

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan

Working Draft



**LAS VIRGENES-MALIBU COUNCIL OF GOVERNMENTS
HAZARD MITIGATION PLAN**

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ACKNOWLEDGEMENTS

The Hazards Mitigation Plan has been a very comprehensive project that required the efforts, intellect and patience of numerous staff individuals within the Las Virgenes-Malibu region. The scholarly research involved to obtain historical backgrounds and compose sound mitigation strategies was a tremendous accomplishment and is greatly appreciated not only by region staff but by region residents as a whole. The Hazards Mitigation Plan is vital in reducing the possibility of the loss of life and property during and after an emergency situation. This would not have been possible without the following individuals:

Steering Committee:

Tony Corrales, City Manager - City of Calabasas
Cherie L. Paglia, City Manager - City of Hidden Hills
Katie Lichtig, City Manager - City of Malibu
Greg Ramirez, City Manager - City of Agoura Hills
Ray Taylor, City Manager - City of Westlake Village

Focus Group Number 1:

Carol Tubelis, Assistant to the City Manager/City Clerk - City of Agoura Hills
Tom Wheeler, Risk Management/Public Safety - City of Calabasas
Cherie L. Paglia, City Manager - City of Hidden Hills
Brad Davis, Emergency Preparedness Coordinator - City of Malibu
Audrey Brown, Assistant City Manager - City of Westlake Village

Terry Dipple, Executive Director of the Las Virgenes-Malibu Council of Governments

Part I.

Mitigation Action Plan

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EXECUTIVE SUMMARY

The Las Virgenes-Malibu Council of Governments' (COG) region faces many disaster risks on an ongoing as well as seasonal basis. There have been 15 Presidential Disaster Declarations in the five-city COG region since 1980. Seven declarations for winter storm flooding, five for wildfires, two for earthquakes and one for a winter freeze. Consequently it would be extremely prudent and beneficial for the COG to mitigate the impact of disasters and build a robust community outreach program to promote awareness and preparedness at the individual family level as well as at the business level.

MULTI-JURISDICTIONAL PLAN

The cities of Agoura Hills, Calabasas, Hidden Hills, Malibu and Westlake Village have decided to combine their efforts and compose one multi-jurisdictional hazard mitigation plan. The five cities comprise the Las Virgenes-Malibu Council of Governments (COG). They are also the core of Los Angeles County's Disaster Management Area B.

The cities are located in a region that experience similar hazards and problems related to these hazards and have combined their efforts in order to produce a more thorough hazard mitigation plan. With these united forces, identifying problems and setting mitigation strategies was a collaborative task. Utilizing a collaborative approach also allowed the Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan to have a larger public participation process in creating the plan.

FIVE-YEAR ACTION PLAN MATRIX

The Las Virgenes-Malibu Council of Governments Hazard Mitigation Action Plan includes resources and information to assist Region residents, public and private sector organizations, and others interested in participating in planning for hazards. The mitigation plan provides a list of activities that may assist the Las Virgenes-Malibu Council of Governments in reducing risk and preventing loss from future hazard events. The strategies address multi-hazard issues, as well as activities for earthquakes, earth movements, flooding, terrorism, fires and windstorms. This plan meets the requirements of the Disaster Mitigation Act of 2000. By preparing this plan, the Las Virgenes-Malibu Council of Governments is eligible for federal mitigation funding after disasters and to apply for mitigation grants before disasters strike.

HOW IS THE PLAN ORGANIZED?

The Mitigation Plan contains a five-year action plan matrix, background on the purpose and methodology used to develop the mitigation plan, a profile of the Las Virgenes-Malibu Region, sections on natural hazards that threaten the Region and a number of appendices. All of the sections are described in detail in Section 1, the Plan Introduction.

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WHO PARTICIPATED IN DEVELOPING THE PLAN?

The development of the Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan has been a collaborative city and community effort. The planning process was facilitated by a variety of Region-wide departments along with a consulting agency, MLC & Associates, Inc. The Las Virgenes-Malibu Council of Governments Steering Committee provided vital guidance in developing the plan. Since five cities are represented, one representative from each city was a member of the committee.

The public was invited to participate in the development of the plan. Information was provided through public notices, city websites, newsletters, cable television, and the local newspapers.

The Steering Committee was chosen to provide needed feedback, guidance and approval. The Steering Committee drafted the Mission Statement, Plan Goals, identified the hazards list, and is responsible for final approval of the plan and strategies.

In addition to the participation of the Steering Committee, there was a Focus Group conducted to rate the hazards. Representatives from each of the five cities in the Las Virgenes-Malibu COG region came together to rank the identified hazards according to probability, magnitude/severity, warning time and duration. The survey is provided in Appendix G.

Part II of the plan contains the hazard specific information. Each of the sections provides information on the background and history of the hazard, as well as the economic and social impacts of the hazards. The Steering Committee also directly participated in rating the six designated hazards in the Las Virgenes-Malibu COG region. Please reference Appendix G for this form.

WHAT IS THE PLAN MISSION?

The Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan is to promote sound public policy and programs designed to protect the public, critical facilities, infrastructure, private and public property and the environment from natural and manmade hazards. This will be achieved by developing and implementing this plan to guide the Region towards creating and maintaining a safer more sustainable community.

WHAT ARE THE PLAN GOALS?

The plan goals describe the overall direction that Las Virgenes-Malibu Council of Governments agencies, organizations, and citizens can take to minimize the impacts of hazards. The Plan goals help to guide the direction of future activities aimed at reducing risk and preventing loss from hazards. The goals are stepping-stones between the broad direction of the Mission Statement and the specific recommendations that are outlined in the strategies.

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PLAN GOALS

To Protect Life, Property, Environment

- Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to hazards.
- Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.
- Encourage preventative measures for existing and new development in areas vulnerable to hazards.

Public Awareness

- Develop and implement education and outreach programs to increase public awareness of the risks associated with hazards.
- Develop and implement education and outreach programs to increase public awareness of the mitigation measures associated with hazards.
- Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.

Partnerships and Implementation

- Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation.
- Encourage leadership within public and private sector organizations to prioritize and implement local, county, and Regional hazard mitigation activities.
- Assist in the development of the Safety Element of the General Plan

Emergency Management

- Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.
- Update current ordinances, make recommendations for Region guidelines, codes, and permitting process and establish new ordinances that support mitigation.
- Strengthen emergency operations by increasing collaboration and coordination among departments, public agencies, non-profit organizations, business, and industry.
- Coordinate and integrate hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

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HOW ARE THE STRATEGIES ORGANIZED

The strategies are a listing of activities in which Regional departments within the various cities and citizens can be engaged to reduce risk. They reflect future action to be taken in order to reduce the loss of property and life.

The data collection, research and the public participation process resulted in the development of the hazard mitigation strategies. The matrix includes the following information for each strategy:

HAZARD	The hazard the strategy mitigates.		
PROJECT NAME	Name of the mitigation project strategy.		
STRATEGY	Strategy description		
ACTION ITEMS	What actions will be completed to implement the strategy?		
COORDINATING DEPARTMENT	The department 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. The main department responsible is in bold, the supporting departments are not.		
TIMELINE/COMPLETION DATE	Each project includes an estimate of the time line for implementation.		
TOTAL COST	Estimated cost of the project.		
FUNDING SOURCE(S)	Where the funding will be obtained.		
CONSTRAINTS	Constraints may apply to some of the action projects. These constraints may include a lack of Region staff, lack of funds, or vested property rights which might expose the Region to legal action as a result of adverse impacts on private property		
PLAN GOALS ADDRESSED	The plan goals addressed by each project are included as away to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins.		
	Public Awareness		Protect Life and Property
	Partnerships and Implementation		Emergency Management

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

HOW WILL THE PLAN BE IMPLEMENTED, MONITERED, EVALUATED?

The Plan Maintenance section of this document details the formal process that will ensure that the Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan remains an active and relevant document. The plan will be adopted by the Las Virgenes-Malibu COG and each city. Each individual city will implement the pertinent mitigation strategies for said city.

The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing a plan revision every five years. This section describes how the Region will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how the Las Virgenes-Malibu Council of Governments intends to incorporate the mitigation strategies outlined in the plan into existing planning mechanisms such as each city's individual General Plans, Capital Improvement Plans, Building & Safety Codes and other programs, and/or plans within the cities.

PLAN ADOPTION

The Las Virgenes-Malibu Council of Governments will be responsible for adopting the Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan. Individual cities shall also be responsible for plan adoption. These governing bodies have the authority to promote sound public policy regarding hazards.

Once the plan has been adopted, the Executive Director of the Las Virgenes-Malibu COG is responsible for submitting it to the State Hazard Mitigation Officer at the Governor's Office of Emergency Management. The Governor's Office of Emergency Services will then submit the plan to the Federal Emergency Management Agency (FEMA) for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, Las Virgenes-Malibu Council of Governments will gain eligibility for Hazard Mitigation Grant Program funds.

COORDINATING BODY

The Las Virgenes-Malibu Council of Governments Hazard Mitigation Steering Committee was responsible for coordinating implementation of plan strategies and undertaking the formal review process.

IMPLEMENTATION THROUGH EXISTING PROGRAMS

The Las Virgenes-Malibu Council of Governments individual cities address statewide planning goals and legislative requirements through General Plans, Capital Improvement Plans, and Building & Safety Codes. The Hazard Mitigation Plan provides a series of recommendations that are closely related to the goals and objectives of these existing planning programs. The Las Virgenes-Malibu Council of Governments will have the opportunity to implement recommended mitigation strategies through existing programs and procedures.

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ECONOMIC ANALYSIS OF MITIGATION PROJECTS

The Federal Emergency Management Agency's approach to identify costs and benefits associated with hazard mitigation strategies or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis. Conducting a 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 provide a basis upon which to compare alternative projects.

FORMAL REVIEW PROCESS

The Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The evaluation process includes a firm schedule and timeline, and identifies the departments and organizations participating in plan evaluation. The Executive Director of the Las Virgenes-Malibu COG will be responsible for contacting the Hazard Mitigation Steering Committee members and organizing the annual meeting. Committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan.

CONTINUED PUBLIC INVOLVEMNET

The Las Virgenes-Malibu Council of Governments is dedicated to involving the public directly in the continual review and updates of the Hazard Mitigation Plan. Copies of the plan will be catalogued and made available at various locations through out the Region including but not limited to libraries, City Halls and respective city websites. The existence and location of these copies will be available on the respective city websites and through bulletins.

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SECTION 1

INTRODUCTION

MULTI-JURISDICTIONAL PLAN

The cities of Agoura Hills, Calabasas, Hidden Hills, Malibu and Westlake Village have decided to combine their efforts and compose one multi-jurisdictional hazard mitigation plan. The five cities comprise the Las Virgenes-Malibu Council of Governments (COG). They are also the core of Los Angeles County’s Disaster Management Area B. (see Chart 1). The total region population as of 2002 is 65,931 covering an approximate square mile area of over 100 miles, with 48.0 of those square miles being land. (Source: <http://www.losangelesalmanac.com/topics/Geography/ge09.htm>)

The cities are located in a region that experiences similar hazards and problems related to these hazards and have combined their efforts in order to produce a more thorough Hazard Mitigation Plan. With these united forces, identifying problems and setting mitigation strategies was a more collaborative task. Utilizing a collaborative effort also allowed the Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan to have a larger public participation process.

The Las Virgenes-Malibu COG Hazard Mitigation Plan is showcasing what can be accomplished when multiple local government agencies join efforts to create comprehensive planning measures to prevent the loss of life and property in cases of hazardous events. The planning process proved to be a unique experience allowing for more resources to be available for revision, study and overall utility. The Las Virgenes-Malibu COG Hazard Mitigation Plan can be used as a vehicle for future regional projects.

CHART 1. LOS ANGELES COUNTY DISASTER MANAGEMENT AREA B

LA COUNTY DISASTER MANAGEMENT AREA B			
Area	CITY	2002 Population	Population Rank
B	AGOURA HILLS	21,610	64
B	CALABASAS	20,730	66
B	HIDDEN HILLS	1,959	83
B	MALIBU	13,048	75
B	WESTLAKE VILLAGE	8,584	79
B	SANTA CLARITA	158,289	4
B	PALMDALE	123,717	8
B	LANCASTER	123,147	9
	Total Las Virgenes-Malibu COG	65,931	(of 88 Los Angeles County cities)



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Emergencies and disasters can cause damage to the Las Virgenes-Malibu region and its residents, businesses, infrastructure and our environment. These disasters can cause numerous deaths or injuries and cost tremendous amounts of money in terms of response and recovery dollars. As the population of the Region continues to increase, the exposure to hazards creates an even higher risk than previously experienced.

Throughout history, the residents of the cities that comprise the Las Virgenes-Malibu Council of Governments have dealt with the various hazards affecting the area. State, County and local history show that the residents of the area have dealt or will deal with earthquakes, earth movements (including landslide and mudslide), flooding, fires (including wildland and structural), wind storms and possible terrorist events.

While the cities within the Council of Governments cannot prevent disasters from happening, their effects can be reduced or eliminated through a well organized public education and awareness effort, preparedness and mitigation. Most hazards cannot be fully mitigated; therefore the community must be prepared to provide efficient and effective response and recovery.

It is impossible to predict exactly when these disasters will occur, or the extent to which they will affect the region. 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 disasters.

Chart 2 reflects major disasters occurring in Los Angeles County within the last fifteen years.

