic, with historical deadly and expensive fires. The continued growth and development increases the public need for mitigation planning in Southern California.

Section 7: Drought

Previous Occurrences of Drought in the City of Rolling Hills

Fortunately, there is no history of severe drought (e.g. landscape restrictions, emergency water distribution to residents, etc.) within the City of Rolling Hills. However, the City is designated on the U.S. Drought Monitor as having experienced "exceptional drought". This designation comes from a combination of a significant decrease in rain combined with water supply restrictions resulting from the state-wide California drought. These conditions were increasingly evident from 2012 to 2018.

Since the writing of the 2008 Mitigation Plan, there have been no significant damages to the City from a drought.

Previous Occurrences of Drought in Los Angeles County

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

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

Local Conditions

According to the City of Rolling Hills 1990 General Plan – Open Space and Conservation Element, water resources are limited to external sources including the Metropolitan Water District through West Basin Municipal Water District and California Water Service Company.

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

Impacts of Drought in the City of Rolling Hills

Based on the risk assessment, it is evident that drought events continue to have the potential to yield devastating economic impacts to the City.

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

- ✓ Injury and loss of life
- ✓ Disruption of and damage to public infrastructure
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Uncontrolled fires and associated injuries and damage

Hazard Identification and Risk Assessment

Definition

Drought is defined as a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (e.g., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness of the rains (e.g., rainfall intensity, number of rainfall events). Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity. Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. Human beings often exacerbate the impact of drought. Recent droughts in both developing and developed countries and the

resulting economic and environmental impacts and personal hardships have underscored the vulnerability of all societies to this "natural" hazard.

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

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

Drought Threat

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

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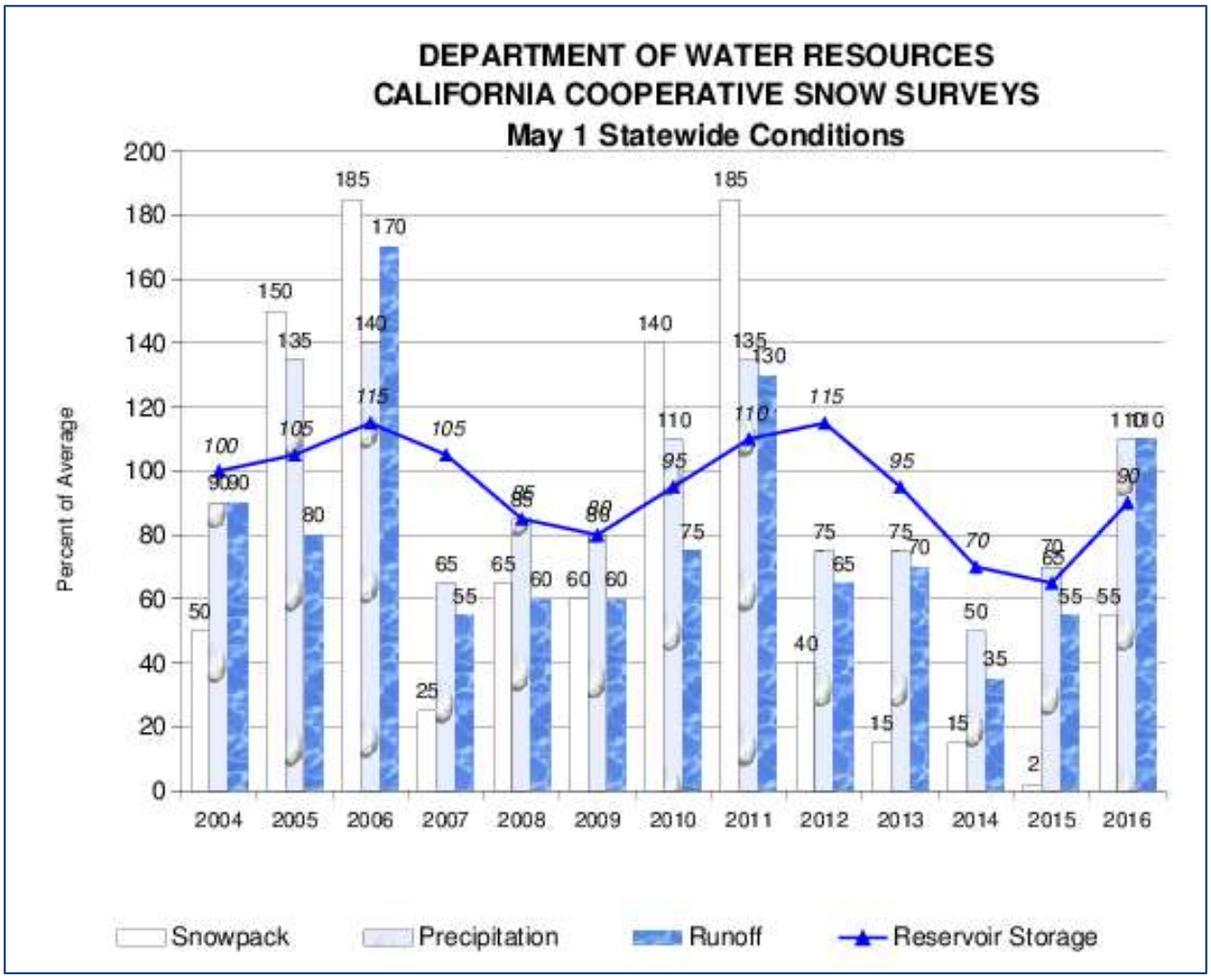
General Situation

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

Figure: California Cooperative Snow Surveys
(Source: California Department of Water Resources)



Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multiyear period. There is no universal definition of when a drought begins or ends.

Types of Drought

There are four different ways that drought can be defined:
(1) Meteorological - a measure of departure of precipitation from normal. Due to climatic differences what is considered a drought in one location may not be a drought in another location.
(2) Agricultural - refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
(3) Hydrological - occurs when surface and subsurface water supplies are below normal.
(4) Socioeconomic - refers to the situation that occurs when physical water shortage begins to affect people.

Historical California Droughts

A significant drought, reported by many of the ranchers in southern California, occurred in 1860. The great drought of the 1930s, coined the "Dust Bowl," was geographically centered in the Great Plains yet ultimately affected water shortages in California. The drought conditions in the plains resulted in a large influx of people to the west coast. Approximately 350,000 people from Arkansas and Oklahoma immigrated mainly to the Great Valley of California. As more people moved into California, including Los Angeles County increases in intensive agriculture led to overuse of the Santa Ana River watershed and groundwater resulting in regional water shortages. Several bills have been introduced into Congress in an effort to mitigate the effects of drought.

In 1998, President Clinton signed into law the National Drought Policy Act, which called for the development of a national drought policy or framework that integrates actions and responsibilities among all levels of government. In addition, it established the National Drought Policy Commission to provide advice and recommendations on the creation of an integrated federal policy. The most recent bill introduced into Congress was the National Drought Preparedness Act of 2003, which established a comprehensive national drought policy and statutorily authorized a lead federal utility for drought assistance. Currently there exists only an ad-hoc response approach to drought unlike other disasters (e.g., hurricanes, floods, and tornadoes) which are under the purview of FEMA.

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

The Long-term Climatic Viewpoint

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

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

Past California Droughts

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

11,000 years before present

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

6,000 years before present

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

900-1300 A.D. (Approximate)

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

1300-1800 A.D. (approximate)

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

Mid - 1500s A.D.

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

1850s A.D.

Sporadic measurements of California precipitation began.

1890s A.D.

Long-term stream flow measurements began at a few California locations. Of the many varied indexes used to measure drought, the "Palmer Drought Severity Index" (PDSI) is the most commonly used drought index in the United States. Developed by meteorologist Wayne Palmer, the PDSI is used to measure dryness based on recent temperature compared to the amount of precipitation. It utilizes a number range, 0 as normal, drought shown in terms of minus numbers, and wetness shown in positive numbers. The PDSI is most effective at analyzing long-range drought forecasts or predications. Thus, the PDSI is very effective at evaluation trends in the severity and frequency of prolonged periods of drought, and conversely wet weather. The National Oceanic and Atmospheric Administration (NOAA) publish weekly

Palmer maps, which are also used by other scientists to analyze the long-term trends associated with global warming and how this has affected drought conditions.

Palmer Drought Severity Index

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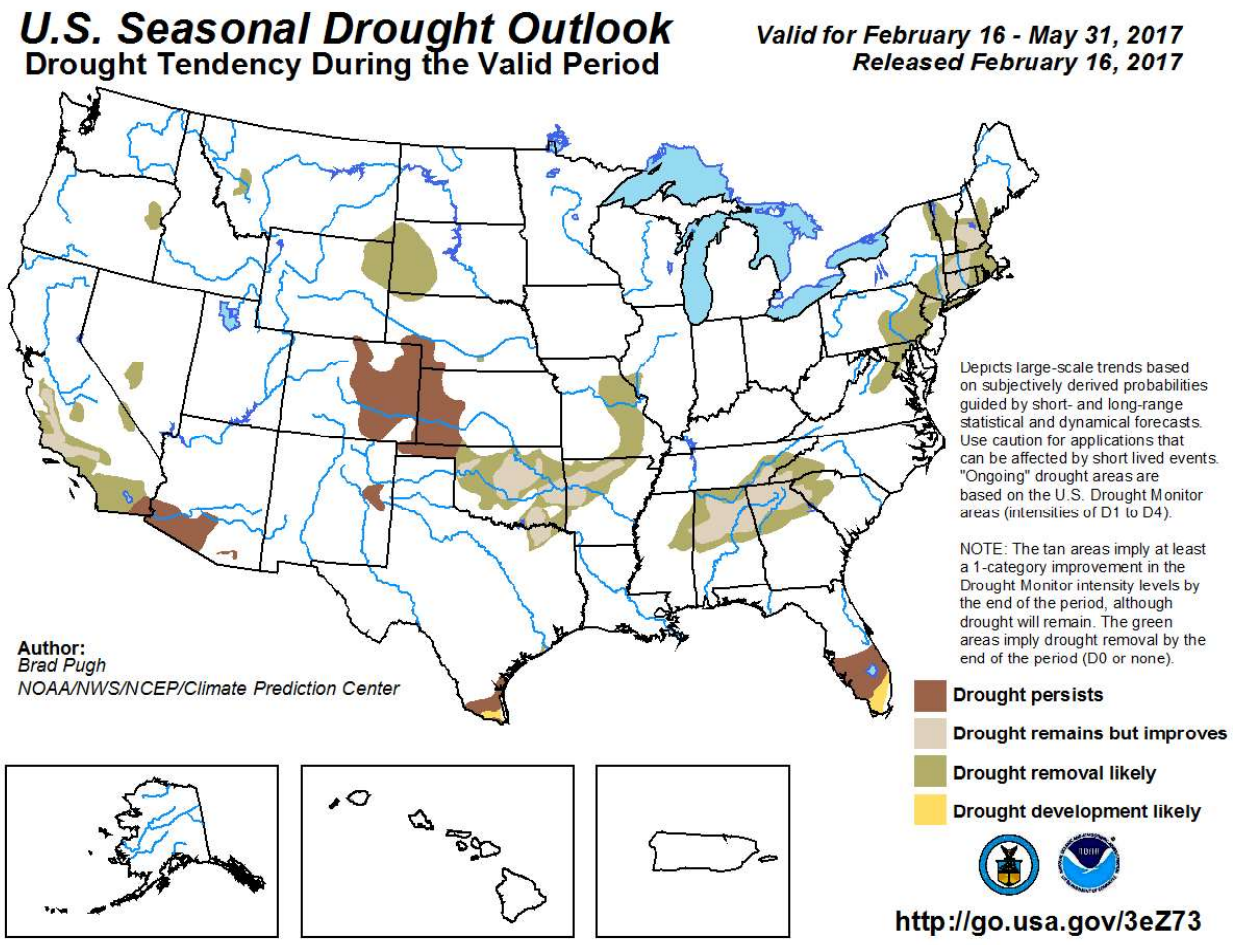
The following map is the most current snapshot of drought conditions across the U.S. It is provided by NOAA's Climate Prediction Center.

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



PART III: MITIGATION STRATEGIES

Section 8: Mitigation Strategies

Overview of Mitigation Strategy

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

The Plan provides a set of action items to reduce risk from hazards such as education and outreach programs and the development of partnerships. The Plan also provides for the implementation of preventative activities, including programs that restrict and control development in areas subject to damage from hazards.