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CHART 2. LOS ANGELES COUNTY DISASTERS SINCE 1989

Los Angeles County Disasters since 1989									
Hazard Type	Disaster Name	Disaster #	Year	Counties and Cities Declared	State Declaration	Federal Declaration	# of Deaths	# of Injuries	Cost of Damage
Economic	Mediterranean Fruit Fly	N/A	1989	Los Angeles	8/9/1989	Not declared			
Fire	Santa Barbara Fires	DR-872	1990	Los Angeles, Santa Barbara, Riverside, San Bernardino	6/28/90, 6/29/90	6/30/1990	3	89	\$300,000,000
Earthquake	Upland Earthquake	N/A	1990	Los Angeles, San Bernardino	3/9/90, 3/13/90	Not declared	0	38	\$12,034,150
Economic	Mexican Fruit Fly	N/A	1990	Los Angeles, San Diego	5/14/1990	Not declared			
Severe Storm	1992 Winter Storms	DR-935	1992	Los Angeles, Ventura, City of Los Angeles, kern, orange, San Bernardino	2/12/92, 2/19/92	2/25/1992	5		\$123,240,531
Civil Unrest	Los Angeles Civil Disorder	DR-942	1992	Los Angeles	4/29/1992	5/22/1992	53	2,383	\$800,000,000
Flood	1992 Late Winter Storms	DR-979	1992	Alpine, Los Angeles, Humboldt, Napa, Santa Barbara, Culver City, City of Los Angeles, Contra Costa, Mendocino, Sonoma, Fresno, imperial, Madera, Monterey, San Bernardino, Sierra, Tehama, Trinity, Tulare, Modoc, Orange, Riverside, Lassen, Siskiyou, Plumas, San Diego	1/7/93 - 2/19/93	1/15/1993	20	10	\$600,000,000
Fire	Southern California Firestorms	DR-1005	1993	Los Angeles, Ventura, San Diego, Orange, Riverside, San Bernardino	10/27/93, 10/28/93	10/28/1993	4	162	\$1,000,000,000
Earthquake	Northridge Earthquake	DR-1008	1994	Los Angeles, Ventura, Orange	1/17/94, 1/24/94	1/17/1994	57	11,846	\$40,000,000,000



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Los Angeles County Disasters since 1989									
Hazard Type	Disaster Name	Disaster #	Year	Counties and Cities Declared	State Declaration	Federal Declaration	# of Deaths	# of Injuries	Cost of Damage
Severe Storm	Severe Winter Storms	DR-1044	1995	Los Angeles, Orange, Humboldt, Lake , Sonoma, Butte, Colusa, Contra Costa, Del Norte, Glenn, Kern, Lassen, Mendocino, Modoc, Monterey, Napa, placer, Plumas, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz, Tehama, Ventura, Yolo, Yuba, Alpine, Amador, Nevada, Riverside, Sacramento, San Bernardino, San Mateo, Shasta, Sutter, Trinity, San Diego, Alameda, Marin, Fresno, Kings, El Dorado, Madera, Solano, Siskiyou	1/6/95 - 3/14/95	1/13/1995	11		\$741,400,000
Severe Storm, Flood	Late Winter Storms	DR-1046	1995	All counties except Del Norte		1/10/1995	17		\$1,100,000,000
Fire	Southern California Firestorms	EM-3120	1996	Los Angeles, Orange, San Diego	10/1/1996			5	\$40,000,000



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Los Angeles County Disasters since 1989									
Hazard Type	Disaster Name	Disaster #	Year	Counties and Cities Declared	State Declaration	Federal Declaration	# of Deaths	# of Injuries	Cost of Damage
Flood	El Nino		1998	Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, Fresno, Glenn Humboldt, Kern, Kings, Lake, Los Angeles, Marin, Mendocino, Merced, Monterey, Napa, Orange, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Ventura, Yolo, Yuba			17		\$550,000,000
Earthquake	Sierra Madre Earthquake	N/A	2003	Los Angeles	7/5/1991	Not declared	1	30	\$33,500,000
Fire	Southern California Wildfires	DR-1498	2003	Ventura, Los Angeles, San Bernardino, Riverside, San Diego	10/24-26/03	10/27/2003			



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WHY DEVELOP A MITIGATION PLAN?

Changes to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which provides the basis for federal assistance to state and local governments impacted by a disaster, have placed a new emphasis on local mitigation planning. Hazard Mitigation, also known as prevention before the occurrence of a disaster, is now considered to be the first step in preparing for emergencies, rather than the final step in recovery. FEMA is now requiring state and local governments to develop hazard mitigation plans by November 2004. The consequences of not having an approved Local Hazard Mitigation Plan are significant. Without one, cities would be ineligible for FEMA mitigation programs including: the Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and most importantly, potential loss of public assistance funding for repetitively damaged facilities following a disaster.

Some of the required contents of a Local Hazard Mitigation Plan exist in current region planning documents. The General Plans, existing building codes, Master Plans, and Standardized Emergency Management System plans contain requirements of the Local Hazard Mitigation Plan.

The Disaster Mitigation Act of 2000 (DMA 2000), Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identifies and prioritizes mitigation actions, encourages the development of local mitigation and provide technical support for those efforts. This Hazard Mitigation Plan serves to meet those requirements.

This plan assists the Las Virgenes-Malibu region in reducing risk from hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the Las Virgenes-Malibu region. Upon completion, the Local Hazard Mitigation Plan will include mitigation strategies that outline the Region's plans for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and their ability to expand on and improve these existing tools.

The information and mitigation strategies within the Hazard Mitigation Plan:

- (1) Establish a basis for coordination and collaboration among Regional departments and the public in the Las Virgenes-Malibu Council of Governments region;
- (2) Identify and prioritize future mitigation projects; and
- (3) Assist in meeting the requirements of federal assistance programs.

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WHOM DOES THE MITIGATION PLAN AFFECT?

The Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan affects the entire Region. This plan provides a framework for pre-emptive planning for hazards. The resources and background information in the plan is applicable Region-wide, and the goals and recommendations can lay groundwork for mitigation plans and partnerships for neighboring communities.

PLANNING PROCESS

The development of the plan has been a collaborative staff and community effort. The planning process has been facilitated a variety of Region wide departments along with a consulting agency, MLC & Associates, Inc. In addition, a Steering Committee was established, composed of the Las Virgenes-Malibu Council of Governments City Managers. The Steering Committee was chosen to facilitate the progression of the plan, provide imperative feedback, guidance and approval. This Steering Committee revised and approved the Mission Statement, Plan Goals, decided and approved the hazards, and was responsible for approving the plan and strategies.

The Las Virgenes-Malibu Council of Governments Steering Committee was a vital guide in developing the plan. Since five cities are represented, one representative from each city was a member of the committee. The Las Virgenes-Malibu COG Hazard Mitigation Plan is showcasing what can be accomplished when multiple local government agencies join efforts to create more comprehensive planning measures to prevent the loss of life and property in case of hazard events. The planning process proved to be a unique experience allowing for more resources to be available for revision, study, and overall utility. The Las Virgenes-Malibu COG Hazard Mitigation Plan can be a vehicle for future regional projects.

The planning process was coordinated by the Las Virgenes-Malibu Council of Governments which is comprised of five cities: Agoura Hills, Calabasas, Hidden Hills, Malibu, Westlake Village. The process also included the Los Angeles County Fire and Sheriff's Departments, along with MLC & Associates, Inc. Various departments within the cities assisted in drafting the plan by providing resources such as various city documents including but not limited to General Plans, Master Plans, SEMS Plans, reports and studies, hazard maps, and public process documentation. These departments' included but were not limited to:

- Building & Safety
- City Manager
- Community Development
- Emergency Preparedness
- Fire
- Planning
- Public Works
- Recreation & Parks
- Sheriff's Department

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The information in the Hazard Mitigation Plan is based on research from these sources. Having multiple departments from multiple cities work on integrating all their resources and energies into one plan proved to be beneficial. A wealth of knowledge was acquired and the multiple sources allowed for a more comprehensive approach to drafting the Hazard Mitigation Plan.

Staff from the cities in the Las Virgenes-Malibu Council of Governments conducted data research and analysis and assisted in developing the final mitigation plan. Staff met with MLC & Associates, Inc. and with the Executive Director of the Las Virgenes-Malibu COG.

INPUT FROM THE STEERING COMMITTEE

The Hazard Mitigation Steering Committee convened approximately four weeks over the course of seven months to guide development of the Hazard Mitigation Plan. The Steering Committee was comprised of the following representatives:

Tony Corrales
City Manager
City of Calabasas

Cherie L. Paglia
City Manager
City of Hidden Hills

Katie Lichtig
City Manager
City of Malibu

Greg Ramirez
City Manager
City of Agoura Hills

Ray Taylor
City Manager
City of Westlake Village

As shown in Appendix D, the Hazard Mitigation Steering Committee along with various city staff and various other stakeholders met to develop the plan. This process involved much dialogue, discussion and input on the development of the plan.

RESOURCES/OUTSIDE INPUT

The Las Virgenes-Malibu Council of Governments staff examined multiple existing mitigation plans, programs and activities from neighboring communities and from around the country, current FEMA hazard mitigation planning standards (31`86 series) and the State of California Hazard Mitigation Plan Guidance document. These resources were valuable in helping to guide the

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creation of the Las Virgenes-Malibu Hazard Mitigation Plan. Staff provided recommendations and much needed information through studies of these resources.

HAZARD SPECIFIC RESEARCH

Las Virgenes-Malibu Council of Governments staff and community collected data and compiled research on hazards. Research materials came from a variety of sources (see Resource Appendix A). The Las Virgenes-Malibu Council of Governments staff conducted research using data, speaking with experts, studying current mitigation activities, resources and programs, referring consultants and examining potential strategies from research materials and stakeholder input.

The sections of the plan referenced various sources including, but were not limited to:

- Edison International
- Federal Emergency Management Agency
- Las Virgenes-Malibu Council of Governments Chamber of Commerce's
- Las Virgenes-Malibu Council of Governments Records
- Las Virgenes-Malibu Council of Governments School Districts
- Los Angeles County Fire Department
- Los Angeles County Office of Emergency Management
- Los Angeles County Public Works
- Los Angeles County Records
- Los Angeles County Sheriff Department
- State Office of Emergency Services
- United States Census

Various city documents including but not limited to General Plans, Master Plans, SEMS Plans, reports and studies hazard maps, and public process documentation

Other materials used as reference sources consisted of county and city mitigation plans, including:

- City of Austin, Texas Hazard Mitigation Plan
- City of Berkeley, California Hazard Mitigation Plan
- City of Beverly Hills Hazard Mitigation Plan
- Clackamas County (Oregon) Natural Hazards Mitigation Plan
- Hamilton County, Ohio Plan
- Natural Hazard Planning Guidebook from Butler County, Ohio
- Six County (Utah) Association of Governments
- Upper Arkansas Area Risk Assessment and Hazard Mitigation Plan
- Urbandale-Polk County, Iowa Plan

For more references refer to Resource Appendix A.

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STATE AND FEDERAL GUIDELINES AND REQUIREMENTS FOR MITIGATION PLANS

The following are the Federal requirements for approval of a Hazard Mitigation Plan:

- Open public involvement, with public meetings that introduce the process and project requirements.
- 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 opportunity for other local government agencies, the business community, educational institutions, and non-profits to participate in the process.
- Incorporation of local documents, including the local General Plans, the Zoning Ordinances, the Building Codes, and other pertinent city and regional 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 community
- A comprehensive mitigation strategy, which describes the goals & objectives, including proposed strategies, programs & 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 All Hazard Mitigation Plan into other planning mechanisms.
- Formal adoption by the Council.
- Plan Review by both State OES and FEMA

These requirements are spelled out in greater detail in the forthcoming plan sections and supporting documentation.

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PUBLIC/COMMUNITY PROCESS

Public participation is a key component of strategic planning processes. Citizen participation offers stakeholders in the community the opportunity for inclusion of their interests and concerns into the process. The Federal Emergency Management Agency requires public input during the development of local hazard mitigation plans. The public was invited to participate in the development of the plan. Information was and will be provided on city websites, newsletters, cable and the local newspapers.

The Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan integrates a cross section of local resident and business community input. To accomplish meaningful participation, rather than appointing, educating and grappling with scheduling concerns of a project-specific steering committee, it was deemed more efficient and more representative to enlist the expertise of existing city commissions, homeowner groups and business interest representative of all stakeholders in the community.

This has been a collaborative effort with input from various region city departments and the community. Furthermore the Region has utilized a robust communication networks within Area B officials and cities. Area B refers to the Los Angeles County Disaster Management Area. The cities have worked closely to share information and aid in development and creation of the multi-jurisdictional plan at hand.

As shown in Appendix E, numerous opportunities were provided for public participation and input into the plan.

HOW IS THE PLAN USED?

Each section of the Hazard Mitigation Plan provides information and resources to assist people in understanding the Region and the hazard-related issues facing citizens, businesses, and the environment. Combined, the sections of the plan work together to create a document that guides the mission to reduce risk and prevent loss from future hazard events.

The structure of the plan enables people to use a section of interest to them. It also allows individual city governments to review and update sections when new data becomes available. The ability to update individual sections of the mitigation plan places less of a financial burden on the Region. City Council Members can allocate funding and staff resources to selected pieces in need of review, thereby avoiding a full update, which can be costly and time-consuming. New data can be easily incorporated, resulting in a Hazard Mitigation Plan that remains current and relevant to the Las Virgenes-Malibu COG region.

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The Hazard Mitigation Plan is organized as follows:

PART I: MITIGATION ACTION PLAN

Executive Summary:

The Five-Year Action Plan provides an overview of the mitigation plan mission, goals, and strategies. Plan strategies are included in this section, and address multi-hazard issues, as well as hazard-specific activities that can be implemented to reduce risk and prevent loss from future events.

Section 1: Introduction

The Introduction describes the background and purpose of developing the Hazard Mitigation Plan for the Las Virgenes-Malibu Council of Governments and the planning process.

Section 2: Community Profile

This section presents the history, geography, demographics, and socioeconomics of Las Virgenes-Malibu region. It serves as a tool to provide a historical perspective of hazards in the Region.

Section 3: Risk Assessment

This section provides information on hazard identification, vulnerability and risk associated with hazards in Las Virgenes-Malibu region.

Section 4: Multi-Hazard Goals and Strategies

This section provides information on the process used to develop goals and strategies that cut across the six hazards addressed in the mitigation plan.

Section 5: Plan Maintenance

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

PART II: HAZARD SPECIFIC INFORMATION

Hazard-Specific Information on the six hazards is addressed in this part of the plan. Chronic hazards occur with some regularity and may be predicted through historic evidence and scientific methods. Each of the hazard-specific sections includes information on the history, hazard causes and characteristics, hazard assessment and goals and strategies. Chronic hazards addressed in the plan include:

Section 6: Earthquake

Section 7: Fire

Section 8: Terrorism

Section 9: Flooding

Section 10: Earth Movement (Landslide)

Section 11: Windstorm

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PART III: RESOURCES

Resources include, but are not limited to, all information used to gather data and conduct analytical research to assemble the entire Las Virgenes-Malibu COG Hazard Mitigation Plan. The Resources section also includes tools used to develop the plan, documentation of meetings, discussion and events that involved the planning process.

Appendix A: Resources

This section provides a list of resources for region, county, state, and federal agencies and organizations that may be referenced directly and indirectly within the Region of the Las Virgenes-Malibu COG Hazard Mitigation Plan. The resources are also provided for public information.

Appendix B: Crosswalk

This section includes the Local Hazard Mitigation Plan Review Crosswalk for California Local Governments.

Appendix C: Natural Hazard Risk Analysis Rating Form

This section includes the survey by which community members rated the identified hazards.

Appendix D: Planning and Public Involvement Meetings

This section provides a list of dates, descriptions and locations of all meetings pertaining to the planning process used for creating the Hazards Mitigation Plan. This section also provides a list of dates, descriptions and locations of all meetings that involved the community in the planning process of the Hazard Mitigation Plan as well as emergency preparedness mitigation activities.

Appendix E: Malibu Flood Mitigation Plan

This section includes the Hazard Mitigation Plan prepared for the city of Malibu in May of 2001 by David Evens and Associates.

Appendix F: Steering Committee/Focus Group Hazard Rating Survey

This survey was provided to the Steering Committee and Focus Group to rate the Las Virgenes-Malibu COG region hazards.

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SECTION 2 COMMUNITY PROFILE

INTRODUCTION

The purpose of this document is to develop a plan for responding to hazards in the Las Virgenes-Malibu Region. Hazards impact the Region's citizens, property, the environment, and economy. Potential earth movements, earthquakes, flooding, terrorism, windstorms and fires expose residents and businesses to the financial and emotional costs of recovering from disasters. The risk increases as more people move to areas affected by these hazards.

Records show that population of California and County of Los Angeles is growing. The growing population and activity within the region creates 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 potential impacts can assist in protecting the life and property of citizens and communities.

Local residents and businesses can work together with the Las Virgenes-Malibu region to create a hazard mitigation plan that addresses the potential impacts of hazardous events within the entire locale.

REGIONAL PROFILE

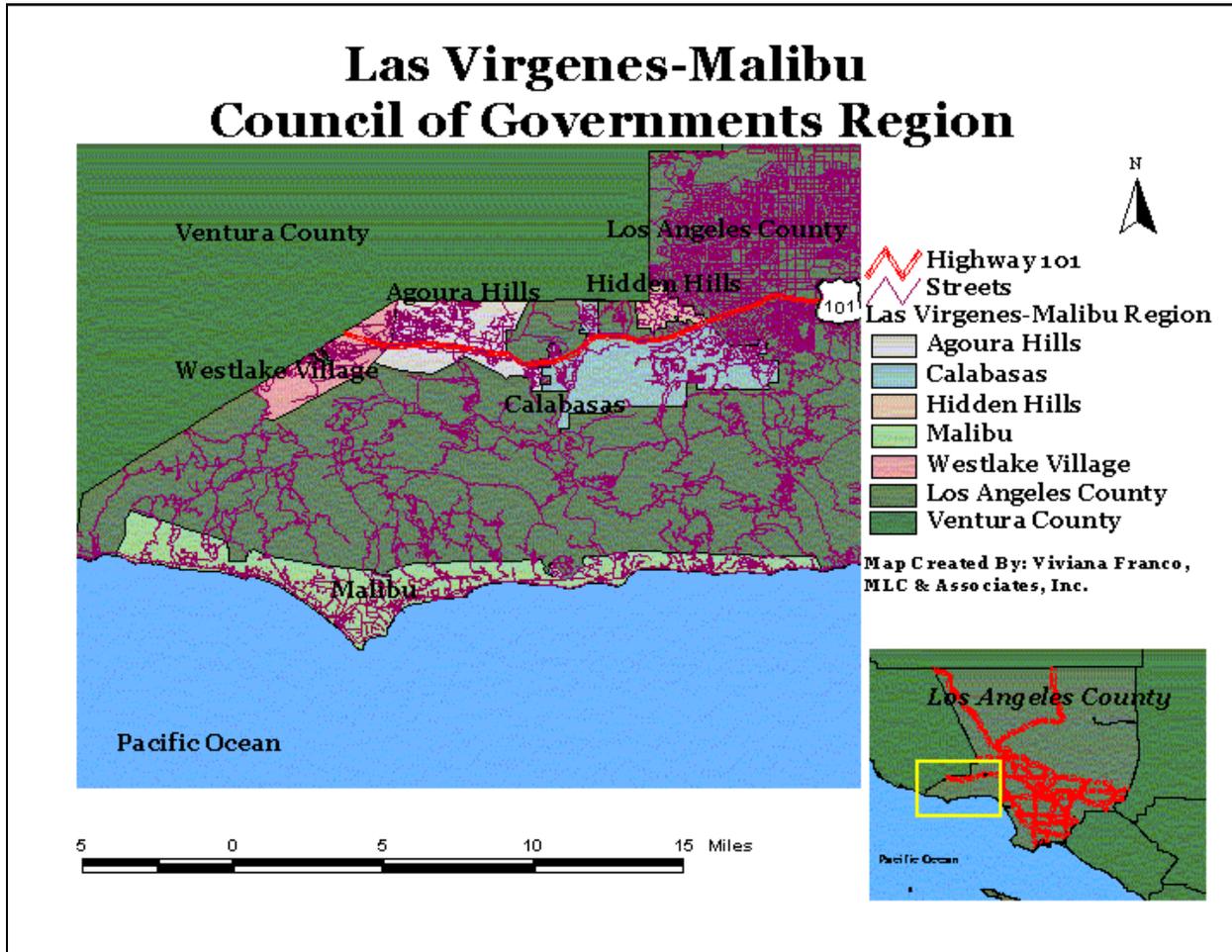
Geography and the Environment

The Las Virgenes-Malibu region is 129.62 square miles in size (Los Angeles Almanac). It is located in the North-West area of Los Angeles County. The area is partially urbanized; however there is a large portion of the area that can be characterized as wild land. The region also has many business centers.

The geography includes mountainous terrain that includes valleys and slopes. Small rivers and waterways are seasonal, depending on rainfall. The proximity of the cities to the ocean creates a Mediterranean climate, however in the cities of Agoura Hills, Calabasas, Hidden Hills and Westlake Village the summer temperatures can reach into the high 90's. Malibu enjoys the closest relationship to the ocean (see CLIMATE section for additional details).

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MAP 1. LAS VIRGENES-MALIBU COUNCIL OF GOVERNMENTS REGION



The Region's street system consists of a grid of local streets arterials, and other lesser thoroughfares. Regional access to the area is provided primarily through the San Diego (405) Freeway and the US Highway 101.

In Malibu major east/west arterials include Pacific Coast Highway and major north/south streets including Malibu Canyon Road. The cities of Agoura Hills, Calabasas, Hidden Hills and Westlake Village are situated in the area north of Malibu, along the east/west trajectory of the US 101. Major arterials include Agoura Road, Kanan Road, Valmar Road, Mulholland Drive and Valley Circle Boulevard.

LOS ANGELES COUNTY SHERIFF'S DEPARTMENT

The Las Virgenes-Malibu COG contract their police services with the Los Angeles County Sheriff's Department. The Malibu/Lost Hills Station provides immediate services and is located

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at 27050 Agoura Road, Agoura Hills, CA 91301. This station serves the western portion of Los Angeles County, which is a blend of residential, rural, mountain, beach and recreational areas. The cities served by this station include Agoura Hills, Calabasas, Hidden Hills, Malibu, and Westlake Village as well as the unincorporated communities of Chatsworth Lake Manor, Malibu Lake, Topanga, and West Hills.

The Malibu/Lost Hills station has comprehensive Fire, Flood and Earthquake Operation Plans. The areas under the station's jurisdiction are sectioned into 27 areas. They are detailed plans that include actions and procedures the Sheriff's Department is to take when an event takes place. There are identified evacuation shelters, secondary evacuation shelters, command post sites, multipurpose staging areas, alternate traffic routes and critical facilities assessments to be made. The critical facilities assessments are ranked in the following order:

1. "A" priorities must be checked immediately
2. "B" priorities must be checked immediately if children are present, otherwise as time permits
3. "C" priorities must be checked as time permits

Critical facilities identified by the Malibu/Lost Hills Station are noted in Section 3.

LOS ANGELES COUNTY FIRE DEPARTMENT

The Las Virgenes-Malibu COG contracts fire services with the Los Angeles County Fire Department. The Las Virgenes-Malibu COG is located in Division VII – Central Region of the Los Angeles County Fire Department's regional plan divisions. Battalions 1 and 5 of the Los Angeles County Fire Department are assigned to directly serve the Las Virgenes-Malibu region with a total of 17 stations assigned to serve six cities; Agoura Hills, Calabasas, Hidden Hills, Malibu, West Hollywood and Westlake Village. Battalion 5 is the main division since its stations are located within the region itself. There are a total of 11 stations throughout the region. Headquarters are located at 3970 Carbon Canyon Rd., Malibu 90265.

CLIMATE

Temperatures in the Las Virgenes-Malibu region fall within a Mediterranean climate. The cities of Agoura Hills, Calabasas, Hidden Hills and Westlake Village are more similar in temperatures. The highs range from 68 degrees in the winter to 96 degrees in the summer. The lows range from 38 degrees in the winters to 58 degrees in the summer. The City of Malibu differs due to its proximity to the coast. The temperature there ranges from 57 degrees in the winter months to 67 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.

Rainfall in the region averages approximately 12 inches of rain per year. However the term "average rainfall" is misleading because over the recorded history of rainfall in the region,

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rainfall amounts have ranged from no rain at all in some years to over a foot of rain in very wet years.

Further more actual rainfall in Southern California tends to fall in large amounts during sporadic and often heavy storms rather than consistently over storms at somewhat regular intervals. In short, rainfall in Southern California might be characterized as feast or famine within a single year. Because the metropolitan basin is largely built out, water originating in higher elevation communities can have a sudden impact on adjoining communities that have a lower elevation.



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CITY PROFLES

AGOURA HILLS

The City of Agoura Hills was incorporated in 1982. It has a population of 21,610 people, making it the most populous city with in the Las Virgenes-Malibu COG. It is 8.2 square miles in size. It boasts a climate that averages 65° F with an annual rainfall of 19.5".

LAND AND DEVELOPMENT

The City of Agoura Hills owns approximately 62 buildings (including school buildings), 7 buildings within city parks and one civic center. The number of total buildings within the City is 6,955 within 8,283 parcels. City owned streets run 64 miles. The city’s business centers include the Twin Oaks Shopping Center and the Agoura Meadows Shopping Center.

MINERALS AND SOILS

Local soils conditions are discussed in the Sections 6 and 10 of this plan.

POPULATION AND DEMOGRAPHICS

The following is a list of general demographics for the City of Agoura Hills.

General	
INCORPORATED	8-Dec-82
LONGITUDE LOCATION	118 degrees, 46 minutes, 40 seconds West
LATITUDE LOCATION	34 degrees, 8 minutes, 42 seconds North
ALTITUDE	936 feet to 2,036 feet
AREA	7.86 square miles
CLIMATE	On average, 65° F with an annual rainfall of 19.5"
Population	
POPULATION	21,005
MEDIAN AGE	32.3 years
UNDER 19 YEARS	32.70%
AGES 19 - 54 YEARS	51.20%
54 YEARS AND OLDER	16.10%
Households	
TOTAL HOUSING UNITS	6,993
AVERAGE HOUSEHOLD SIZE	3.05
MEDIAN INCOME	\$84,188
MEDIAN HOME VALUE	\$368,338

Source: 2000 U.S. Census



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**HOUSING AND COMMUNITY DEVELOPMENT, BUILDING AGE AND
CONSTRUCTION TYPE**

Subject	Number	Percent
Total housing units	6,955	100.0
UNITS IN STRUCTURE		
1-unit, detached	5,191	74.6
1-unit, attached	974	14.0
2 units	7	0.1
3 or 4 units	168	2.4
5 to 9 units	126	1.8
10 to 19 units	140	2.0
20 or more units	349	5.0
Mobile home	0	0.0
Boat, RV, van, etc.	0	0.0
YEAR STRUCTURE BUILT		
1999 to March 2000	0	0.0
1995 to 1998	53	0.8
1990 to 1994	272	3.9
1980 to 1989	2,995	43.1
1970 to 1979	2,793	40.2
1960 to 1969	682	9.8
1940 to 1959	130	1.9
1939 or earlier	30	0.4

Source: 2000 U.S. Census



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CALABASAS

The City of Calabasas was incorporated in 1991. It has a population of 20,730 people, making it the second most populous city within the Las Virgenes-Malibu COG. It is 13.15 square miles in size. The city's annual rainfall is 13.6 inches per year.