The resources and information within the Plan:

- Establish a basis for coordination and collaboration among agencies and the public in the City
- Identify and prioritize future mitigation projects
- Assist in meeting the requirements of federal assistance programs

The Plan works in conjunction with other City plans, including the Multi-Hazard Functional Plan (also known as Emergency Operations Plan).

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.

Mitigation Measure Categories

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

Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

Property Protection: Actions that involve modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.

Public Education and Awareness: Actions to inform and educate citizens, property owners, and elected officials about hazards and potential ways to mitigate them.

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

Natural Resource Protection: Actions that, in addition to minimizing hazard losses preserve or restore the functions of natural systems. Examples include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

Emergency Services: Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.

Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, retaining walls, and safe rooms.

Goals

The Planning Team examined the mitigation goals in the 2008 Hazard Mitigation Plan and agreed to leave the goals intact. The goals address the Risk Assessment and reflect the input of the Planning Team in representing long-term vision for hazard reduction or enhanced mitigation capabilities. In addition, the goals are compatible with community needs and goals expressed in other planning documents prepared by the City.

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

Protect Life and Property

Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from 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 hazards.

Enhance Public Awareness

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

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

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.

Preserve Natural Systems

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

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

Encourage Partnerships and Implementation

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

Encourage leadership within the City and public organizations to prioritize and implement local and regional hazard mitigation activities.

Strengthen Emergency Services

Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.

Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.

Coordinate and integrate hazard mitigation activities where appropriate, with emergency operations plans and procedures.

The Planning Team also developed hazard-specific mitigation goals, which appear in Section 8: Mitigation Strategies.

Public Participation

Public input during development of the Plan assisted in creating plan goals. Meetings and follow-on discussions with the Planning Team members yielded historical information on hazard events, status updates on the identified mitigation action items, action item priorities, and new action items.

In addition to the Planning Team, other public input was solicited through the City's Planning Department website and the City resident newsletter.

How are the Mitigation Action Items Organized?

The Planning Team chose to separate the Mitigation Action Item Matrices because the process of implementing a shared matrix is impractical.

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

The action items are organized within the following Mitigation Actions Matrix, which lists all of the multi-hazard (actions that reduce risks for more than one specific hazard) and hazard-specific action items included in the Plan. Data collection and research and the public participation process resulted in the development of these action items (Section 9: Planning Process). Each 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 that follows assigns primary responsibility for each of the action items. The hierarchies of the assignments vary – some are positions, others departments, and other committees. The primary responsibility for implementing the action items falls to the entity shown as the "Coordinating Organization". The coordinating organization is the agency with regulatory responsibility to address hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of or responsible for implementing activities and programs.

Plan Goals Addressed

The plan goals addressed by each action item are included as a way to monitor and evaluate how well the 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

Building & Infrastructure

The Planning Team representatives provided input on whether or not an Action Item involved New and/or Existing Buildings and/or Instructure.

Comments

Planning Team department representatives provided status updates on each of the mitigation action items identified in the 2008 Plan. The status was indicated in the comments column using the following categories: New, Revised, Completed, Deleted, and Deferred.

Funding Source and Planning Mechanism

The City of Rolling Hills has a wide range of possible funding sources for its identified projects. The General Fund provides the main support to a majority of the action items. Items also may be supported by private and public grants, Pre- and Post-Hazard Mitigation Grants, Community Development Block Grants, and other funding mechanisms. In addition to identifying the potential funding sources, the Planning Team identified a "planning mechanism" that will be used to facilitate implementation. Planning mechanisms are regulatory resources. A complete list of planning mechanisms can be found in the Planning Process (Capability Assessment-Existing Processes and Programs).

Benefit and Cost Ratings

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

Cost ratings are 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 can be funded through existing jurisdictional funding but would require budget modifications.
Low: The action item can be funded under existing jurisdictional funding.

Benefit ratings are 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.

Ranking Priorities

To assist with implementing the Plan, the Planning Team added the following process for ranking mitigation action items. Designations of "Low," "Medium," and "High" 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?
Implemented by existing state or federal grant programs?
Completed within the 5-year life cycle of the LHMP?
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?

During the prioritization meeting of 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

The General Plan

The Planning Team went to great lengths to examine the various regulatory documents influencing the community's ability to mitigate against the identified hazards. Perhaps the most important of these documents was the General Plan. It is the intention of the Planning Team to link the Plan actions items as closely as possible to the General Plan. The purpose of this association is that many development projects require a determination of "General Plan conformity" prior to approval. If the Plan and General Plans are aligned, this will better ensure both the sustainability and implementation of the Plan. Since the establishment of the DMA 2000 regulations, FEMA and other regulators have been frustrated by the ineffectiveness of Plan implementation – in other words, the failure of plans to actually affect the built environment and cause a reduction in risk. The Planning Team believes that changing the circle of build-

damage-rebuild can most effectively be broken by linking the Plan to the regulations and policy guidelines that allow for construction and land use.

Following are the Goals and Policies drawn from the City's 1990 General Plan – Safety Element:

GOAL 1: Recognize Rolling Hills' risk of earthquake-induced hazards and implement appropriate policies and programs to address this risk.

Policy 1.1: Restrict expansion of existing development and construction of new development near active faults or landslide areas.

Policy 1.2: Continue enforcement of site investigation (such as seismic, geologic, and soils investigations" and implementation of adequate hazard mitigation measures for development proposals near active faults and areas vulnerable to direct or secondary impact from earthquake-induced slop instability.

Policy 1.3: Advocate the development of easily maintained and earthquake resistant utility lifelines, including natural gas, water, power and communications.

Policy 1.4: Promote the construction of new residences or modifications to existing residences to be built in simple geometrical configurations.

Policy 1.5: Improve knowledge of the hazards and mitigation of non-structural interior and exterior components, especially in high occupancy building and emergency operations centers.

GOAL 2: Protect public safety and minimize the social and economic impacts from landslides hazards.

Policy 2.1: Continue to restrict new development and expansion of existing development in areas susceptible to landslides, debris flow, and rock falls, unless these geological hazards can be mitigated by conventional structural or alternative non-structural methods.

Policy 2.2: Explore and implement hazard mitigation and slope maintenance plans for existing and continuing development in hillside areas, especially areas underlain by large landslide complexes.

Policy 2.3: Consider the alternative use of properties for a natural preserve in active landslide areas.

Policy 2.4: Promote and facilitate conversion from septic tank to sewage system to help mitigate slope failure.

GOAL 3: Minimize injury, loss of life and property, and economic disruption caused by flood hazards.

Policy 3.1: Continue to restrict expansion of development in flood prone areas, especially in canyon bottoms and stream areas.

Policy 3.2: Continue to ensure that runoff caused by new development does not impact existing development

GOAL 4: Reduce threats to public safety and protect property from brush fire hazards.

Policy 4.1: Strengthen review requirements of new projects and modifications to existing development in the City of Rolling Hills to continue emphasis upon the use of fire-retardant materials.

Policy 4.2: Continue to coordinate firefighting efforts with adjacent communities to prevent the rapid spread of brush fires and to ensure efficient response.

Policy 4.3: Advocate and support the creation of neighborhood fire education programs and firefighting capability, especially in the result of post-earthquake residential fires.

Policy 4.4: Encourage the use of natural fire-resistant landscaping in development.

GOAL 5: Reduce threats to the public health and safety from hazardous materials and wastes and the transport of such materials.

Policy 5.1: Adopt Los Angeles County Hazardous Waste Management Plan by reference.

Policy 5.2: Strengthen emergency response plan for accidental atmospheric releases of hazardous materials in adjacent industrialized communities.

Policy 5.3: Promote the safe transportation and storage of hazardous materials in areas surrounding the city of Rolling Hills.

Policy 5.4: Educate homeowners on appropriate storage and use of hazardous materials.

GOAL 6: Strengthen Rolling Hills' short-term emergency response and long-term recovery capability.

Policy 6.1: Develop an Emergency Preparedness Plan for Rolling Hills that is comprehensive and responds to regional multi-jurisdictional emergency planning efforts.

Policy 6.2: promote greater public awareness and understanding of safety hazards and emergency preparedness and response procedures.

Policy 6.3: Promote the development of community of neighborhood self-help and disaster control groups to improve effectiveness of local emergency response, light search and rescue, and short-term medical care.

Policy 6.4: Improve inter-agency and multi-jurisdictional planning to ensure efficient and integrated emergency response capability to all disasters.

Policy 6.5: Promote improved cooperation with nonprofit and private sector emergency response organizations.

Policy 6.6: Maintain designated evacuation and disaster routes in Rolling Hills.

Policy 6.7: Develop appropriate land use and building regulation alternatives for areas heavily damaged in a disaster.

Mitigation Actions Matrix

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

Table: Mitigation Actions Matrix
(Source: Rolling Hills Planning Team)

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
MULTI-HAZARD ACTION ITEMS														
MH 1 - Continue policy to ensure mitigation measures are in place to safeguard critical facilities located in Rolling Hills.	City Manager, Planning Department	Ongoing	X				X	B	H	L	H	BFC, ZO	Y	Revised: action item, added Funding Source, Ranking, and Planning Mechanism
MH 2 - Adopt and enforce updates to the Los Angeles	City Manager, Planning Department,	Ongoing	X				X	B	H	L	H	BFC	Y	Revised: action item, added Funding Source, Ranking, and Planning Mechanism

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
County Building Code and Fire Code.	Los Angeles County Building & Safety Division (BSD)													
MH 3 - Develop additional building and reconstruction policies and requirements in the Building and Fire Code for post-disaster situations.	City Manager, Planning Department, BSD	1-5 years	X				X	B	M	M	M	BFC	Y	Revised: timeline, added Funding Source, Ranking, and Planning Mechanism, Status: Deferred from 2008 due to lack of staff and funding
MH 4 - Ensure compliance to rebuilding in conformance with applicable codes, specifications and standards.	City Manager, Planning Department	Ongoing	X			X		B			H	ZO, BFC, HMP	Y	Revised: added Funding Source, Ranking, and Planning Mechanism
MH 5 - Develop training and	City Manager, Planning	Ongoing	X	X				B, GF	H	M	H	*	Y	Revised: action item, added Funding Source, Ranking, and

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
information program for actions to take to mitigate against hazards on individual properties.	Department													Planning Mechanism
MH 6 – Integrate and coordinate with adjoining cities and ity's ser ice providers to develop Hazard Mitigation Plans that are consistent with the goals and framework of the ity's Hazard Mitigation Plan.	City Manager, Planning Department	Ongoing	X			X		B, GF	H	L	H	*		Revised: action item, added Funding Source, Ranking, and Planning Mechanism
MH 7 - Underground communications	City Manager, Planning Department	Ongoing	X		X			Speci al Utility	H	H	M	ZO, HMP	Y	Revised: action item, added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
and electric utility lines to reduce risk of arcing line in high winds, earthquake, and fire.								Fund, GR						
MH 8 - Review existing regulations to ensure adequacy in reducing the amount of future development in identified hazard areas.	City Manager, Planning Department	Ongoing	X	X	X			*	M	L	H	GP, HMP	Y	Revised: added Funding Source, Ranking, and Planning Mechanism
MH 9 - Provide adequate and consistent enforcement of ordinances and codes within and between	City Manager, Planning Department	Ongoing	X	X		X		*	L	H	H	GP, HMP	Y	Revised: added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
jurisdictions.														
MH 10 - Integrate the goals and action items from the ity's Hazard Mitigation Plan into existing regulatory documents and programs, where appropriate.	City Manager, Planning Department	Ongoing	X			X		*	M	L	M	GP, HMP	Y	Revised: action item, added Funding Source, Ranking, and Planning Mechanism
MH 11 - Coordinate and integrate hazard mitigation activities, where appropriate, with emergency operations plans and procedures.	City Manager, Planning Department	Ongoing	X			X		*	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 12 - Identify critical facilities at risk from hazard	City Manager, Planning Department	Ongoing	X	X	X	X	X	B	H	L	H	HMP	Y	Revised: timeline, added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
events.														
MH 13 - Enforce construction and subdivision design that can be applied to steep slopes to reduce the potential adverse impacts from development.	City Manager, Planning Department	Ongoing	X		X			B	H	L	H	ZO, BFC	Y	Revised: added Funding Source, Ranking, and Planning Mechanism
MH 14 - Develop public and private partnerships to foster hazard mitigation program coordination and collaboration in the city.	City Manager, Planning Department	Ongoing	X	X	X	X		*	H	L	H	HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 15 - Encourage the development of unifying organizations to	City Manager, Planning Department	Ongoing	X	X		X		*	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
ensure communication and dissemination of hazard mitigation information.														
MH16 - Provide new home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed through city bi-weekly newsletter.	City Manager, Planning Department	Ongoing	X	X				B	H	L	M	HMP	Y	Revised: added Funding Source, Ranking, and Planning Mechanism
MH 17 - Minimize the risk of erosion through	City Manager, Planning Department	Ongoing	X	X	X			*	H	L	H	GP, HMP	Y	Revised: Action Item, added Funding Source, Ranking, and Planning Mechanism

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
development of a Hillside Review Ordinance.														
MH 18 - Install and improve back-up power in critical facilities.	Utility Companies	Ongoing	X			X		*	H	H	H	GP, HMP	Y	Revised: timeline, Deferred due to lack of funding
MH 19 – Following an emergency, examine damage and update codes to mitigate against future disasters.	City Manager, Planning Department Los Angeles County Building and Safety Department	Ongoing	X		X	X		*	H	L	H	GP, HMP	Y	Revised: action item, added Funding Source, Ranking, and Planning Mechanism
MH 20 - Bury utility lines on Crest Road. Assist with funding as possible and revise Code Regulations in an effort to spearhead	City Manager, Southern California Edison Company, Cox Cable or other telecommunicat	1-5 years	X			X	X	*	M	H	M	HMP	Y	Revised action item, timeline, added Funding Source, Ranking, and Planning Mechanism, Deferred from 2008 due to lack of staff and funding

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
utility line burial projects.	ion companies as appropriate													
MH 21 - Minimize suffering and disruption caused by disasters.	City Manager, Planning Department	Ongoing	X	X				*	H	M	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 22 - Provide technical assistance to help the community develop disaster management operations capabilities.	City Manager Utility Companies, LACoFD, DMAC Area G Coordinator	Ongoing	X	X		X		*	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 23 - Determine temporary protection measures; install plastic sheeting on roofs, cover exterior openings such as	City Manager, Planning Department	Ongoing	X	X				*	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
windows or doors, draining trapped water in ceilings or draining accumulated flood waters, temporary shoring to avoid imminent building collapse or damage.														
MH 24 - Partner with other organizations and agencies in the community to identify grant programs and foundations that may support mitigation activities.	City Manager, Planning Department	Ongoing	X		X	X		*	MNA	M	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 25 - Allocate	City Manager	Ongoing	X			X		*	H	NA	H	GP,		Revised: added Funding

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
city resources and assistance to mitigation projects when possible.												HMP		Source, Ranking, and Planning Mechanism
MH 26 - Identify and pursue funding opportunities to develop and implement local mitigation activities.	City Manager	Ongoing	X			X		B	M	M	M	HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 27 – Following a disaster, determine which costs will be reimbursed to government for the demolition of government buildings.	City Manager	As Needed	X			X		B	H	L	M	HMP		Revised: action items, timeline, added Funding Source, Ranking, and Planning Mechanism
MH 28 - Ensure repairs or	City Manager, Planning	As Needed	X			X		B	M	L	M	HMP		Revised: added Funding Source, Ranking, and Planning

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
construction funded by Federal disaster assistance conforms to applicable codes and standards.	Department, Los Angeles County Building and Safety													Mechanism
MH 29 - Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population.	City Manager, Planning Department	Ongoing	X	X				*	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 30 - Identify opportunities for partnering with citizens, private contractors, and other jurisdictions to increase	City Manager	Ongoing	X	X		X		*	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
availability of equipment and manpower for efficiency of response efforts.														
MH 31 - Enhance outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to other hazards.	City Manager	Ongoing	X			X		B, GF	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 32 - Encourage implementation of wildfire mitigation	City Manager, Planning Department	Ongoing	X		X			*	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.														
MH 33 - Conduct a full review and update of the Hazard Mitigation Plan every 5 years by evaluating mitigation successes, failures, and updated hazard information.	City Manager, Planning Department	5 years	X					B, GF	M	M	H	HMP		Revised: action item, added Funding Source, Ranking, and Planning Mechanism
MH 34 – During next update to the EOP, establish a	City Manager, Planning Department	1-5 years				X		*	M	M	H	GP, HMP		Revised: action item, timeline, added Funding Source, Ranking, and Planning

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
committee representative of all areas of the City and surrounding areas that will include vets, pet store owners, the Humane Society, animal shelters, the Extension Office and other interested parties to work on animal-specific evacuation and sheltering needs.														Mechanism, Deferred from 2008 due to lack of staff and funding
MH 35 - Coordinate public education to increase awareness of hazards and opportunities for	City Manager, Planning Department	Ongoing		X				*	H	L	H	GP, HMP		Revised: timeline, added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
mitigation.														
MH 36 - Encourage interested individuals to participate in hazard mitigation planning and training activities.	City Manager, Planning Department	Ongoing		X				B	H	L	H	HMP		Revised: timeline, added Funding Source, Ranking, and Planning Mechanism, Status: participated in Peninsula Expo
MH 37 - Educate the public about procedures for reporting human-caused incidents.	City Manager, Planning Department, and City Service Providers	Ongoing		X		X		*	H	L	M	GP, HMP		Revised action item, timeline, added Funding Source, Ranking, and Planning Mechanism
MH 38 - Educate the public about emergency sheltering and evacuation procedures.	City Manager, Planning Department, and City Service Providers	Ongoing		X		X		*	H	L	H	GP, HMP		Revised: timeline, added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
MH 39 - Educate the public about hazards prevalent to their geographic location.	City Manager, Planning Department, and City Service Providers	Ongoing		X		X		B	H	L	H	HMP		Revised action item, timeline, added Funding Source, Ranking, and Planning Mechanism, Deferred from 2008 due to lack of staff and funding
MH 40 - Publicize the documents associated with emergency response and mitigation.	City Manager, Planning Department, And City Service Providers	Ongoing		X		X		B	H	L	H	HMP		Revised timeline, added Funding Source, Ranking, and Planning Mechanism
MH 41 – Develop and distribute maps of evacuation routes that will facilitate the commu ity's safe evacuation.	City Manager, Planning Department, And City Service Providers	Ongoing		X		X		*	H	H	H	HMP		Revised: timeline, added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
MH 42 - Develop informational literature on animal (including livestock) disaster plans and supply kits and have them available at City Hall.	City Manager, DMAC Area G Coordinator	Ongoing		X		X		*	H	L	H	HMP		Revised: action item, timeline, added Funding Source, Ranking, and Planning Mechanism
MH 43 - Distribute packets of information to all property owners of the city including the following information of property protection measures: Maintenance for Fire and Watershed Safety, Do It Yourself Planning	City Manager	3-5 years		X				*	H	M	M	GP, HMP	Y	Revised: action item, timeline, added Funding Source, Ranking, and Planning Mechanism, Deferred since 2008 due to lack of staff and funding.

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
for Emergency Supplies, Emergency Numbers, List of Roofers, and List of Retail/Wholesale Supply Vendors.														
MH 44 - Maintain materials at City Hall on disaster supplies kits and plans, etc.	City Manager City Service Providers	Ongoing	X	X		X		B	H	H	H	HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 45 - Work with the County Office of Emergency Services, the American Red Cross, the Board of Education, County Fire Department, churches and	City Manager City Service Providers	Ongoing	X	X		X		*	H	H	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
Social Services to hold work session to share information about local shelters. Information to include the site of each shelter, how many people it can house and feed, if it has back-up power available on site, completed site survey forms and types of resources that they have or that they need. This will benefit all areas of the City in the need to open shelters.														

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
MH 46 - Encourage residents to participate in existing LA County CERT Program in coordination with the Community Association.	City Manager, LACoFD	Ongoing	X	X		X	X	B	M	L	H	HMP		Revised: action item, timeline, added Funding Source, Ranking, and Planning Mechanism
MH 47 - Conduct occasional tabletop disaster exercises with local law enforcement, emergency managers, town and county officials, the LEPC and other disaster response agencies.	City Manager, City Service Providers	Ongoing (One conducted Dec. 2016)		X		X		B	H	L	H	HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
MH 48 - Conduct a detailed	City Manager Planning	3 - 5 years	X		X	X	X	*	M	H	H	GP, HMP	Y	Revised: timeline, added Funding Source, Ranking, and

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
vulnerability assessment in the future in order to accurately identify the extent of damages to vulnerable buildings, infrastructure, and critical facilities.	Department													Planning Mechanism, Deferred from 2008 due to lack of staff and funding
MH 49 – Seek funding to update the General Plan Safety Element in advance of the next Mitigation Plan update. (Note: as required in Senate Bill 1241, 2012)	City Manager, Planning Department	1-3 years	X	X	X	X	X	*	H	H	H	GP	Y	New
MH 50 – Seek funding to update	City Manager	1-3 years	X	X		X	X	*	H		H	HMP		New

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
ity's Emergency Operations Plan.														
MH 51 – Work with residents to establish a volunteer City HAM radio operator program utilizing City equipment.	City Manager	1-3 years					X	*	H	M	H	HMP		New
EARTHQUAKE ACTION ITEMS														
EQ 1 - Adopt County of Los Angeles earthquake Building Codes.	City Manager Planning Department	Ongoing	X			X		B	H	L	H	BFC	Y	Revised: added Funding Source, Ranking, and Planning Mechanism
EQ 2 - Minimize earthquake damage risk by retrofitting critical facilities owned by City as needed.	City Manager	Ongoing	X					*	H	H	H	*	Y	Revised: action item, Coordinating Organization, timeline, added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
EQ 3 - Integrate new earthquake hazard mapping data for the city and improve technical analysis of earthquake hazards as they become available.	City Manager Planning Department	Ongoing	X	X				*	M	H	H	GP, HMP	Y	Revised: timeline, added Funding Source, Ranking, and Planning Mechanism
EQ 4 - Allocate City resources and assistance to mitigation projects when possible.	City Manager	Ongoing	X			X		*	H	n/a	H	GP, HMP		Revised timeline, added Funding Source, Ranking, and Planning Mechanism
EQ 5 - Encourage reduction of non-structural and structural earthquake hazards in homes, school, and government	City Manager, Planning Department	Ongoing	X					*	H	M	H	HMP	Y	Status: moved from Multi-Hazard Action Items (MH 7) Revised: added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
offices.														
LAND MOVEMENT ACTION ITEMS														
LM 1 - Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	City Manager, Planning Department	Ongoing	X	X				*	H	M	H	GP, HMP	Y	Revised: Action Item, added Funding Source, Ranking, and Planning Mechanism
LM 2 - Identify safe evacuation routes in high-risk debris flow and landslide areas.	City Manager, LACoFD	Ongoing	X			X		*	H	L	H	GP, HMP		Revised: added Funding Source, Ranking, and Planning Mechanism
LM 3 - Limit activities in identified potential and historical	City Manager, Planning Department	Ongoing	X				X	*	H	L	H	GP, BFC, HMP	Y	Revised: added Funding Source, Ranking, and Planning Mechanism

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
landslide areas through regulation and public outreach.														
LM 4 - Improve data and mapping on specific landslide risks by: ing areas where riparian landslides may occur. ▪ le ing an inventory of locations where critical facilities, other buildings, and infrastructure are vulnerable to landslides. ing GIS to	City Manager, Planning Department, City Engineer, County of Los Angeles Public Works	Ongoing	X	X	X	X	X	GF	H	H	H	GP, BFC, HMP	Y	New

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
identify and map landslide hazard areas. ▪ lo ing and maintaining a database to track community vulnerability to landslides. ing vegetation in wildfire-prone areas to prevent landslides after fires (e.g., encourage plants with strong root systems).														
WILDFIRE ACTION ITEMS														
WF 1 - Continue to require Class A	City Manager, Planning	Ongoing	X	X		X		B	H	L	H	BFC	Y	Revised: action item, added Funding Source, Ranking, and