COMMISSIONS

The City of Calabasas offers its citizens a host of services and keeps them well informed. The city has a variety of commissions including:

- Environmental Commission
- Communications & Technology Commission
- Education Commission
- Library Commission
- Parks & Recreation Commission
- Planning Commission
- Public Safety Commission
- Traffic & Transportation Commission
- Tree Board

As a result of these commissions, citizens of Calabasas have various opportunities to participate in city issues. They can voice their concerns and interests within the commission meetings which are announced in advance.

The purpose of the Public Safety Commission is to foster and maintain effective interaction with law enforcement and seek to develop a formal mechanism to support such interaction. The scope of subject matter that is pursued by Public Safety Commission and representatives of law enforcement are as follows:

- Fire / Life Safety Issues
- Crime Incidents / Trends
- Traffic Safety School Related Issues
- Time and Performance Data
- Safety Hazards
- Public Perceptions of Law Enforcement Performance

PUBLIC INVOLVEMENT GROUPS

Along with the chance to participate on commission boards, the public also has an opportunity to participate in the various emergency preparedness groups within the city that include:

- Calabasas Emergency Response Team (CERP)
- Disaster Triage Assistance Team (DTAT)
- Medical Reserve Corps
- Community Emergency Response Team (CERT)

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The CERP program has been nationally recognized for its excellence, the following information describes the city of Calabasas CERP program more specifically.

CERP

The City of Calabasas Emergency Response Program consists of the following:

1. The City Emergency Response organization is organized on the SEMS model. The City of Calabasas has an emergency operations center and separate communications room. The City of Calabasas coordinates its emergency activities with the Lost Hills Sheriffs Station and the L.A. County Office of Emergency Management through the Emergency Management Information System (EMIS) on line system. The City of Calabasas also has an internal cable network which is used during emergency/disaster situations to relay information on conditions within the City including transit issues, fire hazards, flood, shelter locations, school issues, and animal care and control.

2. The Calabasas Emergency Response Program (CERP) represents a group of volunteers who assist in pre-emergency notification, use as block captains, and radio communications by Sector Leaders to the City Hall Communications room. (Commercial radio system). The City of Calabasas also has a group of volunteers who are trained in the Community Emergency Response Training program. This is a 20 hour training activity that is approved by FEMA. These volunteers work with other teams in neighboring cities and utilized by the County Fire and Sheriff Departments to support their operations.

3. The Calabasas Emergency Response Program has been recognized by the L.A. County Emergency Preparedness Commission for their pro-active involvement in the City. Along with these groups, Calabasas also has an extensive list of Homeowners Associations that meet to discuss various community issues and are very involved in the community. The following is a list of the Homeowners Associations in the City of Calabasas.

Calabasas Home Owner Associations	
Alizia Canyon	Malibu Canyon Townhomes
Archstone Calabasas	Malibu Canyon Villas
Bellagio - Park Verdi	Malibu Creek Apartments
Braewood Calabasas	Malibu Creek Condominiums
Calabasas Colony	Mira Monte
Calabasas Country Estates	Mountain Park
Calabasas Highlands	Mulholland Heights
Calabasas Hills	Mulholland Heights North
Calabasas Park (Lake)	Mulholland Ranch Estates
Calabasas Park Estates	Mullwood Townhomes
Calabasas Ridge	Oak Creek
Calabasas View	Oak Creek Estates
Calabasas Village Mobil Estates	Oak Park



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Calabasas Home Owner Associations	
Clairidge	Old Topanga, Inc.
Classic Calabasas	Palatino
Country Lane HOA	Park Moderne
Creekside Calabasas	Park Sorrento Condos
Deer Springs	Saint Andrews
El Encanto	Saratoga Hills HOA
Greater Mulwood Homeowners	Saratoga Ranch
Las Villas Calabasas	Serenata
Las Virgenes Hills Homes	Steeplechase
Las Virgenes Homeowners Federation	Stonecreek
Las Virgenes Park	Tanterra HOA
Las Virgenes Village Townhomes	The Oaks of Calabasas
Malibu Canyon Apartments	Vista Pointe
Malibu Canyon Community	Westridge
Malibu Canyon Park	Woodland

LAND AND DEVELOPMENT

There are approximately 14 publicly owned buildings with 55.5 lane miles of streets in the City of Calabasas. According to the 2000 Census, there are 7,426 housing units within the City. A 2003 Los Angeles Times survey, showed that the median home value is \$880,000 with 7,426 housing units (mostly single-family) the total value of housing units is approximately \$6.5 billion. There are 7,694 parcels. The total valuation is approximately \$1.5 million per acre; however of the 8,269 acres within the City, approximately 3,000 acres are designated Open Space, this means 5,000 acres at \$1.5 million per acre gives a total valuation of approximately \$7.5 billion. For more information please consult the Los Angeles County Tax Assessor’s Office or their website at <http://assessormap.co.la.ca.us/mapping/viewer.asp>.

The city also hosts a variety of “Business Centers” including:

- Old Town Shopping Center
- The Commons
- The Courtyard at the Commons
- Creekside Village
- Calabasas Canyon Center
- Calabasas Plaza
- Malibu Canyon Plaza
- Plaza Calabasas
- Gelson’s Village

MINERALS AND SOILS

Local soils conditions are discussed in Sections 6 and 10 of this plan.



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POPULATION AND DEMOGRAPHICS

The following is a list of general demographics for the City of Calabasas.

General	
Elevation	500-2800 Feet (Average 796 Feet)
Date of Incorporation	5-Apr-91
Size of Incorporated Area	12.9 Sq. Mi.
Populaiton	
Total Population	20,033
Median Age	38.5 Years
Population 18 Years And Over	71.40%
Population 65 Years And Older	8.60%
Income	
Median Household Income	\$93,860
Median Home Value	\$479,000
Median New Home Price In 2003	\$880,000
Number of Housing Units	\$7,426
Household Types	
Average Household Size	3
Persons Living In Home	17%
Couples With Children	35.20%

Source: 2000 U.S. Census

HOUSING AND COMMUNITY DEVELOPMENT, BUILDING AGE AND CONSTRUCTION TYPE

Subject	Number	Percent
Total housing units	7,485	100.0
UNITS IN STRUCTURE		
1-unit, detached	5,089	68.0
1-unit, attached	742	9.9
2 units	35	0.5
3 or 4 units	153	2.0
5 to 9 units	283	3.8
10 to 19 units	355	4.7
20 or more units	594	7.9
Mobile home	234	3.1
Boat, RV, van, etc.	0	0.0
YEAR STRUCTURE BUILT		
1999 to March 2000	100	1.3
1995 to 1998	387	5.2
1990 to 1994	1,202	16.1
1980 to 1989	2,702	36.1
1970 to 1979	1,702	22.7
1960 to 1969	1,194	16.0
1940 to 1959	155	2.1
1939 or earlier	43	0.6

Source: 2000 U.S. Census



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HIDDEN HILLS

The City of Hidden Hills was incorporated in 1961. It has a population of 1,959 people, making it the least populous city in the Las Virgenes-Malibu COG. It is 1.65 square miles in size. The city has a total of 540 single family homes and its city hall houses 3 full time employees. The city offers its citizen’s a variety of services including a city newsletter. The city also has a Public Safety Commission led by Jim Doran.

The City of Hidden Hills works closely with neighboring cities, most notably the City of Calabasas from which the Hidden Hills shares traffic and transportation information.

LAND AND DEVELOPMENT

The city is almost totally residential, with the exception of a realty office.

MINERALS AND SOILS

According to the 2000 Census, the City of Hidden Hills has 590 housing units. Local soils conditions are discussed in the Sections six and ten of this plan.

POPULATION AND DEMOGRAPHICS

The 2000 US Census states that the city has a total of 1,875 residents with 568 households. The following is a list of general demographics for the City of Hidden Hills.

Total population	1,875	100.0
SEX AND AGE		
Male	902	48.1
Female	973	51.9
Median age (years)	40.4	(X)

Source: 2000 U.S. Census

HOUSING AND COMMUNITY DEVELOPMENT, BUILDING AGE AND CONSTRUCTION TYPE

In terms of development, the city has more recent buildings and follows the universal building codes. There are a total of 590 housing structures in the city. The following chart displays building age in the City of Hidden Hills.

Subject	Number	Percent
Total housing units	590	100.0
UNITS IN STRUCTURE		
1-unit, detached	588	99.7
1-unit, attached	2	0.3
2 units	0	0.0
3 or 4 units	0	0.0



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Subject	Number	Percent
5 to 9 units	0	0.0
10 to 19 units	0	0.0
20 or more units	0	0.0
Mobile home	0	0.0
Boat, RV, van, etc.	0	0.0
YEAR STRUCTURE BUILT		
1999 to March 2000	10	1.7
1995 to 1998	33	5.6
1990 to 1994	69	11.7
1980 to 1989	63	10.7
1970 to 1979	115	19.5
1960 to 1969	124	21.0
1940 to 1959	174	29.5
1939 or earlier	2	0.3

EMERGENCY PREPAREDNESS

The City of Hidden Hills has a comprehensive Emergency Preparedness Plan that combines mitigation strategies in a coordinated manner both internally and with existing regional multi-jurisdictional plans.

The City has contractual agreements with Los Angeles County Sheriff’s Department and with Los Angeles County Fire Department to protect public safety and property within city limits. Utility companies providing services to the community, such as Southern California Edison, Las Virgenes Municipal Water District, Southern California Gas Company and Pacific Bell all have aggressive emergency response plans in the event of a disaster. For planning purposes, the worst-case scenario provided by major utilities emphasizes a 72 hour recovery period for services.

City Fax/Email Notification

The City of Hidden Hills has implemented an E-mail/fax notification system which notifies residents, who have signed-on for the program of any events or situations within the City. It is used as an emergency response instrument. One of the most current hazard events in which the system was utilized was during the October fires that came through Ventura and Los Angeles Counties and very close to the City. The system is also used to circulate public service announcements such as reminding seniors to check alternate electrical power sources in the event of an electric shutdown. This notification is a joint effort between the City of Hidden Hills and Southern California Edison.



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MALIBU

The City of Malibu was incorporated in March of 1991. It has a population of 13,048 people, making it the third most populous city within the Las Virgenes-Malibu COG. It is 100.96 square miles in size, 81.09 percent of that being water area. Elevations within the city range from 2650 feet above Mean Sea Level (MSL) to Sea Level. There are 21 canyons and watershed areas along 27 miles of coastline. The city averages less than a mile wide at its most narrow point and 8 miles wide at its widest.

Pacific Coast Highway (PCH), designated State Route 1 is the major four lane arterial roadway traversing the city, which provides access through the city for approximately 40,000 daily commuters. Beach traffic substantially increases the traffic congestion along the PCH during the summer months. Malibu's beaches are a major southland destination that attracted 8.8 million visitors in 1999.

City of Malibu is the 75th most populous City in Los Angeles County, and offers the benefits of living in a Mediterranean type of climate. The City is characterized by the unique and attractive landscape 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.

PUBLIC INVOLVEMENT GROUPS

The public has an opportunity to participate in the various emergency preparedness groups within the city that include:

MVPS

The City sponsors the Malibu Volunteer Patrol ("MVPs"), a group of residents trained to assist law enforcement personnel. The volunteers work various assignments including patrolling the community, assisting with dissemination of information to the community, and providing community services such as the "Kid Print" program.

The involvement of members of the community working alongside the Sheriff's Department personnel improves the communication and understanding between the two groups. This is yet another example of interagency efforts within the Las Virgenes-Malibu Council of Governments.

CERT

The city of Malibu participates in the Community Emergency Response Team (CERT). The City of Malibu holds CERT trainings four times a year. Additionally, there are over 60 Homeowner Associations within the City of Malibu who are very active within the public sphere. They often hold CERT meetings within their homes.

Las Virgenes-Malibu Council of Governments

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LAND AND DEVELOPMENT

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

The environment of most of the Las-Virgenes-Malibu region cities is nearly identical with that of their immediate neighbors and the transition from one incorporated municipality to another is seamless to most people.

The city has a total of 96-100 miles of streets within the city and approximately 6,753 parcels of land within the City, of which nearly 5,500 are developed. The city of Malibu has 7,038 households and 1,299 businesses.

MINERALS AND SOILS

Local soils conditions are discussed in the Sections 6 and 10 of this plan.

POPULATION AND DEMOGRAPHICS

The number of City residents has increased at a slow rate over the past thirty years, and growth predictions indicate that this trend will continue. A snapshot of demographics is provided below.

Subject	Number	Percent
Total population	12,575	100
SEX AND AGE		
Male	6,216	49.4
Female	6,359	50.6
Median age (years)	42.9	
RACE		
White	11,558	91.9
Black or African American	113	0.9
American Indian and Alaska Native	27	0.2
Asian	313	2.5
Native Hawaiian and Other Pacific Islander	12	0.1
Hispanic or Latino (of any race)	689	5.5
HOUSEHOLDS BY TYPE		
Households with individuals under 18 years	1,392	27.1
Households with individuals 65 years and over	1,263	24.6
Average household size	2.39	



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Average family size	2.86	
HOUSING OCCUPANCY		
Total housing units	6,126	100
Occupied housing units	5,137	83.9
Vacant housing units	989	16.1
For seasonal, recreational, or occasional use	533	8.7
HOUSING TENURE		
Occupied housing units	5,137	100
Owner-occupied housing units	3,741	72.8
Renter-occupied housing units	1,396	27.2
HOUSING TENURE		
Average household size of owner-occupied unit	2.52	
Average household size of renter-occupied unit	2.03	

Employment and Industry

Tourism and service industries are Malibu's principal employment activities. The City business climate has been strong and growing with concentrations of metals fabrication, machinery, and computer hardware and software firms.