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
roofing standards and “draft hydrants” for new pools per Building and Fire Codes	Department													Planning Mechanism
WF 2 - Improve water systems to assist with wildfire and drought conditions.	City Manager, California Water Service Company	Ongoing	X		X			*	H	H	H	HMP	Y	Revised: Coordinating Organization, timeline, added Funding Source, Ranking, and Planning Mechanism
WF 3 - Inventory alternative firefighting water sources and encourage the development of additional sources.	City Manager, Planning Department	Ongoing	X	X				*	H	H	M	GP, HMP	Y	Revised: timeline, added Funding Source, Ranking, and Planning Mechanism
WF 4 - Enhance emergency services to increase the efficiency of	City Manager, LACoFD	Ongoing	X			X		*			M	GP, HMP		Revised: timeline, added Funding Source, Ranking, and Planning Mechanism

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
wildfire response and recovery activities.														
WF 5 - Increase communication, coordination, and collaboration between wildland/urban interface property owners, local and county planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs.	City Manager LACoFD	Ongoing	X	X		X		B	H	M	H	HMP		Revised: added Funding Source, Ranking, and Planning Mechanism, Status: Participated in Peninsula Expo
WF 6 - Work with LACoFD to seek	City Manager, LACoFD	1 year	X	X	X	X	X	B	H	L	H	HMP	Y	New

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
funding and develop a Community Wildfire Protection Plan (CWPP). The Plan must include certain components: **Collaboration** - must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties; **Prioritized Fuel Reduction** - must identify and														

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure; **Treatment of Structural Ignitability** - must recommend measures that homeowners and communities can take to reduce the ignitability of structures														

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	Building & Infrastructure: Does the Action Item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
throughout the area addressed by the plan.														
WF 7 - Work with Southern California Edison and LACoFD to seek funding for undergrounding of utility lines.	City Manager, LACoFD, Southern California Edison	1 year	X	X	X	X	X	B	H	H	H	B	Y	New
WF 8 – Provide fuel reduction/fire prevention training for Rolling Hills Community Association landscaping staff and homeowners.	Rolling Hills Community Association	Ongoing	X	X	X	X	X	RHCA	H	M	H	HMP		New
WF 9 - Distribution of wildfire safety and prevention	City Manager, LACoFD	Ongoing	X	X	X	X	X	B, GF	H	M	H	B		Revised: added Funding Source, Ranking, and Planning Mechanism, Deferred since

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
information to residents and businesses residing within identified forested land.														2008 due to lack of staff and funding, Status: Moved from MH 53
WF 10 – Publicize and Enforce Ordinance 345 (Abatement of Fire Fuel Hazards)	City Manager	Ongoing	X	X	X			B	H	L	H	B		New
DROUGHT ACTION ITEMS														
DR 1 – Inform residents of Landscape Efficiency Ordinance applicability and requirements and other water conservation methods	City Manager, Planning Department	Ongoing		X	X			B	H	L	H	HMP, ZO		New

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			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
DR 2 – Enforce Landscape Efficiency Ordinance city-wide	City Manager, Planning Department	Ongoing		X	X			B	H	L	H	HMP, ZO`		New
DR 3 - Replace existing landscaping and watering systems at City Hall with water saving materials and watering schedule/system	City Manager,	Ongoing			X			B	H	M	H	HMP	Y	New
DR 4 - Provide information regarding drought status and water saving mandates and requirements established by local water purveyor to city residents	City Manager	Ongoing		X	X			B	H	L	H	HMP		New

Section 9: Planning Process

Plan Methodology

DMA 2000 emphasizes the importance of participatory planning in the development of a Mitigation Plan. This Plan was written using the best available information from a wide variety of sources.

Throughout the planning process, the City made a concerted effort to gather information from City and County departments, as well as state and federal agencies, the Rolling Hills Community Association, the local business community, planning area residents, and other stakeholders.

Disaster Mitigation Act of 2000

Requirement §201.6(c) (1)

[The plan shall includ ...:

the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

The Planning Team solicited information from internal and external departments and agencies with specific knowledge of hazards and past historical events, as well as planning and zoning codes, ordinances, and recent planning decisions. The hazard mitigation strategies contained in this plan were developed through an extensive planning process involving local businesses and residents.

Following initial input by the Planning Team, the Plan was made available for input by outside agencies and the general public. Input gathered was incorporated into the Plan and included in the staff report to the Planning Commission. Input was incorporated into the plan and was submitted to Cal OES and FEMA for a conditional approval.

Upon receipt of an Approval Pending Adoption on January 4, 2019 from FEMA, staff presented the Plan on February 11, 2019 to the City Council for discussion and adoption. A copy of the City Council Resolution adopting the Plan appears later in this Section. Following adoption by the City Council, the Plan was re-submitted to FEMA for final approval which was issued on _____.

The rest of this section describes the mitigation planning process including: 1) plan writing phases, 2) stakeholder involvement; and 3) integration of existing data and plans.

Planning Process Phases

Throughout the project, the City followed their traditional approach to developing a policy document, including preparation and review of the First Draft Plan by the Planning Team. Comments were incorporated into the Second Draft Plan and made available to the public and outside agencies. Comments were incorporated into the Third Draft Plan and presented to the Planning Commission. Comments were incorporated into the Fourth Draft Plan and forwarded to Cal OES and FEMA for a conditional approval pending adoption by the City Council. Any mandated revisions were incorporated into the Fourth Draft Plan and presented to City Council. Comments and adoption documentation were incorporated into the Final Draft Plan and resubmitted to FEMA for final approval. Upon receipt of FEMA's Final Approval, the letter was added to the Final Plan along with documents from the City Council public meeting.

Figure: Planning Process Phases

Plan Writing Phase (First Fourth Draft Plan)	Plan Review Phase (Fourth Draft Plan)	Plan Adoption Phase (Fifth Draft Plan)	Plan Approval Phase (Final Draft Plan and Final Plan)	Plan Implementation Phase
• Planning Team input (research, meetings, writing) • Review of First Draft Plan • Changes incorporated into Second Draft Plan • Notice to public and outside agencies of the availability of the Second Draft Plan • Changes incorporated into Third Draft Plan • Presentation of Third Draft Plan to Planning Commission • Incorporated input into Fourth Draft Plan	• Fourth Draft Plan submitted to Cal OES and FEMA for Approval Pending Adoption • Incorporate FEMA-mandated revisions into the Final Draft Plan	• Public notice of upcoming City Council public meeting • Distribute Final Draft Plan to the City Council in advance of the public meeting • Present Final Draft Plan to the City Council • City Council Adopted Plan • Adoption and any comments incorporated into Final Draft Plan	• Submit Final Draft Plan to FEMA for Final Approval • Incorporate FEMA's Letter of Approval into the Final Plan.	• Conduct Planning Team meetings • Integrate mitigation action items into budget, CIP and other funding and strategic documents

Stakeholder Involvement

The stakeholders in this project included the Planning Team which served as the **primary stakeholders** consisting of representatives from the City and several service-providing outside agencies. The public, additional outside agencies, and the Planning Commission were involved as **secondary stakeholders** participating during the plan writing phase. All contributed greatly to the plan writing process.

Planning Team

The Planning Team first met on June 23, 2015 to review the updated requirements associated with DMA 2000 and to develop a work plan for creating the 2016 Plan. Additional Planning Team meetings were held on July 21, 2015 and September 15, 2015. The early meetings focused on identifying hazards and vulnerabilities, while the later meetings were dedicated to capturing the status of 2008 mitigation actions and development of new action items. In addition to Planning Team meetings, each member of the Team was involved in reviewing the Plan and assisted with data collection and other reference and historical materials.

Who Participated in Developing the Plan?

The Plan is the result of a collaborative planning effort between City's citizens, public agencies, non-profit organizations, the private sector, regional, and state and federal organizations. Public participation played a key role in development of goals and action items. The Planning Team guided the process of the planning phases identified above.

Table: Planning Team Timeline

	May 2015	June	July	August	September	October	November	December	January 2016	February November	December	January 2017	February	March December	January 2017	February December	January 2018	February May	June December	January 2019	February
Contracted with Emergency Planning Consultants (EPC)	X																				
Research and Writing of Plan	X																				
Planning Team Meetings		X	X		X																
Review and Comment on First Draft Plan									X	X											
Prepare and Distribute Second Draft Plan to Public and External Agencies for Input											X										
Present Third Draft Plan to Planning Commission												X									
Incorporate Input into Fourth Draft Plan and Submit to Cal OES and FEMA Approval Pending Adoption													X	X	X	X	X	X			
Prepare update to Fourth Draft Plan incorporating FEMA-mandated revisions																			X		
Receive FEMA Approval Pending Adoption																				X	
Brief City Council on Status of the Approval Process																				X	
Post Availability of the Final Draft Plan along with notice of City Council public meeting																				X	
Conduct City Council Public Meeting																					X
Forward City Council Resolution to FEMA																					X
FEMA Issues Final Approval																					
Incorporate FEMA Final Approval into Final Plan																					

Table: Planning Team Level of Participation

	Yolanta Schwartz, Chair	Kristen Raig	Art Beckler	Jeff Robinson	J Lopez	David Whitney	Laura Walters	Reece Souza	Kit Bagnell	Marvin Jackmon	Ray Pok	Scott Swendner	Dan Trejo	Faviola Ochoa	Connie Turner	Reynaldo Castro	Mike Harriel	Carolyn Harshman, Emergency Planning Consultants
Contracted with Emergency Planning Consultants (EPC)																		
Research and Writing of Plan	X																	X
Planning Team Meetings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Review and Comment on First Draft Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Prepare and Distribute Second Draft Plan to Public and External Agencies for Input																		X
Present Third Draft Plan to Planning Commission	X																	X
Incorporate Input into Fourth Draft Plan and Submit to Cal OES and FEMA Approval Pending Adoption																		X
Receive FEMA Approval Pending Adoption	X																	
Prepare Fourth Draft Plan incorporating FEMA-mandated revisions																		X
Brief City Council on Status of Approval Process	X																	

	Yolanta Schwartz, Chair	Kristen Raig	Art Beckler	Jeff Robinson	J Lopez	David Whitney	Laura Walters	Reece Souza	Kit Bagnell	Marvin Jackmon	Ray Pok	Scott Swendner	Dan Trejo	Faviola Ochoa	Connie Turner	Reynaldo Castro	Mike Harriel	Carolyn Harshman, Emergency Planning Consultants
Post Availability of the Final Draft Plan along with notice of City Council public meeting	X																	
Participate in City Council Public Meeting	X																	X
Incorporate Input from Council Meeting into Final Draft Plan																		X
Submit City Council Resolution to FEMA																		X
Receive FEMA Final Approval	X																	
Incorporate FEMA Final Approval into the Final Plan																		X

Planning Team Involvement

The Planning Team was responsible for the following tasks:

- ✓ Establish plan development goals
- ✓ Prepare timetable for plan completion
- ✓ Developing a strategy for public involvement
- ✓ Ensure plan meets DMA 2000 requirements, and federal and state guidelines
- ✓ Organize and oversee public involvement
- ✓ Solicit participation of government agencies, businesses, residents, and other stakeholders
- ✓ Gather information (such as existing data and reports)
- ✓ Develop, revise, adopt, and maintain plan
- ✓ Participate in Planning Team meetings and City County public meeting
- ✓ Reviewing multiple drafts of the Plan

The Planning Team identified and profiled hazards; determined hazard rankings; estimated potential exposure or losses; evaluated development trends and specific risks; and developed mitigation goals, objectives, and activities.

During its meetings the Planning Team gathered and shared information, assessed risks, identified critical facilities, developed mitigation strategies, and provided continuity throughout plan development to ensure the plan addresses jurisdiction-specific hazard vulnerabilities and mitigation strategies. Members communicated regularly by phone and email between group meetings.

The City will continue the Hazard Mitigation Planning Team following FEMA approval of the Plan. The Team will meet annually after the Plan is adopted to ensure implementation of the Plan. Members of the Team will provide project direction and oversight, assist with plan evaluation, and convene supplementary meetings as-needed.

Public Input and Outside Agency Involvement

Notification and solicitation of public input is identified in the Executive Summary under "Public Input". Copies of the notices, flyers, Planning Commission minutes, and newsletter are included in Part III: Mitigation Strategies - Planning Process attachments.

Several outside agencies were invited to and participated on the Planning Team – Los Angeles County Fire Department, Los Angeles County Sheriff's Department, Los Angeles County Building & Safety Department, Los Angeles County Disaster Management Area Coordinators (DMAC) Area G, Rolling Hills Community Association, Southern California Edison, Cox Cable, California Water Service, and Sempra Utilities. In addition to direct involvement on the Planning Team, notice was provided to additional outside agencies encouraging input to the Plan during the plan writing phase and prior to the decision-maker public meeting. Any comments received through that process are identified in the Table below including agency, name, position title and comments received. Outside agencies were informed of the opportunity to contribute during the plan writing phase via an email and web link from the Planning Team Chair (see below in Attachments).

Table: Public Input and Outside Agency Input to the Plan

Public/Agency	Name	Position Title	Comments
General Public			No Comments Received
City of Palos Verdes Estates	Anton Dahlerbruch	City Manager	No Comments Received
City of Rancho Palos Verdes	Tracy Bonano	Emergency Manager	Format recommendations incorporated
City of Rolling Hills Estates	Douglas Prichard	City Manager	No Comments Received
Palos Verdes Chamber of Commerce	Eileen Hupp	President/CEO	No Comments Received
Palos Verdes Peninsula Unified School District	Lydia Cano / Trent Bahadursingh	Deputy Superintendent	No Comments Received
Frontier Communications / Verizon	Dan Hayes	Design Engineer	No Comments Received

State and Federal Guidelines and Requirements for Mitigation Plans

Following are the Federal requirements for approval of a mitigation plan:

- ✓ Open public involvement, with public meetings that introduce the process and project requirements.
- ✓ The public must be afforded opportunities for involvement in identifying and assessing risk, drafting a plan, and public involvement in approval stages of the plan.
- ✓ Community cooperation with an opportunity for other local government agencies, the business community, educational institutions, and non-profits to participate in the process.
- ✓ Incorporation of local documentation including the local General Plan, the Zoning Ordinance, the Building Codes, and other pertinent documents.

The following components must be part of the planning process:

- ✓ Complete documentation of the planning process
- ✓ A detailed risk assessment on hazard exposures in the planning area
- ✓ A comprehensive mitigation strategy, which describes the goals and objectives, including proposed strategies, programs and actions to avoid long-term vulnerabilities
- ✓ A plan maintenance process, which describes the method and schedule of monitoring, evaluating and updating the plan and integration of the Plan into other planning mechanisms
- ✓ Formal adoption by the City Council
- ✓ Plan review by Cal OES
- ✓ Plan approval by FEMA

These requirements are identified in greater detail in the following plan sections and supporting documentation.

Through its consultant, Emergency Planning Consultants, the City had access to numerous existing mitigation plans from around the country, as well as current FEMA Mitigation Planning standards (386 series) and the State of California Mitigation Plan Guidance.
Other reference materials consisted of state, county, and city mitigation plans, including:

- ✓ County of Los Angeles Mitigation Plan (2014)
- ✓ State of California Multi-Hazard Mitigation Plan (2013)

Hazard specific research: The consultant and City staff collected data and compiled research on four hazards: earthquakes, land movement, wildfires, and drought.

Research materials came from the City's General Plan, the County of Los Angeles All-Hazards Mitigation Plan, and state agencies including Cal OES and CAL FIRE websites. The City staff conducted research by referencing long time City employees and locating information in historical documents. Information was also incorporated from after-action documentation provided for previous proclaimed and declared disasters. The City staff also played a critical role in capturing previously unidentified mitigation activities, current and new mitigation activities, hazard resources, and ongoing programs.

Public Participation

Upon completion of the Second Draft Plan, the document was posted on December 15, 2016 on the City's website. The public was encouraged to provide comments, submit questions, and to be actively engaged in the drafting of the plan. During that period, hard and electronic copies were available at City Hall located at 2 Portuguese Bend Road, Rolling Hills. Copies of the notices of availability are located at the end of this Section. Following input gathered from the public posting, the document was updated and reposted on December 21, 2016.

To facilitate communication between the Planning Team and residents, and to involve the public in ongoing planning and evaluation, the adopted Final Plan will be available to the public through a variety of venues, including posting on the City's website. The Planning Team recognizes that community involvement increases the likelihood that hazard mitigation will become a standard consideration in the planning area.

Hazard Mitigation Programs

The City adheres to the Stafford Act, the California Emergency Services Act, and DMA 2000, which require local governments to develop and implement mitigation plans. Cities and counties have intimate knowledge of local geography, and they are on the front line with personnel and equipment during a disaster. Local governments are in the best position to assess their strengths, weaknesses, opportunities, and constraints.

Coordination with Federal Policies

The City of Rolling Hills does not participate in the 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.

Current Mitigation Programs

The City intends to incorporate mitigation planning as an integral component of daily operations; the Hazard Mitigation Planning Team will continue its work by integrating mitigation strategies into the general operations of the City and partner organizations. After conducting a risk assessment (Section 3: Risk Assessment), the Team will identify additional policies, programs, practices, and procedures that could be modified to address mitigation activities. In addition, the City intends to implement the plan through its involvement in FEMA and Cal OES programs. Table: Capability Assessment - Existing Processes and Programs identify existing opportunities through which the Plan can be implemented.

Table: Capability Assessment - Existing Processes and Programs

Resource Type	Resource Name	Ability to Support Mitigation
Personnel	ity Manager's Of ice	*The City Manager is appointed by and serves at the pleasure of the Mayor and City Council, acts as the "CEO" of the City, providing responsible management and efficient administration of the City. The Manager provides professional leadership in executing and administering City Council policies and coordinating City activities. Other responsibilities include providing information and recommendations to the Council, monitoring the City's financial condition, responding to citizen inquiries and requests for information, assisting residents, overseeing City services and contracts, and supervising other City departments.*
Personnel	City Clerk	*The City Clerk administers democratic processes such as elections, access to city records, and all legislative actions ensuring transparency to the public. The City Clerk also act as the compliance officer for federal, state and local statutes including the Political Reform Act, the Brown Act and the Public Records Act.*
Personnel	Planning	*Planning includes the following functional areas: Building and Safety, Business Licenses, Code Enforcement, Economic Development,* *Housing, and Planning. A wide range of mitigation actions can be managed by this department.*
Personnel	Fire	*Fire related services are outsourced to Los Angeles County Fire Department. Public Safety also partners with a number of community organizations to help residents address various issues.*
Personnel	Law Enforcement	*Law enforcement services are outsourced to the Los Angeles County Sheriff's Department.*
Personnel	Hazard Mitigation Planning Team	*Hazard Mitigation Planning Team is made up of representatives from each of the departments and offices assigned mitigation action items in the Hazard Mitigation Plan. In addition to responsibility to prepare each of the 5-year plan updates as required by FEMA, the Planning Team is responsible for implementing, monitoring, and evaluating the plan during its quarterly meetings. The Planning Team plays a pivotal role in writing, implementing, and funding mitigation action items.*

Resource Type	Resource Name	Ability to Support Mitigation
Personnel	Finance	*This position is responsible for managing the City's financial operations in accordance with generally accepted accounting principles, laws and established policies and plans. The department consists of five programs to accomplish its objectives: Administration, Revenue Management, Accounts Payable, Accounting, Banking, and Treasury Services*
Plans	Emergency Operations Plan	*Emergency Operations Plan is a reference and guidebook to operations during a major emergency impacting Rolling Hills. 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 City's Hazard Mitigation Plan identifies the risks from natural 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 Rosemead. 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.*
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.*

Use of Existing Data

The Planning Team gathered and reviewed existing data and plans during plan development. Numerous electronic and hard copy documents were used to support the planning process:
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 Rolling Hills General Plan and Elements
www.rolling-hills.org
Applicable Incorporation: Land Use map, Community Profile section – geography, environmental, population, housing, transportation and demographic data

City of Rancho Palos Verdes General Plan and Elements
https://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 Torrance General Plan and Elements
https://www.torranceca.gov/our-city/community-development/general-plan
Applicable Incorporation: Land Use map, Community Profile section – geography, environmental, population, housing, transportation and demographic data

County of Los Angeles General Plan and Elements
http://planning.lacounty.gov/generalplan/generalplan
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.lacoa.org
Applicable Incorporation: Information about hazards in the County contributed to the hazard-specific sections in the City's Mitigation Plan.

California State Hazard Mitigation Plan (2013)
www.caloes.ca.gov
Applicable Incorporation: Used to identify hazards posing greatest hazard to State.

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

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

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

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

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

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

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

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

These documents are updated as needed to reflect the mitigation strategies identified in Section 8: Mitigation Strategies.

Federal Data

A variety of federal data was collected and used throughout the mitigation planning process:

- ✓ Census data
- ✓ FEMA "How To" Mitigation Series (386-1 to 386-9)
- ✓ National Oceanic and Atmospheric Administration Statistics

The Planning Team also examined public laws and programs (such as the National Flood Insurance Program) during plan development.

Plan Adoption

The Planning Team chose to send the Plan first to Cal OES and FEMA for a joint review and conditional approval prior to distributing the Second Draft Plan for external review and presentation of the Third Draft Plan to the City Council for adoption.

Adoption of the plan by the City Council demonstrates the City's commitment to meeting mitigation goals and objectives. A governing body's adoption legitimizes the plan and authorizes responsible entities within the City to execute their responsibilities. The resolution of adoption by each City Council is located in this Section.

Public Meetings

On January 17, 2017, the Rolling Hills Planning Commission received a presentation on the Third Draft Plan. The Commission voted to recommend that the City Council adopt the updated Mitigation Plan. Input gathered during the meeting was incorporated into the Fourth Draft Plan

and submitted to Cal OES and FEMA for a conditional approval (pending adoption by the City Council).

Upon receipt of conditional approval from FEMA, the Fifth Draft Plan was posted for review and the City Council public meeting noticed. The Planning Team prepared a staff report outlining the planning process and any comments gathered since the posting of the Fifth Draft Plan in advance of the City Council public meeting. On February 11, 2019, the Rolling Hills City Council heard the Mitigation Plan item and voted to _____ (adopt) the Plan.

Invitation Process

The Planning Team identified possible public notice sources. The Agenda Item concerning this Plan was posted on the website and at City Hall.

Attachment: City Council Resolution

Attachment: Planning Commission Notice and Minutes

Attachment: Planning Team Sign-In Sheets

SIGN IN SHEET

Hazard Mitigation Plan Update 2015- Team Meeting - Tuesday., June 23, 2015 @ 2:30PM
ROLLING HILLS CITY HALL, 2 PORTUGUESE BEND RD., ROLLING HILLS

NAME/COMPANY (if applicable)	ADDRESS	PHONE	E-MAIL
CAROLYN HARSHMAN	SAN DIEGO	858 922-6964	EPC@PACBELL.NET
Jeff Robinson/ARRA G	3861 Carson St, #106, Torrance, CA 90503	310 316 0055	jrobinson@arrag.inco.org
Yolanta Schwartz City of RH	Yschwartz@cityofrh.net 2 Portuguese Bend Rd	3103771521	Yschwartz@cityofRH.net
DAN TREJO	2632 W. 237th ST. TORRANCE	310-257-1425	dtrejo@calwater.com
Rosemary Lackow City of RH	—	310 - 377 1521	
DOUGLAS SHIVE LASD	— LOMITA STATION	310 539-1661	DSHIVE@LASD.ORG
REECE SOUZA	LOMITA STATION	(310)539-1661	RWSOUZA@LASD.ORG
SCOTT SWENDNER / COX	43 PENINSULA CNTR RHE	310 265 5874	SCOTT.SWENDNER@COX.COM
MARVIN JACKMON / SCE	505 MAPLE Ave. TORRANCE	626 388-7462	MARVIN.JACKMON@SCE.COM
LAURA WALTERS / LA County Fire	1650 W. 162nd St. Gardena 90247	310 - 217-7074	LWALTERS@FIRE.LACOUNTY.GOV
J. Lopez / County of LA Fire / Forestry	12605 Osborne St. Pacoima, CA 91331	(818) 890-5758	J.Lopez@fire.lacounty.gov
KIT BAGNELL LACO B&S	24320 Narbonne Ave, Lomita	310 534 3760	kbagnell@dpw.lacounty.gov

SIGN IN SHEET 2:00

Hazard Mitigation Plan Update 2015- Team Meeting - Tuesday., July 21, 2015 @ 2:00PM
ROLLING HILLS CITY HALL, 2 PORTUGUESE BEND RD., ROLLING HILLS