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

GROWTH PROJECTIONS

The Annual Projected Population Growth Rate for the City of Malibu is 1.4%.

HOUSING AND COMMUNITY DEVELOPMENT

The City of Malibu is experiencing a great deal of 'in-fill' building, which is increasing the population density creating greater service loads on the built infrastructure, including roads, water supply, sewer services and storm drains.



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Housing Units in the City of Malibu

Total housing units	6,188
1 unit detached	3,858
1 unit attached	480
2 units	126
3 or 4 units	278
5 to 9 units	156
10 to 19 units	159
20 or more units	515

Source: Current City of Malibu Data

To address development issues, the Community Development Agency has engaged in activities that promote the quality of life for the citizens of City of Malibu. The large-scale effort is termed the City of Malibu Community Program, and includes neighborhood and other public facility improvements, rehabilitation of existing housing, and new housing development. HUD provides funding for City of Malibu's Community Program. The City participates in the Community Development Block Grant (CDBG) program. The primary resource available to address non-housing community development needs is the CDBG.

The City of Malibu's Economic Development Commission (EDC) is a body that helps to promote economic prosperity throughout the City. The EDC's mission is to promote development while maintaining quality of life and integrity of the environment.

There is an increased (or decreased) concentration of resources and capital in City of Malibu. The best indicator of this fact is the increasing (or decreasing) per capita personal income in the region since the 1970's. Per capita income is an estimate of total personal income divided by the total population.

This estimate can be used to compare economic areas as a whole, but it does not reflect how the income is distributed among residents of the area being examined. The City's per capita personal income is also increasing relative to California's and the United State's average per capita incomes, resulting in a more/less affluent community than the average population.

HOUSING NEEDS AND COSTS

In the City of Malibu the demand for housing outstrips the available supply, and the recent low interest rates have further fueled a pent up demand.

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EMERGENCY PREPAREDNESS

Emergency Preparedness Program

In response to the numerous floods, fires, and storms experienced during the first decade of incorporation, the City of Malibu created the Emergency Preparedness program to develop the structure and training of City resources in preparation for future disasters. Within a six-year period, Malibu survived six major federally declared disasters. Of the \$20 million in costs incurred by these disasters, the City was reimbursed approximately \$16 million by the Federal and State governments, leaving \$4 million to be funded by the City.

Services conducted under the Emergency Preparedness program include an annual training exercise to familiarize staff and volunteers with the functions of the EOC and their individual roles under various potential disaster scenarios. Under this program, the City has also implemented an emergency decal program for residents, designed to facilitate community access in the event of major road closures.

Under the City Manager's direction, the Emergency Preparedness Coordinator is responsible for implementation of the State Emergency Management System Multi-Hazard Function Plan within the organization. Activities include training staff and volunteers in preparation of a disaster and equipping the City's Emergency Operations Center (EOC).

Comprehensive Website

The City of Malibu also implements a host of Emergency Preparedness Information links on its website. The following is a current list of the services and information offered to the public on the City of Malibu's website.

Breaking Emergency News

About Emergency Preparedness

City of Malibu Department of Emergency Preparedness

Blackout Notifications

Websites where you can sign up for email blackout notifications

Community Emergency Response Team Training

Decal Program

For residents - to facilitate community access in the event of a major road closure.

Disaster Preparedness Survey

Emergency Information Subscription Service

Email notification of important emergency information.

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Emergency Preparedness Information

Monthly updates.

Emergency Services Links

Important Phone Numbers

Sheriff, Fire, Utilities, Medical

Information on Communicable Diseases -- DHS Website

Resources and information on bioterrorism.

Traffic Information Emergency Radio

A radio station dedicated to local information.

Weather Links

A compilation of links for current and forecasted weather

West Nile Virus Update

What you need to know about West Nile Virus.

WESTLAKE VILLAGE

The City of Westlake Village was incorporated in 1981. It has a population of 8,584 people, making it the fourth most populous city within the Las Virgenes-Malibu COG. It is 5.66 square miles in size. Located on the eastern side of the Ventura/Los Angeles County line, Westlake Village is a unique, master-planned community. The lakeside and surrounding area development was begun in 1966 by the American Hawaiian Steamship Company. There is one public elementary school, one private elementary school and one private high school. Water resources within the City's boundaries include one reservoir and one lake.

The City encompasses nineteen individual neighborhoods, with active homeowners' associations to promote and maintain high quality architectural standards. An array of housing types are present throughout the city including convenient townhomes, condominiums, mobile homes, single-family and lakefront residences, and view-oriented estates.

The City of Westlake Village is a general law municipality, operating on a contract basis in which many of the day-to-day services of local government are provided by public and private agencies. The residents of Westlake Village elect a five-member City Council to oversee the City operations and to guide the future development of the community. Council members are elected "at large" to serve a four-year term. Each year the Council selects one of its members to serve as Mayor and Mayor Pro Tem.

PUBLIC INVOLVMENT GROUPS

Public input and participation is very important to have a well rounded municipal government. Along with the chance to participate on commission boards, the public also has an opportunity to participate in the various emergency preparedness groups within the city that include:

Disaster Response Team

Since 1994 the city of Westlake Village has formed the Westlake Village Disaster Response Team (WLVDRS). The following are the WLVDRS two main objectives.

1. Provide community disaster preparedness education. This is accomplished through the WLVDRS basic training classes. Citizens who attend the basic training, in whole or in part, are encouraged to use the knowledge that they gain to better prepare themselves, their families, and their businesses for a potential disaster. The hope is that for every person who attends this training that will be at least one less victim that will need aid during a disaster.

2. Recruit, equip, and maintain a well-trained citizen response team. During a disaster or emergency situation the WLVDRS must be officially activated in order to perform its duties. An order for activation can come from either the City Council, the City Manager, the Sheriff's Department or the Fire Department. The WLVDRS may not self-activate unless such extreme emergency conditions exist that normal means of communication are interrupted.

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Volunteers in Policing

The City of Westlake Village has identified the enhancement of law enforcement services through the City's contract with the Los Angeles County Sheriff's Department as an important priority. The program consists of a core group of volunteers who are sponsored by the City of Westlake Village and are trained by the Malibu/Lost Hills Sheriff's Station. The City provides a marked vehicle, uniforms, and specialized equipment. The program volunteers provide a variety of services to include the patrol of neighborhoods and shopping centers, performing patrol checks of businesses, conducting vacation checks, and are available for related civilian requests.

The volunteer patrol members serve as a mobile Neighborhood Watch for the community. Interested citizens can contact the Lost Hills Sheriff's station.

SAR City

The city of Westlake Village is a Search and Rescue city and holds annual trainings. Please see Appendix D for more information.

LAND AND DEVELOPMENT

There are approximately 10 publicly owned buildings with 29.5 lane miles of streets in the City of Westlake Village. According to the 2000 Census, there are 3,573 building units within the City, 201 non-residential and 3,372 d.u.'s, with a total valuation of buildings of \$1.25 billion dollars.

The city also houses approximately 850 commercial and light industrial business firms. There are 2,971 parcels with a total valuation of \$2.014 billion dollars. For more information please consult the Los Angeles County Tax Assessor's Office or their website at <http://assessormap.co.la.ca.us/mapping/viewer.asp>.

The City of Westlake Village is also home to many business centers including Westlake Marketplace, The Landing, County Line and North Ranch Gateway Shopping Center. Industrial parks include the Dole Headquarters.

MINERALS AND SOILS

Local soils conditions are discussed in the Sections six and ten of this plan.

POPULATION AND DEMOGRAPHICS

A snapshot of demographics for the City of Westlake Village is provided below.

Subject	Number	Percent
Total population	8,368	100.0
SEX AND AGE		
Male	4,025	48.1
Female	4,343	51.9

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Subject	Number	Percent
RACE		
One race	8,186	97.8
White	7,506	89.7
Black or African American	69	0.8
American Indian and Alaska Native	11	0.1
Asian	509	6.1
Asian Indian	55	0.7
Chinese	205	2.4
Filipino	57	0.7
Japanese	69	0.8
Korean	64	0.8
Vietnamese	23	0.3
Other Asian ¹	36	0.4
Native Hawaiian and Other Pacific Islander	6	0.1
Native Hawaiian	0	0.0
Guamanian or Chamorro	3	0.0
Samoan	1	0.0
Other Pacific Islander ²	2	0.0
Some other race	85	1.0
Two or more races	182	2.2
<i>Race alone or in combination with one or more other races³</i>		
White	7,673	91.7
Black or African American	93	1.1
American Indian and Alaska Native	29	0.3
Asian	614	7.3
Native Hawaiian and Other Pacific Islander	17	0.2
Some other race	147	1.8
HISPANIC OR LATINO AND RACE		
Total population	8,368	100.0
Hispanic or Latino (of any race)	386	4.6
Mexican	187	2.2
Puerto Rican	23	0.3
Cuban	21	0.3
Other Hispanic or Latino	155	1.9
Not Hispanic or Latino	7,982	95.4
White alone	7,248	86.6
HOUSEHOLDS BY TYPE		
Total households	3,270	100.0
Family households (families)	2,492	76.2
With own children under 18 years	1,057	32.3
Married-couple family	2,153	65.8
With own children under 18 years	879	26.9



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Subject	Number	Percent
Female householder, no husband present	261	8.0
With own children under 18 years	135	4.1
Nonfamily households	778	23.8
Householder living alone	631	19.3
Householder 65 years and over	257	7.9
Households with individuals under 18 years	1,095	33.5
Households with individuals 65 years and over	1,005	30.7
Average household size	2.56	(X)
Average family size	2.93	(X)
HOUSING OCCUPANCY		
Total housing units	3,347	100.0
Occupied housing units	3,270	97.7
Vacant housing units	77	2.3
For seasonal, recreational, or occasional use	14	0.4
Homeowner vacancy rate (percent)	1.0	(X)
Rental vacancy rate (percent)	2.0	(X)
HOUSING TENURE		
Occupied housing units	3,270	100.0
Owner-occupied housing units	2,870	87.8
Renter-occupied housing units	400	12.2
Average household size of owner-occupied unit	2.60	(X)
Average household size of renter-occupied unit	2.25	(X)

Source: 2000 U.S. Census

HOUSING AND COMMUNITY DEVELOPMENT, BUILDING AGE AND CONSTRUCTION TYPE

The following chart depicts the age of building types within the city of Westlake Village. The age of a building can significantly impact its reaction to certain hazards. For instance, older buildings built with less code enforcements are less likely to withstand much alteration and damages due to a hazard.

Subject	Number	Percent
Total housing units	3,423	100.0
UNITS IN STRUCTURE		
1-unit, detached	2,254	65.8
1-unit, attached	622	18.2
2 units	21	0.6
3 or 4 units	141	4.1



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Subject	Number	Percent
5 to 9 units	114	3.3
10 to 19 units	68	2.0
20 or more units	24	0.7
Mobile home	179	5.2
Boat, RV, van, etc.	0	0.0
YEAR STRUCTURE BUILT		
1999 to March 2000	21	0.6
1995 to 1998	317	9.3
1990 to 1994	126	3.7
1980 to 1989	767	22.4
1970 to 1979	1,133	33.1
1960 to 1969	990	28.9
1940 to 1959	61	1.8
1939 or earlier	8	0.2

EMERGENCY PREPAREDNESS

The following are a sample of programs, plans and activities the city of Westlake Village.

SEMS

The Standardized Emergency Management System (SEMS) has been adopted by the City of Westlake Village for managing response to multi-agency and multi-jurisdiction emergencies and to facilitate communications and coordination among all levels of the system and among all responding agencies.

Automated Telephone Systems (CAN, Teleminder, and other call-up and call-back systems)

The City, along with Agoura Hills, Calabasas, Hidden Hills and Malibu, contract for an automatic telephone system, which has the capability of dialing all listed telephone numbers and providing a warning message. The system is controlled by the Lost Hills Sheriff’s Station.

Cable TV

The City made arrangements with the local cable operator to provide the public with alerting and notification of disaster situations when necessary. The estimated subscriber rate is 78%. This system includes break into all TVS that are a part of this cable system. Viewers will be instructed to turn to Channel 10. The City’s Cable Channel 10 will then broadcast ongoing instructions and information to citizens.



**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

**SECTION 3
RISK ASSESSMENT**

The goal of mitigation is to reduce the future impacts of hazards. Hazards can cause property damage, disrupt the local economy, and force the expenditure of large amounts of public and private funds to assist with recovery. However, mitigation should be based on risk assessments. Risk assessment is measuring the potential loss from a hazard event by evaluating the vulnerability of buildings, infrastructure and people. It identifies the characteristics and potential consequences of hazards, how much of the community could be affected by a hazard, and the impact on community assets. A risk assessment consists of three major components: hazard identification, vulnerability analysis and risk analysis.

FEDERAL REQUIREMENTS FOR RISK ASSESSMENTS

Recent federal regulations for hazard mitigation plans outlined in 44 CFR Part 201 include a requirement for 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. There are hazards profiled in the mitigation plan, including earthquakes, earth movements including landslide, flooding, fires (including wildland and structural), wind storms and terrorism. The Federal criteria for risk assessment and information on how the Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan meets those criteria are outlined in the Table below.

CHART 3. RISK ASSESSMENT

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. The region developed maps identifying the location of the hazard in the region which appear throughout the plan and are listed in the table of contents.
Profiling Hazard Events	Each hazard section includes documentation of the history, and causes and characteristics of the hazard in the Region which appear in the “history” section under each of the hazards in Part II of the plan.
Assessing Vulnerability: Identifying Assets	The “hazard identification” and “risk assessment” sections under each hazard in Part II of the plan provides a summary of the vulnerability assessment of each hazard and where data is available, contains the types and numbers of existing buildings, infrastructure and critical facilities exposed to each hazard.

**Las Virgenes-Malibu Council of Governments
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Section 322 Plan Requirement	How is this addressed?
Assessing Vulnerability: Estimating Potential Losses:	The calculations of the impact of the hazard and if data is available, the economic and physical losses, are discussed under the “What is susceptible to...” section under each hazard in Part II of the plan. Vulnerability 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 Las Virgenes-Malibu Council of Governments Community Profile Section of this plan provides a description of the development trends in the region, including the geography and environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns.

WHAT IS RISK ASSESSMENT?

The Region conducted a risk assessment by soliciting regional city staff and community input as demonstrated by the following actions.

Hazard Identification

The Steering Committee discussed all possible hazards that may affect Las Virgenes-Malibu region. Several sources participated in assessing which hazards are most likely to occur within the Las Virgenes-Malibu region and which ones would be most significant. Weighing the history, the probability, and the magnitude of each hazard to the Region, the Steering Committee and the Focus Group chose to incorporate the following hazards into the Mitigation Plan:

- Earthquake
- Earth Movement (Landslide/Debris Flow)
- Flood (including Reservoir Failure)
- Fire (including Wildland and Structural Fire)
- Windstorm
- Terrorism

Community

In another informal survey named the Natural Hazard Risk Analysis Rating Form (created by Janice Rogala) community members from each city were asked to rank the hazards list from most likely to least likely to occur in the Las Virgenes-Malibu Council of Governments. The cities chose from various mediums to channel the survey. See Attachment I, at the end of this section to view an example of how the city of Hidden Hills chose to distribute the survey.

The surveys are being conducted currently and shall be incorporated into the plan. A sample of the survey form is attached in Appendix C.



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Steering Committee and Focus Group

The Steering Committee participated in rating the hazards by taking the Hazard Rating Survey. In addition, in order to get a more comprehensive rating of the hazards, a focus group was created to assess the risk and vulnerability of the hazards. Please note Appendix F for a sample of this survey. This Focus Group was comprised of the following members:

Carol Tubelis

Assistant to the City Manager/City Clerk
City of Agoura Hills

Gary J. Lysik

Chief Financial Officer
City of Calabasas

Dirk Lovett

City Engineer
City of Hidden Hills

Brad Davis

Emergency Preparedness Coordinator
City of Malibu

Audrey Brown

Assistant City Manager
City of Westlake Village

Focus Group # 1, along with the Steering Committee took the following survey and ranked the hazards according to probability, damage, duration, and recovery time. The following chart depicts their responses.

CHART 4. FOCUS GROUP HAZARD RATING SURVEY (IN PROGRESS)

Note: Not all surveys have been completed. Scheduled to be completed by 11/15/2004.

Hazard	Probability	Magnitude/Severity	Warning Time	Duration
Terrorism	TBD	TBD	TBD	TBD
Windstorm	TBD	TBD	TBD	TBD
Earthquake	TBD	TBD	TBD	TBD
Flooding	TBD	TBD	TBD	TBD
Landslide	TBD	TBD	TBD	TBD
Wildfires	TBD	TBD	TBD	TBD

See Appendix F for a sample of the survey. The following chart represents the Steering Committee's responses.

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CHART 5. STEERING COMMITTEE HAZARD RATING SURVEY (IN PROGRESS)

Hazard	Probability	Magnitude/Severity	Warning Time	Duration
Terrorism	TBD	TBD	TBD	TBD
Windstorm	TBD	TBD	TBD	TBD
Earthquake	TBD	TBD	TBD	TBD
Flooding	TBD	TBD	TBD	TBD
Landslide	TBD	TBD	TBD	TBD
Wildfires	TBD	TBD	TBD	TBD

The information from the Steering Committee and Focus Group surveys are currently being tabulated and results shall be included in the plan.

OTHER NATURAL DISASTERS

There are a number of possible disasters that can happen at any given time, at any given place. However, based on historical analysis the probabilities, the hazards chosen to be identified in detail in the plan were narrowed down to five natural and one manmade disaster that are most common or likely to occur within the Las Virgenes-Malibu region. The following two natural disasters are not ruled out as possibilities, but are categorized as not very likely to occur.

**Natural
*Tsunami***

A tsunami has never occurred within the Las Virgenes-Malibu region. Although the Region enjoys a close proximity to the ocean, there is no record of a Tsunami or repercussions of. State data shows that although the Las Virgenes-Malibu region would sustain some water if a Tsunami hits the Southern California Coast, it would have little to no affect on the region.

Drought

Historical records of the last century do not show any significant loss of life or property to the Las Virgenes-Malibu region because of a drought occurrence. The last devastating drought to hit Southern California was from 1862-1864, where the state lost nearly a quarter of its earnings and 40% of its livestock, mostly because of the dry Southern region. (**Leonard Pitt, Decline of the Californios: A Social History of the Spanish-Speaking Californias, 1846-1890, pg.247**) However times and technology allow for more tolerance. The region of Southern California is currently undergoing a six year drought; however there are no accounts that indicate a serious threat to life or property due to a drought within the region.

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Manmade

The only manmade disaster that is included in the plan for the Las Virgenes-Malibu Council of Governments is terrorism. The Region has been preparing diligently to prevent this type of catastrophe. The following are possibilities, as all disasters are, but the likelihood based on history and the affect they would have on life or property have been taken into consideration.

Power Outage

Power services are provided to the region by Southern California Edison. Power outages can occur whenever there is a severer disruption to the power lines or grid. For instance during a severe storm, an earthquake and/or wildfire. Power outages do occur in the region whether associated with a disaster or not. Southern California Edison (SCE) is the power service provider for the Las Virgenes-Malibu region.

SCE has an emergency preparedness program in place to address pre- and post-disaster planning needs. Additionally, they have developed the necessary plans to communicate post-disaster with the region and, as necessary, to integrate response activities with the region. Finally, SCE has assessed the vulnerability of their equipment to hazards and have taken steps to mitigate that vulnerability.

Aircraft Crash

The airports nearest to the Las Virgenes-Malibu Council region, which handle the greatest amount of air traffic, are Santa Monica Airport, Los Angeles International Airport, Ontario Airport, and Burbank Airport

Civil Unrest

Though Los Angeles County experienced a Civil Unrest in 1992, the Las Virgenes-Malibu region suffered no loss of life or property.

Hazardous Material Accidents

The Las Virgenes-Malibu region could be affected by hazardous materials incidents. The spills/releases of material can result from both stationary and mobile sources. The level of exposure from stationary sources is considered to be very low, due to the types of business and industry conducted within the region (traffic from major highways and railways still pose a risk). Although there are sites in the region known to harbor hazardous materials, there is no record of a hazard material spill or incident in the cities within the region. Because of this low historical frequency, the Steering Committee did not address this disaster. The following map identifies minimal hazardous waste handlers and generators in the Las Virgenes-Malibu region.

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PROFILING HAZARDS

This process describes the causes and characteristics of each hazard, how it has affected the Las Virgenes-Malibu region in the past, and what part of the Las Virgenes-Malibu region population, infrastructure, and environment has historically been vulnerable to each specific hazard. A profile of each hazard discussed in this plan is provided in each hazard section. For a full description of the history of the hazard and the city’s vulnerability, see the appropriate hazard section.

ASSESSING VULNERABILITY/ESTIMATING POTENTIAL LOSSES/INVENTORYING ASSETS

Assessing vulnerability is a three step process. The first step is to identify existing structures and critical facilities that are located within the hazard area. Government critical facilities are of particular concern because these buildings provide essential products and services to the general public that are necessary to preserve the welfare and quality of life in the region and fulfill important public safety, emergency response, and/or disaster recovery functions.

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Once existing structures are identified, the next step is to include an estimate of losses for the identified asset. Estimating potential loss 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. The last step in assessing the region's vulnerability to hazards is to analyze development trends in the region.

CRITICAL FACILITIES AND INFRASTRUCTURE

Critical and essential facilities are those facilities that are vital to the continued delivery of key government services or that may significantly impact the public's ability to recover from the emergency. The list on the following pages illustrates the critical and essential facilities and public infrastructure within the Las Virgenes-Malibu region. These facilities were deemed "critical" by the Steering Committee along with Focus Group #1.

The following are a list of buildings that have been identified by the cities in the Las Virgenes-Malibu COG as Critical Facilities. **Currently information is being gathered and a map of the critical facilities shall be included in the plan.**

FIRE STATIONS

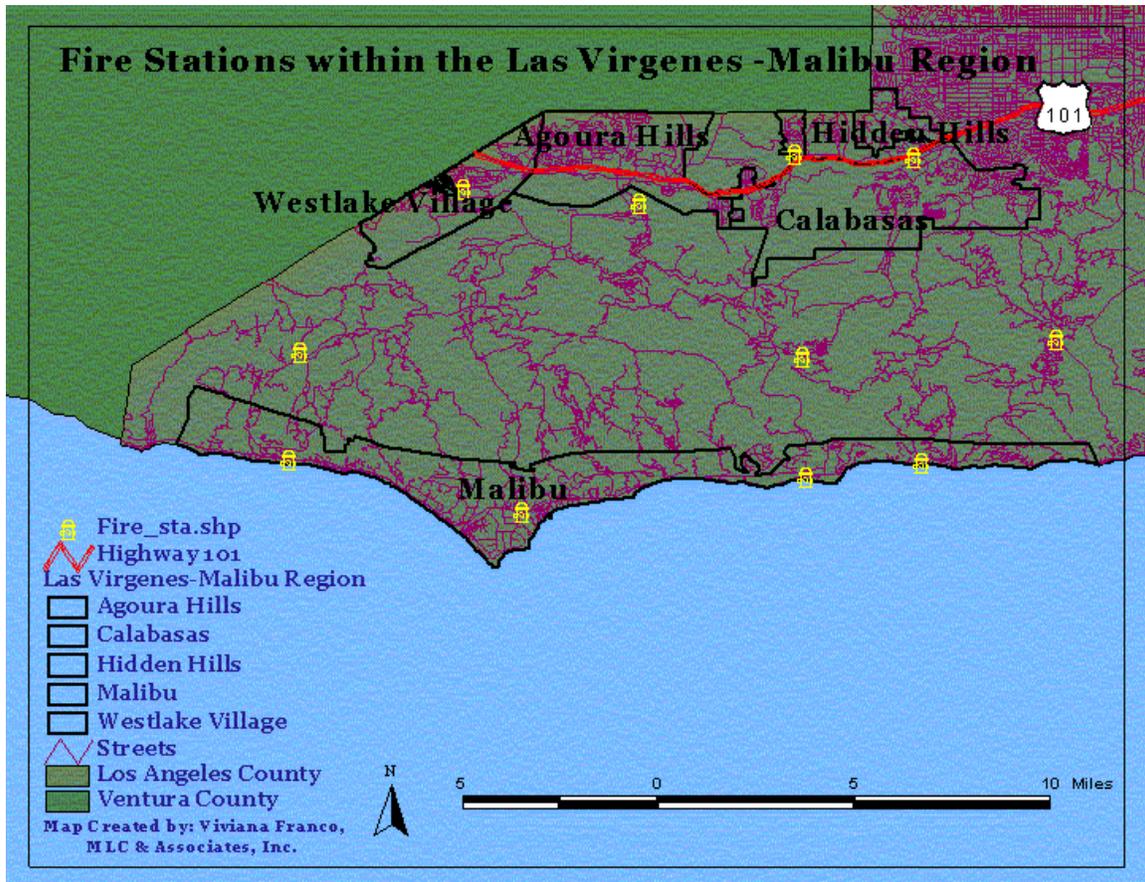
These are the stations located within the Las Virgenes-Malibu COG region. The Map 3 denotes their locations.

CHART 6. LAS VIRGENES-MALIBU COG FIRE STATIONS

FS 65	4206 N. Cornell Rd., Agoura 91301-2528
FS 67	25801 Piuma Rd., Calabasas 91302-2153
FS 68	24130 Calabasas Rd., Calabasas 91302-1511
FS 70 (Div & Batln. HQ)	3970 Carbon Cyn Rd., Malibu 90265-5005
FS 71	28722 W. Pacific Coast Hwy., Malibu 90265-3902
FS 72	1832 S. Decker Rd., Malibu 90265-9613
FS 88	23720 W. Malibu Rd., Malibu 90265-4603
FS 99	32550 Pacific Coast Hwy., Malibu 90265-2432
FS 125	5215 N. Las Virgenes Rd., Calabasas 91302-1061
FS 144	31981 Foxfield Dr., Westlake Village 91361-4203

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MAP 3. LAS VIRGENES-MALIBU COG FIRE STATIONS



SHERIFF'S STATIONS

Information is being gathered and shall be included in the plan.

**Las Virgenes-Malibu Council of Governments
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CITY FACILITIES

AGOURA HILLS

Facility Name	Civic Center
Size	37,000 sq. ft.
Facility Description: Use(s)	City Hall & Library
Age	3 years
Estimated Value	10 million
Location:	30101 Ladyface Court, Agoura Hills 91301
Major earthquake retrofitting	2001/Foundation & Structural

Facility Name	Reyes Adobe Historical Site
Size	2600 sq. ft.
Facility Description: Use(s)	Museum & Meeting Center
Age	154 years
Estimated Value	2 million
Location	5464 Reyes Adobe Road, Agoura Hills 91301
Major earthquake retrofitting	Yes-House in 1994/Barn in 2004 Structural

Facility Name	Recreation Center
Size	3500
Facility Description: Use(s)	Recreation Center
Age	14 years
Estimated Value	1 million
Location	30610 Thousand Oaks Blvd, Agoura Hills 91301
Major earthquake retrofitting	No

CALABASAS

Information is being gathered and shall be included in the plan.