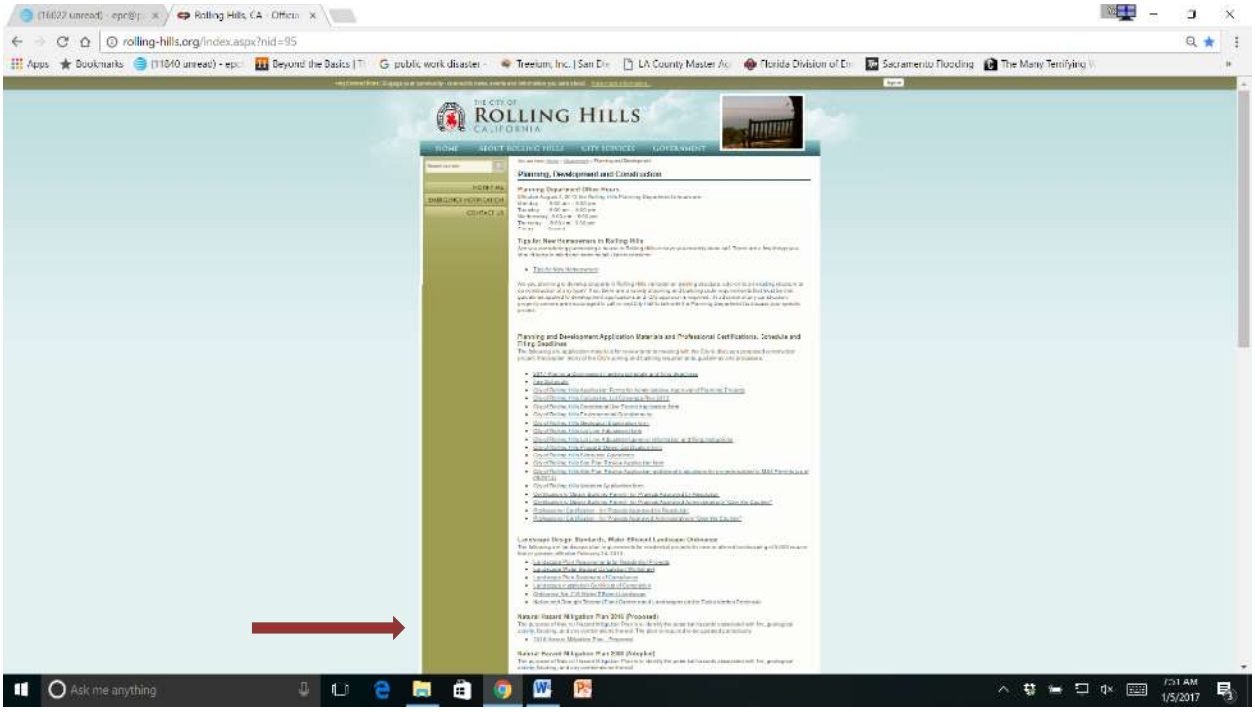
NAME/COMPANY (if applicable)	ADDRESS	PHONE	E-MAIL
David Whitney LACoFD	12605 Osborne St. Pacoima 91331	818-890-5785	David.Whitney@fire.lacounty.gov
J. Lopez, LA Co FD	12605 Osborne St. Pacoima 91331	(818) 890 5758	J.Lopez@fire.lacounty.gov
Jeff Robinson, ARHAB	3858 Carson St #106, Torrance 90503	(310) 316-0055	jrobinson@arhab-hoa.org
DAN TREJO	21632 W. 237th ST. TORRANCE	(310) 257-1425	dtrejo@calwater.com
Rosemary Lackow	City Hall RH		
Faviola Ochoa	555 Fifth St, LA, CA 90013	(213) 244-2720	faviochoa@sempracutilities.com
Yolanta Schwantz	City of RH - Staff		
Kristen Reis	1 Portuguese Bend Rd	310/544-6222	kreis@rhca.net
Art Beckler	" "	" "	abeckler@rhca.net
Ray Cruz	City Mgr. City Hall		
LAURA WALTERS	16500 ex. 162nd St, Gardena	310-217-7014	LWALTERS@fire.lacounty.gov

SIGN IN SHEET

Hazard Mitigation Plan Update 2015- Team Meeting - Tuesday., July 21, 2015 @ 2:30PM
ROLLING HILLS CITY HALL, 2 PORTUGUESE BEND RD., ROLLING HILLS

NAME/COMPANY (if applicable)	ADDRESS	PHONE	E-MAIL
Rebecca Silva (LACoSheriff)	26123 Narbonne Av	(310)53, [illegible]	September 15, 2015
LAURA WALTERS	1630 W 102nd St Gardena 90247	(323) 247-7074	L.walters@fire.lacounty.gov
Jeff Robinson, Area G	3808 Carson St #102, Torrance 90503	(310) 316-0055	jrobinson@mreag-lacoa.org
Art Beckler	RHCA 1 PB Rd. RH	(310) 544-6222	a.beckler@rhca.net
Kristin Raig	RHCA " "	(310) 544-6222	Kraig@rhca.net
Ray Poe, SCE	Interim Pub Affairs mgr.		-
Fabiola Ochoa	So. Ca. Gas. 555 5th St. LA.	(213) 244 CA 90013 2720	fochoa@semprautilities.com
City Reps:			
Ray Cruz City mgr.		(310) 377-1521	rcruz@cityofrh.net
Yolanda Schwartz Planning Director		"	ys@cityofrh.net
Rosemary Lackow, Planning Asst		"	rlackow@cityofrh.net

Attachment: Website Posting of Plan in Plan Writing Phase (posted on December 15, 2016 and updated on 12/21/16)



Attachment: Email Invitation to Planning Team Members and Outside Agencies to Review and Provide Input on First Draft Plan (see Credits for Planning Team members and Outside Agency Involvement for agency, name, and position titles)

DATE: OCTOBER 11, 2016
TO: PLANNING TEAM, Rolling Hills Local Hazard Mitigation Plan Update
OUTSIDE AGENCIES

The draft Local Hazard Mitigation Plan (dated 10.10.16) for the City of Rolling Hills, updated as a result of Planning Team meetings is ready for your review and input.

Please note that there are four areas of threat addressed in the plan: Earthquake, Land Movement, Wildfire, and Drought. See also the list of mitigation actions in Part III of the Plan.

The link to the plan document on drop box is:
https://www.dropbox.com/sh/r7pxesaqoo9gua0/AADhkcHZBZ6NryKaBBWCH5tOa?dl=0
If you have difficulty accessing the document, please contact: Ewa Nikodem, City of Rolling Hills at (310) 377-1521

Please send your comments to the undersigned at rlackow@cityofrh.net no later than Monday, October 25th.

If you have some specific text corrections or revisions, please feel free to provide in a "track-change" format.

If you are no longer the representative from your agency/company who is handling this, please pass on, or advise and we will contact that person.

Thank you again for your assistance.

Rosemary Lackow, Planning Assistant
City of Rolling Hills
2 Portuguese Bend Road, Rolling Hills, CA 90274

Attachment: Flyer Distributed at Peninsula Preparedness Safety Fair (dated October 28, 2015)

City of Rolling Hills INCORPORATED JANUARY 24, 1957

COMING SOON FOR PUBLIC REVIEW

CITY OF ROLLING HILLS
(DRAFT) HAZARD MITIGATION PLAN

The City of Rolling Hills Draft Hazard Mitigation Plan is nearing completion and will soon be ready for public review.

Hazard Mitigation Plans are required of all cities in the United Stated. Hazard mitigation plans assist communities in reducing risk from hazards by identifying resources, information, and a strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the City.

When the Draft Plan is completed, it will be available for public review and a public input meeting will be scheduled. Stay tuned for more information about the Rolling Hills Hazard Mitigation Plan in the City newsletters.

For more information, contact City Hall at (310) 377-1521

October 28, 2016

City of Rolling Hills Newsletter (December 7, 2016)

City of Rolling Hills Newsletter

office: (310) 377-1521 - fax: (310) 377-7288
www.RollingHills.org

December 7, 2016 — Issue No. 16-23

Wishing you a Wonderful Holiday Season and a Happy New Year

The Rolling Hills City Council and Staff wish all residents a wonderful Holiday Season and all the best for the coming year! During the holiday season, City Hall will be closed on Friday, December 23rd, Monday, December 26th and Monday, January 2nd.

Holiday Trash Collection Schedule

There will be no trash or greenwaste collection on Monday, December 26th or Monday, January 2nd in observance of the Christmas and New Year holidays. Residents who normally receive service on Monday, will be serviced on Tuesday; and those who receive service on Tuesday, will be serviced on Wednesday. Normal collection schedule will resume on Thursday both weeks.

Christmas Tree Recycling December 27 – January 13

To participate, place your tree with decorations and candle removed, next to your greenwaste and Republic Services will recycle it. Flocked trees and trees coated with fire retardant will be accepted. Please cut trees over six feet in half. **Do not place trees in plastic bags.** If you have any questions, please contact Republic Services' Customer Service Department at 1-888-742-5234 or Rolling Hills City Hall at 310-377-1521.

Caballeros Holiday Red Carpet Lunch

The Caballeros Holiday Red Carpet Lunch is scheduled for **Wednesday December 14 at 12:00 noon** at the home of Jeff and Melanie MacLean, 9 Williamsburg Lane. Cost is $25 per person. RSVP to Pam Crane at 310-377-7655 or by e-mail at pamcrane@cox.net

Women's Club Day at the Races

The Women's Club is planning a Day at the Races at Santa Anita Race Park on Thursday, January 26, 2017. Cost $70 per person includes box lunch and transportation by charter bus. Open to all residents. To sign up, pick up an information sheet at the RCHA Office or City Hall. For information contact Myrna Frame at 310-541-2468 or curtismyrna@verizon.net. RSVP's due by December 15th.

City of Rolling Hills: Hazard Mitigation Plan Update

On Tuesday, January 17, 2017 the public is invited to hear a presentation and provide input to the Rolling Hills Planning Commission regarding a draft of the proposed update of the City of Rolling Hills Hazard Mitigation Plan. The meeting will begin at 6:30 p.m. in the Council Chamber at the City Hall. A copy of the draft Plan will be available electronically on the City's web site at www.rolling-hills.org and a paper copy will also be available to view at City Hall, after December 15, 2016.

If you have any questions regarding the proposed updated Hazard Mitigation Plan, please call the City Hall at 310-377-1521.

ROLLING HILLS CRIMES REPORTED

For the time period November 13-26, 2016

No crimes reported.

Beware of Mail and Package Theft

It is always good to be aware that mail and packages that are delivered to your home are vulnerable to theft; especially during the holiday season. The City of Rolling Hills would like to remind residents to take extra care this time of year when having mail and packages delivered to their residence.

Promptly retrieve your mail, especially if you are expecting a check. If you can't pick up your mail each day, ask a trusted friend or neighbor to do it for you. You can also take your mail to a blue US Postal Service collection box; however, if the box is full, do not force your mail in the box because thieves have used tongs to pull mail from an overly stuffed mailbox. You can further protect yourself by taking your mail to a post office and handing it to a postal worker. Additionally, the US Postal Service can also hold your mail if you'll be traveling during the holidays. Another good option is to purchase a mailbox with a lock. For a list of approved locking mailboxes, contact the RHCA at 310-544-6222.

For outgoing mail, do not leave mail with checks or money orders in your personal mailbox for pickup by the mail carrier and never send cash in the mail. Additionally, do not leave packages on your front porch for pick up by private carriers. If you are sending a package, let the person you are sending it to know that it is coming and when to expect it so arrive so they can make arrangements for pick up. Also, be sure to insure any packages you are sending for the replacement cost of the items shipped.

If you are a victim of mail theft—report it! If you receive mail with the contents missing or fail to receive mail you were expecting, you may be a victim of mail fraud. Contact the sender first to be sure the items were sent properly. If you determine the sender was not at fault, immediately file a report with the LA County Sheriff's Department Lomita Station and US Postal Service Inspection Service so it can be investigated accordingly.

RHCA ANNOUNCEMENTS

Save the Date....RHCA Annual Meeting

The Rolling Hills Community Association Annual Meeting will be held at 7:30 p.m. on Wednesday, January 18, 2017 at the South Coast Botanic Garden, 26300 Crenshaw Blvd. Rolling Hills Estates.

License Agreement Requests

The RHCA advises the following regarding requests for license agreements to use easements. **APPROVED: 40 Eastfield Drive** for utility box in road easement. **PENDING: 17 Georgeff Road** for as-built retaining wall. **DENIED:** None.

UPCOMING CITY MEETINGS

Planning Commission Meeting
12/20/16 at 6:30 p.m.
City Council Meeting
01/09/17 and 01/23/17 at 7:00 p.m.
Traffic Commission Meeting
01/26/17 at 6:30 p.m.

City of Rolling Hills Newsletter

office: (310) 377-1521 • fax: (310) 377-7288
www.Rolling-Hills.org

December 19, 2018 *Issue No. 18-24*

Wishing you a Wonderful Holiday Season and a Happy New Year

The Rolling Hills City Council and Staff wish all the residents a wonderful holiday season and all the best for the coming year! During the Holiday Season, City Hall will be closed on Monday, December 24th, Tuesday, December 25th and Tuesday, January 1st.

REMINDER: No Fireworks allowed in the City

Please remember that all fireworks and explosive devices are prohibited. Should you observe fireworks being used, please contact Sheriff's Department at 310-589-1661 or the LA County Fire Department at 310-377-1584.

Rolling Hills ADA Survey – 7 Week Countdown

The City of Rolling Hills is preparing its Americans with Disabilities Act (ADA) Self-evaluation and Transition Plan. As part of this process the City is seeking public, stakeholders input regarding accessibility of programs, services, and activities offered to the public.

Examples of programs, services, and activities might include obtaining a permit, paying a fee, participating in a recreational program, or attending a public meeting. The goal of the transition plan is to eliminate barriers to access services and programs for persons with disabilities.

You can provide your input via survey. The survey is available from December 3, 2018 through February 4, 2019. Surveys are posted on the City's website at: www.rolling-hills.org > Government > Risk Management/ ADA Compliance or https://adaconsultants.az1.qualtrics.com/jfe/preview/SV_5j446K5dqVZ9Gf3?Q_SurveyVersionID=current&Q_CHL=preview

The online survey using the web address above is the fastest way to fill out the survey, however, for those that are more comfortable with filling out the survey by hand, you can print the survey from our website, complete it and return to the City Hall. Hard copies are also available at City Hall. If you have any questions, please contact Julia Stewart, Rolling Hills ADA Coordinator, at jstewart@cityofrh.net or 310-377-1521.

Holiday Trash Pick-up Schedule

With Christmas Day and New Year's Day falling on Tuesday this year, trash and greenwaste collection services will be collected on Wednesday instead. Please note that Republic Services will be collecting trash and green waste on Monday, December 24th and Monday, December 31st.

Christmas Tree Recycling Program

December 27th through January 21st

To participate, place your tree next to your green waste, with decorations and stands removed. Republic Services will transport it to a facility where it will be used for mulch, compost, and landfill cover. Flocked trees and trees coated with fire retardant will be accepted. Please cut trees over six feet in half. Do not place trees in plastic bags. If you have questions, please contact Republic Services Customer Service Department at 1-888-742-5234.

Hazard Mitigation Plan

The City of Rolling Hills prepared a draft hazard mitigation plan. The plan is available at City Hall or on the City's website at www.rolling-hills.org. The purpose of the plan is to effectively address natural hazards that may exist in a community and assess potential impacts from natural disasters. The draft plan is currently being reviewed by the Federal Management Agency (FEMA) and the City expects to receive feedback from FEMA. The draft final plan will be available for public review and discussed at a City Council meeting. Upcoming newsletters will have more information on the availability of the final plan with the date of the City Council meeting.

General Municipal Election

Tuesday, March 5, 2019

At the close of the nomination period on December 7, 2018, there were not more candidates than officers to be elected. The City Council will meet on December 19, 2018 to either make the appointments to the office and cancel the election or direct an election to be held.

City of Rolling Hills INCORPORATED JANUARY 24, 1957

NO. 2 PORTUGUESE BEND ROAD
ROLLING HILLS, CA 90274
(310) 377-1521
FAX (310) 377-7288

REGULAR MEETING
OF THE PLANNING COMMISSION
CITY OF ROLLING HILLS
6:30 PM
TUESDAY, JANUARY 17, 2017
ROLLING HILLS CITY HALL
2 PORTUGUESE BEND ROAD, ROLLING HILLS, CA 90274

1. CALL MEETING TO ORDER

2. ROLL CALL

3. APPROVAL OF THE AGENDA

4. PUBLIC COMMENTS ON MINUTES AND ANY ITEM NOT ON THE AGENDA

5. APPROVAL OF MINUTES

   A. December 20, 2016, Regular Meeting of the Planning Commission

6. REQUEST

   A. REQUEST FOR MINOR MODIFICATION TO A PREVIOUSALY APPROVED PROJECT IN ZONING CASE NO. 880 AT 15 PORTUGUESE BEND ROAD.

7. PUBLIC HEARINGS ON ITEMS CONTINUED FROM A PREVIOUS MEETING

   A. ZONING CASE NO. 914. PER THE REQUEST OF THE APPLICANT IT IS RECOMMENDED THAT THIS CASE BE CONTINUED TO FEBRUARY 21, 2017 FIELD TRIP HEARING.
   Request for a Site Plan Review and Conditional Use Permits for gradng and construction of a new residence, garage and basement, swimming pool and other miscellaneous amenities; and CUP for a stable with corral, tennis court and a guest house in Zoning Case No. 914 located at **11 Upper Blackwater Canyon Road**.

8. NEW PUBLIC HEARINGS

A. **ZONING CASE NO. 915**. Request for a Site Plan Review to construct 1,750 sq. ft. home addition and attached 441 square foot garage, not to exceed 5' high walls and grading related to a proposed stable, home additions and for "as graded" unpermitted pathways; Conditional Use Permit to cnstruct a 5,368 sq. ft. stable with 3,840 sq. ft. loft, 4,300 sq. ft. corral and 2,290 sq. ft riding ring and expand an existing second driveway to 20-ft; Variances to encroach with the residential and garage addition into the front yard setback and to exceed the dsturbance on the lot from 47.9% to 55.6%. Also proposed is to construct a third new paved driveway for access to the stable from Middleridge Lane North. The subject property is located at 1 Middleridge Lane North, (Lot 15, 16, 17-MR), Rolling Hills, CA, (Cipolla). The project has been determined to be categorically exempt pursuant to the California Environmental Quality Act (CEQA), Section 15303.

9. SCHEDULE OF FIELD TRIPS (February 21, 2017)

11 Upper Blackwater Canyon
1 Middleridge Ln N.
11 Saddleback Road

10. PUBLIC FORUM

A. PRESENTATION AND DISCUSSION ON THE DRAFT HAZARD MITIGATION PLAN UPDATE

B. DISCUSSION ON POTENTIAL AMENDMENTS TO THE CITY'S VIEW PRESERVATION ORDINANCE

11. ITEMS FROM STAFF

A. Selection of two members of the Planing Commisison to an Ad Hoc Committee for the purpose of reviewing construction of stables, (oral).

12. ITEMS FROM THE PLANNING COMMISSION

13. ADJOURNMENT

In compliance with the Americans with Disabilities Act (ADA), if you need special assistance to participate in this meeting due to your disability, please contact the City Clerk at (310) 377-1521 at least 48 hours prior to the meeting to enable the City to make reasonable arrangements to ensure accessibility and accommodation for your review of this agenda and attendance at this meeting.

Documents pertaining to an agenda item received after the posting of the agenda are available for review in the City Clerk's office or at the meeting at which the item will be considered.

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Agenda Item No. 5-A
Meeting Date: 02-21-17

MINUTES OF A
REGULAR MEETING
OF THE PLANNING COMMISSION
OF THE
CITY OF ROLLING HILLS
JANUARY 17, 2017

CALL MEETING TO ORDER

A regular meeting of the Planning Commission of the City of Rolling Hills was called to order by Chairman Chelf at 6:34 p.m. on Tuesday, January 17, 2017 in the City Council Chamber, at City Hall, 2 Portuguese Bend Road, Rolling Hills, California. Chairman Chelf introduced Jana Cooley as the City's newest member of the Planning Commission and welcomed her to the Commission.

ROLL CALL

Commissioners Present:	Cardenas, Cooley, Kirkpatrick, Seaburn and Chairman Chelf.
Commissioners Absent:	None.
Others Present:	Yolanta Schwartz, Planning Director. Raymond R. Cruz, City Manager. Natalie Karpeles, Assistant City Attorney. Julia Stewart, Assistant Planner. Heidi Luce, City Clerk. Gary Wynn, Wynn Engineering. Howard Weinberg, Attorney (for 18 Portuguese Bend Road). Tavisha Nicholson, Bolton Engineering. Emily and Chaz Cipolla, 1 Middleridge Lane North. Carolyn Harshman, Environmental Planning Consultants. Rosie Lackow, Assistant Planner. Leah Mirsch, 4 Cinchring Road. Tina Greenberg, 32 Portuguese Bend Road. Marcia Schoettle, 24 Eastfield Drive. Fenton Taylor, 49 Saddleback Road.

APPROVAL OF THE AGENDA

Approved as presented.

PUBLIC COMMENTS ON MINUTES AND ANY ITEM NOT ON THE AGENDA

None.

Nicholson stated that because of the steepness of the slope to create more separation would require taller walls.

Chaz and Emily Cipolla, 1 Middleridge Lane North (property owners) addressed the Planning Commission to further explain the project. Ms. Cipolla stated that they intend to keep their 10 horses on the property and they require a lot of space for the equipment they have for those horses.

Following staff's presentation and public testimony, the members of the Planning Commission determined that a site visit should be scheduled to provide the members of the Planning Commission with further understanding of the applicant's request in Zoning Case No. 915 at 1 Middleridge Lane North. The public hearing was continued. Commissioner Cardenas returned to the dais.

SCHEDULE OF FIELD TRIPS

The Planning Commission scheduled a field trip to the following properties to be held on Tuesday, February 21, 2017 beginning at 7:30 a.m.

11 Saddleback Road
11 Upper Blackwater Canyon
1 Middleridge Lane North

NEW BUSINESS

PRESENTATION, DISCUSSION AND PUBLIC FORUM ON THE DRAFT HAZARD MITIGATION PLAN UPDATE.

Chairman Chelf introduced the item and asked for staff's comments. City Manager Cruz stated that State and local governments are required to maintain a Hazard Mitigation Plan and update it every five years per the Federal Disaster Mitigation Act (DMA) of 2000. He stated that the plan documents the City's hazard mitigation planning process and identifies hazards, potential loses, mitigation needs, goals and strategies; and supplements the City's comprehensive emergency management program. He noted that without an updated Hazard Mitigation Plan, cities are not eligible for funds from the Federal Emergency Management Agency (FEMA) in the event of a natural disaster.

Mr. Cruz stated that through a RFP process, the City selected Carolyn Harshman to help with preparation of the plan which is divided into four major areas: Background, Hazard Analysis, Mitigation Strategies and Appendices. He stated that in order to assist with preparation of the plan a mitigation planning team was assembled including representatives from, the Rolling Hills Community Association, California Water Service Company, Southern California Edison, Los Angeles County Sheriff's Dept., Los Angeles County Fire Dept., Los Angeles County Building and Safety and others; as well as the City's part-time Planning Assistant, Rosie Lackow. He stated that the team met several times to identify hazards, profile the hazards, estimate the inventory at risk, develop mitigation strategies; and ultimately prepare a plan for implementation.

Mr. Cruz then reviewed the public outreach efforts the City engaged in since September 2015 including publication in the City's citywide newsletter, posting information on the City's web site and having material available at the Prepared Peninsula Emergency Preparedness Expo held in November 2016. He

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stated that the primary areas of focus in developing the plan included earthquakes, wildfires, land movement and drought. He further reviewed the identified goals, which include: protecting life and safety; enhancing public awareness; protecting natural systems; increasing partnerships and implementation; and improving emergency services. He stated that to date, no public comments or input has been received on the plan. He stated that presenting the plan at a public meeting before the Planning Commission is part of the public participation process and once the comments are received, the Plan will be forwarded to California Office of Emergency Services (CalOES) and FEMA for their review and comment and once that is received it will be presented to the City Council for final adoption.