HIDDEN HILLS

Information is being gathered and shall be included in the plan.

**Las Virgenes-Malibu Council of Governments
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MALIBU

Facility Name:	Malibu City Hall
Size	2 stories
Facility Description: Use(s)	Offices for City staff
Age	Built 1989
Estimated Value	\$1.2 Million
Location	23815 Stuart Ranch Road, Malibu, Ca 90265
Major earthquake retrofitting	No

Facility Name	Radio Transmitter Site
Size	500 sq. ft.
Facility Description: Use(s)	Houses Radio Transmitter/Antenna
Age	2001
Estimated Value	-
Location	29500 Heathercliff Road, Malibu, Ca 90265
Major earthquake retrofitting	No

Malibu Court House

23525 Civic Center Way, Malibu 90265

Pepperdine University

24255 Pacific Coast Highway, Malibu 90265

Hughes Research Labs

3011 South Malibu Canyon Rd, Malibu 90265

Malibu Beaches and Coastline / “Malibu Colony” Community

(No street address)

Infrastructure / Road tunnels

Malibu Canyon Road and Kanan Dune Rd.

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

WESTLAKE VILLAGE

Facility Name	Westlake Village Civic Center
Size	1 story, 24,991 square feet
Facility Description: Use(s)	City Hall, Library, Community Room
Age	3 years
Estimated Value	\$11,318,074
Location	31200 Oak Crest Drive, Westlake Village 91361
Major earthquake retrofitting	No

POTENTIAL EFFECTS OF HAZARDS ON THE BUILT ENVIRONMENT

Subtle but very measurable changes occur constantly in all communities. These changes can increase the degree of loss that could occur due to a major disaster. A number of factors contribute to this potential increased degree of loss:

- As the population increases, a greater number of people are susceptible to risks within a defined geographic space.
- Inflation constantly increases the worth of real property and permanent improvements.
- The amount of property owned per capita increases over time. The following chart compares average housing standards for the years 1975 and 1998.

HOW WILL BUILDING VALUES BE AFFECTED?

The region's building stock assessed valuation is significant. In addition to the potential loss of buildings (brick and mortar), indirect losses from specific occupants can also be anticipated. For example, "business interruption," which is not usually discussed in damage reports, may have been the largest loss caused by the Northridge earthquake. Safety services and administrative costs associated with closed structures could be considerable and would depend in part on owner cooperation.

COMMERCIAL STRUCTURE VALUATION

The Las Virgenes-Malibu region contains an impressive commercial industry. See Section 2 for more specific details by city.

TOTAL NUMBER OF BUILDINGS IN THE LAS VIRGENES-MALIBU REGION

See Section 2 for specific information for the Las Virgenes-Malibu region cities.

BUILDINGS AND VALUATION IN HAZARDS AREAS

The Las Virgenes-Malibu region contains much property in hazard areas. Past mitigation planning and future strategies have focused on limiting and eventually preventing development in hazard areas. As more information about geology, topography and atmospheric changes becomes available, the cities within the Las Virgenes-Malibu Council of Governments will adjust policies and laws to ensure the safety of their citizens. As more information becomes available on number of parcels, building and housing units within hazard units, this information shall be included in the plan

Las Virgenes-Malibu Council of Governments

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ASSESSING VULNERABILITY/ANALYSING DEVELOPMENT TRENDS

The last step in assessing the region's vulnerability to hazards is to analyze development trends in the region. This process provides stakeholders a basis in making decisions on the type of mitigation approaches to consider and the locations in which mitigation should be approved.

This plan provides comprehensive description of the character of the Las Virgenes-Malibu Council of Governments region. Information 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 Las Virgenes-Malibu Council of Governments region helped in identifying potential problem areas, and serves as a guide for incorporating the goals and ideas contained in this mitigation plan into other community development plans.

Regardless of the data available for hazard assessments, there are numerous strategies the cities within the region can take to reduce risk. These strategies are described in Section 4 of this plan. 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. Strategies throughout the hazard sections provide recommendations to collect further data to map hazard locations and conduct hazard assessments.

Summary

Hazard mitigation strategies can reduce the impacts concentrated around businesses, public infrastructure, and critical facilities. Hazard mitigation for industries and employers may include developing relationships with emergency management services and their employees before disaster strikes and establishing mitigation strategies together. Collaboration among the public and private sector to create mitigation plans and actions can reduce the impacts of hazards.

The Las Virgenes-Malibu Council of Governments have combined their efforts, resources and staff to develop a comprehensive plan that will mitigate for hazards across the entire region. This type of planning has involved much research and action and will prove to be an innovative approach at emergency planning.

**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

ATTACHMENT I. CITY OF HIDDEN HILLS NEWSLETTER

Hidden Hills Newsletter

November 2004

6165 SPRING VALLEY ROAD • 818/888-9281 • FAX 818/719-0083 • WWW.HIDDENHILLSCITY.ORG

<p><u>CITY COUNCIL</u> Mayor Steve Freedland</p> <p>Mayor Pro Tem Ron Berg</p> <p>Council Members Jim Cohen Monty Fisher Stuart Siegel</p> <p>***** <u>Table of Contents</u> <i>Calendar</i> page 1 <i>City Council</i> page 1 <i>Rainy Season</i> page 2 <i>Holidays</i> page 3 <i>Holiday Toy Drive</i> page 3 <i>Crime Statistics</i> page 4 <i>2004 Back to School Party</i> page 4 <i>Household Hazardous Waste & E-Waste Roundup</i> page 5 <i>Hidden Hills Tennis Club</i> page 6 <i>Fiesta Pictures</i> pages 7-11 <i>Fiesta Feedback</i> page 12 <i>2004 Fiesta Event Results</i> pages 13 - 15 <i>Fiesta Thank Yous</i> page 16 <i>Share Your Good News</i> page 17 <i>Crime Prevention Tips</i> pages 18 - 19 <i>LVMCOG Survey</i> pages 20 - 23</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;"> <h2 style="font-family: cursive; margin: 0;">Calendar of November Meeting Dates</h2> </div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">1 & 15</td> <td style="text-align: center;">Monday 7:30 p.m.</td> <td style="text-align: center;">Architectural Committee</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">Wednesday 7:30 p.m.</td> <td style="text-align: center;">Hidden Hills Horsemen</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Thursday 9:30 a.m.</td> <td style="text-align: center;">Theater Committee</td> </tr> <tr> <td style="text-align: center;">8 & 22</td> <td style="text-align: center;">Monday 7:30 p.m.</td> <td style="text-align: center;">City Council</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">Tuesday 9:30 a.m.</td> <td style="text-align: center;">Parks and Recreation Committee</td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">Wednesday 7:30 p.m.</td> <td style="text-align: center;">Equestrian Services Committee</td> </tr> <tr> <td style="text-align: center;">16</td> <td style="text-align: center;">Tuesday 7:30 p.m.</td> <td style="text-align: center;">HHCA Board of Directors</td> </tr> <tr> <td style="text-align: center;">23</td> <td style="text-align: center;">Tuesday 7:30 p.m.</td> <td style="text-align: center;">By-Laws Committee</td> </tr> <tr> <td style="text-align: center;">24</td> <td style="text-align: center;">Wednesday 7:30 p.m.</td> <td style="text-align: center;">Gate Committee</td> </tr> <tr> <td style="text-align: center;">30</td> <td style="text-align: center;">Tuesday 7:30 p.m.</td> <td style="text-align: center;">Public Safety Commission</td> </tr> </table> <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <h2 style="font-family: cursive; margin: 0;">City Council</h2> </div> <p>At the City Council meeting on September 13, 2004, the following actions were taken:</p> <ol style="list-style-type: none"> 1. The Council approved the following items on the Consent Calendar as submitted: City Council Minutes/August 23, 2004; Demand List. Copies of the above items are available in the City Clerk's office. 2. The Council approved the expenditure of \$10,068.18 to A Rental Connection for rentals for the 2004 Fiesta, subject to A Rental Connection signing the required City agreement. 3. The Council approved the installation by the Community Association of a shade trellis at the Lewis and Clark arena, subject to all building and safety requirements being met. <div style="text-align: center; margin-top: 20px;">  </div>	1 & 15	Monday 7:30 p.m.	Architectural Committee	3	Wednesday 7:30 p.m.	Hidden Hills Horsemen	4	Thursday 9:30 a.m.	Theater Committee	8 & 22	Monday 7:30 p.m.	City Council	9	Tuesday 9:30 a.m.	Parks and Recreation Committee	10	Wednesday 7:30 p.m.	Equestrian Services Committee	16	Tuesday 7:30 p.m.	HHCA Board of Directors	23	Tuesday 7:30 p.m.	By-Laws Committee	24	Wednesday 7:30 p.m.	Gate Committee	30	Tuesday 7:30 p.m.	Public Safety Commission
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Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

LVMCOG SURVEY

Las Virgenes Malibu Council of Governments (COG)

Consisting of the Cities of Hidden Hills, Agoura Hills, Calabasas, Malibu
and Westlake Village

DMA 2000 Hazard Mitigation Plan

The Disaster Mitigation Act of 2000 (DMA 2000), Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identifies and prioritizes mitigation actions, encourages the development of local mitigation and provides technical support for those efforts. The COG Board of Directors voted to prepare a regional multi-jurisdictional hazard mitigation plan for its member cities. This mitigation plan serves to meet the requirements of the DMA 2000.

This plan will be designed to assist the Las Virgenes-Malibu Region in reducing risk from hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the Region.

We invite you to participate in prioritizing our City's hazards by taking the time to fill out the short survey on page 21. Your opinion is very important to us, so please return the survey to City Hall, either by fax (818/719-0083), mail, or in person (6165 Spring Valley Road),

BY NOVEMBER 15, 2004.

Instructions for Hazard Mitigation Rating Form

Give each hazard priority risk category listed a rating from 0 to 3; 0 = no risk, 3 meaning a high risk.

0	=	No hazard risk in accordance with the definitions for hazard prioritization on pages 22 and 23.
1	=	Low Risk in accordance with the hazard prioritization definitions on pages 22 and 23.
2	=	Moderate Risk in accordance with the hazard definitions on pages 22 and 23.
3	=	High Risk in accordance with the hazard risk definitions on pages 22 and 23.

Total the numbers horizontally for each hazard category. The highest possible score for a hazard is 24; the lowest potential score is 0.

After the completion of the matrix, the committee will assign the numerical values for the four categories of risk: 1-highest priority risks, 2-moderate priority risks, 3-low priority risks and 0-no risk rating values for prioritization.

Examples: A score of → 17 to 24 could be considered high-priority risk.
9 to 16 could be considered moderate-priority risk.
0 to 8 could be considered low-priority risk.

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Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Hazard	Magnitude	Length of Event and Impact Including Recovery	Distribution	Area Affected	Frequency	Probability	Degree of Vulnerability	Community Priority	Total Score
Earthquake									
Fire: Wildland / Urban									
Flood									
Landslide / Mudslides									
Windstorms									
Terrorism									
Power Outages									

0	No hazard risk in accordance with the definitions for hazard prioritization on pages 22 and 23.
1	Low Risk in accordance with the hazard prioritization definitions on pages 22 and 23.
2	Moderate Risk in accordance with the hazard definitions on pages 22 and 23.
3	High Risk in accordance with the hazard risk definitions on pages 22 and 23.



Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Definitions for Hazard Prioritization

Magnitude

Physical and economic greatness (impact) of the event.

Factors to consider:

- Size of event
- Threat to life
- Threat to Property
 1. Individual
 2. Public sector
 3. Business and manufacturing
 4. Tourism

Length of Event and Impact Including Recovery Time

The risk that the length of time of the event and continued impact will last more than one week.

Factors to consider:

- Length of physical duration during emergency phase
- Length of threat to life and property
- Length of physical duration during recovery phase
- Length of effects on individual citizens and community recovery
- Length of effects on economic recovery, tax base, business and manufacturing recovery, tourism, threat to tax base and threat to employment

Distribution

The depth of the effects among all sectors of the community and State.

Factors to consider:

- How wide spread across the state and community are the effects of the disaster
- Are all sectors of the community affected equally or disproportionately

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Area Affected

How large an area is physically threatened and potentially impaired by a disaster risk.

Factors to consider:

- Geographic area affected by primary event
- Geographic, physical, economic areas affected by primary risk and the potential secondary effects

Frequency

The historic and predicted rate of recurrence of a risk caused event (generally expressed in years such as the 100 year flood).

Factors to consider:

- Historic events and recurrences of events in a measured time frame
- Scientifically based predictions of an occurrence of an event in a given period of time

Degree of Vulnerability

How susceptible is the population, community infrastructure and State resources to the effects of the risk.

Factors to consider:

- History of the impact of similar events
- Mitigation steps taken to lessen impact
- Community and State preparedness to respond to and recover from the event

Community Priorities

The importance placed on a particular risk by the citizens and their elected officials.

Factors to consider:

- Willingness to prepare for and respond to a particular risk
- More widespread concerns over a particular risk than other risks
- Cultural significance of the threat and associated risks
- Opportunity to mitigate for one risk before others due to resource availability
- Distribution of resources

SECTION 4

HAZARD MITIGATION PLAN MISSION STATEMENT, GOALS, STRATEGIES AND ECONOMIC ANALYSIS

This section describes the framework that focuses the plan on developing successful mitigation strategies. The framework is made up of three parts: the Mission, Goals, and strategies.

WHAT IS THE PLAN MISSION?

The Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan mission is to promote sound public policy and programs designed to protect the public, critical facilities, infrastructure, private and public property and the environment from natural and manmade hazards. This will be achieved by developing and implementing this plan to guide the region towards creating and maintaining a safer more sustainable community.

WHAT ARE THE PLAN GOALS?