Carolyn Harshman, CEM, Emergency Planning Consultants reviewed the background as to why the Federal Disaster Mitigation Act (DMA) was adopted in 2000 stating that any entity that is funded through taxation is required to have a Hazard Mitigation Plan and to update the plan every five years. She stated that she prepared the City's first Hazard Mitigation Plan and in the process of updating the plan, the hazards are reviewed for any changes and in Rolling Hills' case, there weren't any major changes. She further reviewed the update planning process, which included a planning group consisting 20 members from a variety of different areas within the city including the City's service providers; public outreach; and the review process. She stated that the mitigation actions are the core of the plan and make up the bulk of the plan.

Ms. Harshman then reviewed the risk assessment, which highlights earthquakes, land movement, wildfire and drought. She reviewed the potential for earthquake events on the Southern San Andreas fault, the Puente Hills fault and the Newport-Inglewood fault which could all impact Rolling Hills and showed a simulation of an catastrophic event on the Southern San Andreas fault and its potential impact on the areas along the fault. With regard to wildfire hazard, she noted that the City is located entirely in an area designated the highest fire rating - Very High Fire Hazard Severity Zone (VHFHSV) which presents a significant potential threat.

Commissioner Kirkpatrick commented that it was insightful to read the background and history behind the potential hazards, specifically regarding earthquakes.

Ms. Harshman commented that one of the recommendations included in the Hazard Mitigation is that the City to update the technical background report when the Safety Element of the General Plan is updated. Planning Director Schwartz commented that one of the mitigation measures is to update the Safety Element of the City's General Plan.

Chairman Chelf called for public comment.

Leah Mirsch, 4 Cinchring Road inquired as to why flood isn't included as one of the potential hazards.

Ms. Harshman commented that in working with the Planning Team is was determined that although there may be some areas prone to localized flooding, it would likely not reach the extent that would result in a major disaster declaration for the City of Rolling Hills.

Tina Greenberg, 32 Portuguese Bend Road commented that when contacting an insurance company to inquire about getting flood insurance, it was explained to her that the City is not in a flood zone and

would not qualify for flood insurance. Ms Harshman further explained that if the City were to declare flood as a major impact area it would trigger a requirement to prove the point.

Hearing no further public comments, Chairman Chelf called for a motion. Commissioner Seaburn moved that the Planning Commission receive and file the DRAFT Hazard Mitigation Plan Update. Commissioner Kirkpatrick seconded the motion, which carried without objection.

DISCUSSION ON POTENTIAL AMENDMENTS TO THE CITY'S VIEW PRESERVATION ORDINANCE.

Chairman Chelf introduced the item and asked for staff's comments. Planning Director Schwartz stated that there will likely be several meetings necessary to review and discuss this topic. She explained that the staff report contains a "Decision Table" designed as a starting point for focusing the discussion on issues before the Planning Commission. She noted that the Decision Table includes the issue under consideration, the current ordinance language regarding the issue and the proposed concept language that came from the DRAFT ordinance prepared by Spencer Karpf. She commented that the Decision Table is designed to be a starting point and the Planning Commission should review the items point by point to determine how to move forward in amending the Ordinance including public input in the process. She commented that there are areas in Mr. Karpf's DRAFT ordinance that may or may not be feasible and after discussion amongst the Planning Commission and taking public input, the City Attorney's office will review it for legality and draft an Ordinance for consideration based on those discussions.

Planning Director Schwartz reviewed the background on this matter stating that after Measure B, which amended the City's View Preservation Ordinance, was adopted by the voters in 2013, it became apparent that there were some flaws in the Measure, which made it difficult to interpret and apply. Following several meeting of the Planning Commission and City Council, administrative regulations interpreting Measure B were adopted and an ordinance was adopted making some other modifications to the City's view preservation ordinance. Recognizing that there were still difficulties in applying Measure B, the City Council created an ad hoc committee consisting of Councilmembers Mirsch and Pieper to meet and discuss options for amending the City's view preservation ordinance and possibly repealing Measure B. The ad hoc committee, along with several residents including, Chairman Chelf, Spencer Karpf and the proponents of Measure B and the initiative petition currently being circulated (Measure 2017) met several times over the course of several months to discuss the mater. She stated that the objective of the ad hoc committee meetings was to try to come to a consensus on direction for crafting a new ordinance that could be adopted, if Measure B is repealed, that takes the concerns of both sides of the issue into account and would avoid the need to place a measure on the ballot that would result in another situation where the regulations can only be changed by another vote of the electorate. She stated the Lynn Gill, who is one of the proponents of Measure B and Measure 2017 has provided information for the Planning Commission's consideration and it is included with the staff report. She commented that he suggests arbitration to limit the City's liability and provided model ordinance from the City of Tiburon that uses arbitration.

Ms Schwartz stated that also included in the staff report as Exhibit E is an ordinance drafted by Mr. Karpf after the ad hoc committee meetings that incorporates many of the concepts agreed to by the ad hoc committee but does not represent full concurrence of the ad hoc committee. She commented that staff has prepared a "Decision Table" to focus the Planning Commissions discussions as this matter is

City Council Staff Report and Minutes (February 11, 2019)

FEMA Letter of Approval

Section 10: Plan Maintenance

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

Method and Scheduling of Plan Implementation

The Planning Team that was involved in research and writing of the Plan will also be responsible for implementation. The Planning Team will be led by the Planning Team Chair (Yolanta Schwartz – Planning Director – Planning Department) who will be referred to as the Local Mitigation Officer.

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

Monitoring and Implementing the Plan

Plan Adoption

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

Local Mitigation Officer

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

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

The Planning Team will meet no less than quarterly to review the status of the mitigation action items. Meeting dates will be scheduled once the final Planning Team has been established.

These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the mitigation plan.

Implementation through Existing Programs

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

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

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

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

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

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

- ✓ Risk Assessment, Community Profile, Planning Process (stakeholders) – General Plan Land Use Element, City's Emergency Operations Plan
- ✓ Community 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 2008 Hazard Mitigation Plan, the only document that was updated was the Annual Budget. Although the Annual

Budget did provide funding for a few of the mitigation action items, those items were not specifically identified as coming from the 2008 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

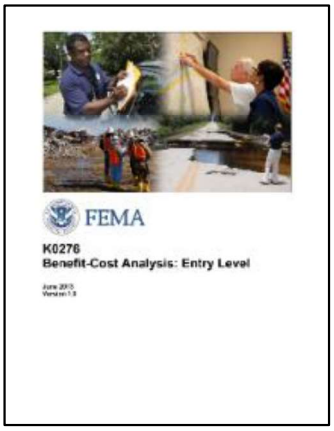
The Stafford Act authorizes the President to establish a program to provide technical and financial assistance to state and local governments to assist in the implementation of hazard mitigation measures that are cost effective and designed to substantially reduce injuries, loss of life, hardship, or 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.

Evaluating and Updating the Plan

The Planning Team will be responsible for coordinating implementation of plan by monitoring the progress of the mitigation action items and documenting progress notes for each item. It will be up to the Local Mitigation Officer to hold 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 **Annual 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 annual 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 track the annual 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 sample of the Annual Implementation Report:

Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified, CIP=Capital Improvement Program, B=Budget, GF=Grant Funds)	Benefit (L=Low, M=Medium, H=High, n/a=not applicable)	Cost (L=Low, M=Medium, H=High, n/a=not applicable)	Priority (L=Low, M=Medium, H=High)	Planning Mechanism (*=not yet identified, GP=General Plan, B=Budget, HMP=Hazard Mitigation Plan, ZO=Zoning Ordinance, BFC=Building/Fire Code)	2018 Comments and Status (Completed, Revised, Deleted, New, Deferred)	2019 Status of Mitigation Action Item
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
MULTI-HAZARD ACTION ITEMS														
MH 1 - Continue policy to ensure mitigation measures are in place to safeguard critical facilities located in Rolling Hills.	City Manager, Planning Department	Ongoing	X				X	B	H	L	H	BFC, ZO	Revised: action item, added Funding Source, Ranking, and Planning Mechanism	

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

Evaluation

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

Formal Update Process

The Mitigation Plan will be monitored on an annual basis to determine the effectiveness of mitigation action items and to reflect changes in land development or programs that may affect mitigation actions or their priorities. The evaluation process includes a firm schedule and timeline, and identifies the agencies and organizations participating in plan evaluation. The Local Mitigation Officer or designee will be responsible for contacting the Planning Team

members and organizing the annual meeting. Planning Team members will also be responsible for participating in the formal update to the Plan every fifth year of the planning cycle.

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

Continued Public Involvement

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

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

PART IV: APPENDIX

Appendix A: Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by the California Office of Emergency Services, the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

This appendix outlines several approaches for conducting economic analysis of hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: 1) The Interagency Hazards Mitigation Team, 2) State Mitigation Plan, 3) Federal Emergency Management Agency Publication 331, and 4) Report on Costs and Benefits of Hazard Mitigation.

This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to provide the details of economic analysis methods that can be used to evaluate local projects. It is intended to: 1) raise benefit/cost analysis as an important issue, and 2) provide some background on how economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred.

Evaluating hazard mitigation provides 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.

Evaluating hazard mitigation provides 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. Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables.

First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value, from a public policy perspective, in assessing the positive and negative impacts from mitigation activities, and obtaining an instructive benefit/cost comparison.

Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

What are Some Economic Analysis Approaches for Mitigation Strategies?

The approaches used 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. The distinction between the two methods is the way in which the relative costs and benefits are measured. Additionally, there are varying approaches to assessing the value of mitigation for public sector and private sector activities.

Benefit/Cost Analysis

Benefit/cost analysis is used in hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. 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. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoided future damages, and risk.

In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented (i.e., if net benefits exceed net costs, the project is worth pursuing). A project must have a benefit/cost ratio greater than 1 in order to be funded.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in Public Sector Mitigation Activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions that involve a diverse set of beneficiaries and non-market benefits.

Investing in Private Sector Mitigation Activities

Private sector mitigation projects may occur on the basis of one of two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies
2. Dispose of the building or land either by sale or demolition
3. Change the designated use of the building or land and change the hazard mitigation compliance requirement

4. Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchasers. Correcting deficiencies is expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

How Can an Economic Analysis Be Conducted?

Benefit/cost analysis and cost-effectiveness analysis are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating alternative mitigation activities is outlined below:

1. Identify the Alternatives:

Alternatives for reducing risk from hazards includes structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation project assists in minimizing risk to hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits:

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate alternative. Potential economic criteria to evaluate alternatives include:

- ✓ **Determine the project cost.** This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- ✓ **Estimate the benefits.** Projecting the benefits or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.
- ✓ **Consider costs and benefits to society and the environment.** These are not easily measured, but are assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impact of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- ✓ **Determine the correct discount rate.** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. *Analyze and Rank the* Alternatives:

Once costs and benefits have been quantified, economic analysis tools can rank the alternatives. Two methods for determining the best alternative given varying costs and benefits include net present value and internal rate of return.

- ✓ **Net present value.** Net present value is the value of the expected future returns of an investment minus the value of expected future cost expressed in today's dollars. If the net present value is greater than the project costs, the project is determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- ✓ **Internal Rate of Return.** Using the internal rate of return method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it is compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project.

Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk; project effectiveness; and economic, environmental, and social returns in choosing the appropriate project for implementation.

How are Benefits of Mitigation Calculated?

Economic Returns of Hazard Mitigation

The estimation of economic returns, which accrue to building or land owner as a result of hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- ✓ Building damages avoided
- ✓ Content damages avoided
- ✓ Inventory damages avoided
- ✓ Rental income losses avoided
- ✓ Relocation and disruption expenses avoided
- ✓ Proprietor's income losses avoided

These parameters are estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment are important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Hazards

Property owners should also assess changes in a broader set of factors that change as a result of a large natural disaster. These are usually termed "indirect" effects, but they have a very direct effect on the economic value of the owner's building or land. They are positive or negative, and include changes in the following:

- ✓ Commodity and resource prices
- ✓ Availability of resource supplies
- ✓ Commodity and resource demand changes
- ✓ Building and land values
- ✓ Capital availability and interest rates
- ✓ Availability of labor
- ✓ Economic structure
- ✓ Infrastructure
- ✓ Regional exports and imports
- ✓ Local, state, and national regulations and policies
- ✓ Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from hazards. Economic analysis saves time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that assist in conducting an economic analysis for hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. Many communities are looking towards developing multi-objective projects. With this in mind, opportunity rises to develop strategies that integrate hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating hazard mitigation with other community projects can increase the viability of project implementation.