The plan goals describe the overall direction that Las Virgenes-Malibu Council of Governments agencies, organizations, and citizens can take to minimize the impacts of hazards. The plan goals help to guide direction of future activities aimed at reducing risk and preventing loss from hazards. The goals are stepping-stones between the broad direction of the mission statement and the specific recommendations that are outlined in the strategies.

PLAN GOALS

To Protect Life, Property, Environment

- Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to hazards.
- Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.
- Encourage preventative measures for existing and new development in areas vulnerable to hazards.

Public Awareness

- Develop and implement education and outreach programs to increase public awareness of the risks associated with hazards.
- Develop and implement education and outreach programs to increase public awareness of the mitigation measures associated with hazards.
- Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.

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Partnerships and Implementation

- Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation.
- Encourage leadership within public and private sector organizations to prioritize and implement local and regional hazard mitigation activities.

Emergency Management

- Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.
- Update current ordinances, make recommendations for city guidelines, codes, and permitting process and establish new ordinances that support mitigation.
- Strengthen emergency operations by increasing collaboration and coordination among departments, public agencies, non-profit organizations, business, and industry.
- Coordinate and integrate hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

HAZARD MITIGATION STRATEGIES

The mitigation plan identifies action items developed and submitted through data collection, research, and the public participation process. Mitigation plan activities may be considered for funding through Federal and State grant programs, and when other funds are made available through the city. To help ensure activity implementation, each action item includes information on the time line and coordinating organizations.

Constraints may apply to some of the action items. These constraints may be a lack of city staff, lack of funds, or vested property rights which might expose the region to legal action as a result of adverse impacts on private property.

The following chart summarizes the proposed mitigation strategies for the Las Virgenes-Malibu. These items were submitted from various departments within the city and carefully planned, reviewed and approved by the Steering Committee.

**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

**MITIGATION STRATEGIES BY HAZARD
HOW ARE THE STRATEGIES ORGANIZED?**

The strategies are a listing of activities in which Regional departments within the various cities and citizens can be engaged to reduce risk. They reflect future action to be taken in order to reduce the loss of property and life.

The strategies are organized within the following matrix. Data collection, research and the public participation process resulted in the development of the hazard mitigation strategies. The matrix includes the following information for each strategy:

HAZARD	The hazard the strategy mitigates.		
PROJECT NAME	Name of the mitigation project strategy.		
STRATEGY	Strategy description		
ACTION ITEMS	What actions will be completed to implement the strategy?		
COORDINATING DEPARTMENT	The department 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. The main department responsible is in bold, the supporting departments are not.		
TIMELINE/COMPLETION DATE	Each project includes an estimate of the time line for implementation.		
TOTAL COST	Estimated cost of the project.		
FUNDING SOURCE(S)	Where the funding will be obtained.		
CONSTRAINTS	Constraints may apply to some of the action projects. These constraints may include a lack of Region staff, lack of funds, or vested property rights which might expose the Region to legal action as a result of adverse impacts on private property		
PLAN GOALS ADDRESSED	The plan goals addressed by each project are included as away to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins.		
	Public Awareness		Protect Life and Property
	Partnerships and Implementation		Emergency Management

Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1

The following are the detailed mitigation strategies for the Las Virgenes-Malibu Council of Governments. Each city has its own mitigation strategies. The mitigation strategies provide detailed action items that support the strategy. There are also mitigation strategies that pertain to the entire Las Virgenes-Malibu region, labeled “Regional Mitigation Strategies”. Multi-Hazard mitigation strategies provide strategies that can be applied to multiple or all hazards.

Please note that while some information was not available when these mitigation strategies were being developed, this information is being gathered and shall be included in the plan as it becomes available.

**LAS VIRGENES-MALIBU COG PROPOSED HAZARD
MITIGATION STRATEGIES**

REGIONAL

Hazard	Multi-Hazard		
Project Name	Develop, revise and maintain Las-Virgenes-Malibu Hazards Mitigation Plan		
Strategy	Coordinate with the cities of Agoura Hills, Calabasas, Hidden Hills, Malibu and Westlake Village to implement and update as needed the Hazards Mitigation Plan.		
Action Items	<ol style="list-style-type: none"> 1. Create the plan with input from all 5 cities 2. Conduct an annual review of the plan 3. Implement and monitor all mitigation strategies within the stated time period 4. Plan mitigation goals will address at least one, if not all plan goals: Public Awareness, Partnership and Implementation, Protect Life and Property and Emergency Management 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management



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Hazard	Multi Hazard		
Project Name	Communications Hardening		
Strategy	Update, revise, upgrade communications networks, facilities, equipment, etc. in the region to avoid communications problems during a hazard event		
Action Items	<ol style="list-style-type: none"> 1. Create antenna lease programs to avoid “black spots” in the region 2. Add repeaters to resisting radio systems 3. Purchase generators 4. Create MOU’s with companies such as Nextel 5. Purchase wireless communication equipment for EOC’s 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness		Protect Life and Property
	Partnerships and Implementation		Emergency Management

Hazard	Multi Hazard		
Project Name	Emergency Preparedness Public Awareness Campaign		
Strategy	To create a comprehensive program that would educate citizens about local hazards and what to do in case of hazard events.		
Action Items	<ol style="list-style-type: none"> 1. Provide the public with information regarding hazards 2. Create public service TV shows on local cable channels 3. Obtained matched funding through partnerships with local business community 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management



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Hazard	Multi Hazard		
Project Name	Hazard Awareness Public/Private Partnerships		
Strategy	Create public/private partnerships to educate and involve surrounding community regarding hazard events		
Action Items	<ol style="list-style-type: none"> 1. Wildland Defensible Space Project – Malibu <ol style="list-style-type: none"> a. Arrange for the city to provide land and the business community provides materials, equipment, etc. Public then becomes educated about Fire Defensible Plants 2. Provide the business community with Business Continuity training <ol style="list-style-type: none"> a. Conduct an assessment of employees that live in the community 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard	Multi Hazard		
Project Name	Rehabilitation of Residential Properties		
Strategy	Provide funds for low/moderate income residents to improve health and safety conditions		
Action Items	<ol style="list-style-type: none"> 1. Provide funds, equipment and/or materials to residents that cannot afford to repair homes 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

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Hazard	Multi Hazard		
Project Name	Emergency Shelter Identification		
Strategy	Identify buildings, areas, locations, etc within the community that can be used as Emergency Shelters in case of a hazard event.		
Action Items	<ol style="list-style-type: none"> 1. Build relationships with local hotels 2. Educate the hotels on hazards and procedures 3. Identify emergency shelters and provide detailed instructions on how to set up when activated as an emergency shelter 4. Conduct at minimum, yearly drills at the emergency shelters 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Multi Hazard		
Project Name	Pre-Established Contracts		
Strategy	Create pre-establish contracts with local merchants to provide emergency items/materials in an emergency situation		
Action Items	<ol style="list-style-type: none"> 1. Create relationships with local merchants 2. Establish contracts that would have these merchants provide certain goods to the city in case of an emergency situation, i.e. Water, candles, canned food, etc. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

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Hazard	Multi Hazard		
Project Name	Critical Infrastructure Assessment		
Strategy	Conduct an assessment of long term support for critical infrastructure		
Action Items	<ol style="list-style-type: none"> 1. Determine what infrastructure is most crucial to the city during an emergency event 2. Conduct an assessment of how well prepared this infrastructure is in terms of long term support, i.e. what buildings have back up generators, emergency materials, etc. to last for a designated period of time 3. Establish a designated period of time the for ‘long term’ support that critical infrastructure should be prepared for 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Multi Hazard		
Project Name	Emergency Services Contractors		
Strategy	Develop a directory of pre-existing contractors in case of emergency services		
Action Items	<ol style="list-style-type: none"> 1. Conduct assessment of past contractors used and local contractors 2. Indicate which contractors best suit the region’s needs 3. Create an inventory of contractors for individual cities to keep and use if and when a hazard event warrants the need for a contractors particular services 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

**Las Virgenes-Malibu Council of Governments
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Hazard	Multi Hazard		
Project Name	Advanced Community Training		
Strategy	Provide advanced emergency training for community members		
Action Items	<ol style="list-style-type: none"> 1. Provide CPR training for residents 2. Provide EMT training for residents 3. Provide more Automatic External Defibrillators (AED) 4. Provide training for residents and staff to be certified to operate AED's already present at some public buildings within the region 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Multi-Hazard		
Project Name	Citizen Corp		
Strategy	Expand the regions citizen participation programs		
Action Items	<ol style="list-style-type: none"> 1. Expand Community Emergency Response Training (CERT) to be active in all cities within the Las Virgenes-Malibu COG , 2. Recruit members for the Medical Reserve Corp 3. Create public awareness campaign through community outreach, press releases and city held volunteer functions 4. Develop a volunteer base to create opportunities for citizens to participate 5. Provide recruitment and training for these groups 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Las Virgenes-Malibu Council of Governments
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Hazard	Multi-Hazard		
Project Name	US 101 Freeway Corridor Improvement Study		
Strategy	Explore potential solutions to the transportation deficiencies of the 40-mile transportation corridor including, and surrounding (city streets and public transportation), the US 101 Freeway from State Route 23 in Thousand Oaks to State Route 110 in Downtown Los Angeles.		
Action Items	<ol style="list-style-type: none"> 1. Identify scope and funding for projects that would help relieve congestion and improve safety along the corridor. 2. Implement recommendations from study that would better serve the community in terms of public safety. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Multi Hazard		
Project Name	Regional Public Safety Commission		
Strategy	To create a regional Public Safety Commission to discuss matters of public safety and assist the Las Virgenes-Malibu Council of Governments to review the Hazard Mitigation Plan annually		
Action Items	<ol style="list-style-type: none"> 1. Create a Public Safety Commission comprised of members from all five cities represented in the Las Virgenes-Malibu COG. 2. Conduct at minimum, six meetings a year to discuss matters of public safety, including hazards in the area and changing social, economic and environmental conditions in regards to the hazards. 3. Provide suggestions on updating the Hazard Mitigation Plan. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

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CALABASAS

Hazard	Fire		
Project Name	Incentive Based Lot Mergers		
Strategy	Initiate process to provide incentive for residents to merge smaller lots		
Action Items	<ol style="list-style-type: none"> 1. Begin process to educate and provide incentive fro residents to consolidate small lots into one larger lot 2. Encourage homes to be developed with enough distance from one another in order to prevent the spread of fires. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Fire		
Project Name	Fire Code Update		
Strategy	Review and update existing city codes		
Action Items	<ol style="list-style-type: none"> 1. Review existing codes relevant to fire protection and prevention in the wildland interface 2. Rewrite codes to reflect new recommendations 3. Submit new codes for approval 4. Work with Los Angeles County Fire Department to enforce new codes 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness		Protect Life and Property
	Partnerships and Implementation		Emergency Management

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Hazard	Fire		
Project Name	Review Fuel Modification Plan Program		
Strategy	Review current fuel modification program sections of the Code to address problems with the existing code.		
Action Items	<ol style="list-style-type: none"> 1. Review existing fuel modification program 2. Prepare a fuel management plan to minimize wildland fire risk in a manner which protects the safety of people, personal property and existing biotic resources. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

HIDDEN HILLS

Hazard	Multi Hazard		
Project Name	Update the General Plan		
Strategy	Review and update the General Plan for the City of Hidden Hills to reflect current conditions.		
Action Items	<ol style="list-style-type: none"> 1. Review entire plan and make adjustments to reflect current city conditions, most notably the Safety Element of the plan. 2. Review existing codes within the plan and see if any new ones need to added or old ones amended. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management



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Hazard	Multi Hazard		
Project Name	Evacuation Routes		
Strategy	Study the possibility of creating alternate evacuation routes in case of an emergency event		
Action Items	<ol style="list-style-type: none"> 1. Conduct an assessment of current emergency routes 2. Determine if these routes are sufficient 3. Take necessary action to create alternative routes, means of city evacuation if current route is not sufficient. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Landslide		
Project Name	Comprehensive Hillslope Management Program		
Strategy	To recognize the concern for future property damages incurred by residents.		
Action Items	<ol style="list-style-type: none"> 1. Create a program that manages hillslope activity, where developments already are present 2. Suggest appropriate proactive measures that govern the long term stability of potentially active landslide areas 3. Prevent future development on potentially unstable hillsides 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management



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MALIBU

Hazard	Multi Hazard		
Project Name	GIS upgrade		
Strategy	To upgrade the Geographic Information Systems in order to add a higher resolution backdrop to map trails, flood hazard areas, geologic sensitive areas and document more detailed information.		
Action Items	<ol style="list-style-type: none"> 1. Upgrade the system and use new technologies to better map hazard areas 2. Seek funding through internal grant writers 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Flood		
Project Name	Risk Assessment of Decentralized Wastewater Management in High Priority Areas of the City of Malibu		
Strategy	Review the findings of the Risk Assessment and create mitigation strategies to prevent future loss of life and property.		
Action Items	<ol style="list-style-type: none"> 1. Review Risk Assessment and implement mitigation strategies accordingly. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management



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Hazard	Flood		
Project Name	Malibu Mitigation Plan		
Strategy	Identify crucial mitigation strategies recommended in the Flood Mitigation Plan, City of Malibu and begin implementation		
Action Items	1. Identify key projects within the Flood Mitigation Plan that will mitigate the loss of life and property during a flood event and request FEMA funding		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness		Protect Life and Property
	Partnerships and Implementation		Emergency Management

Hazard	Flood		
Project Name	Flood Action		
Strategy	Implement Floodplain management activities as recommended by the Flood Mitigation Plan, City of Malibu		
Action Items	<ol style="list-style-type: none"> 1. Floodplain Regulations 2. Flood Mapping 3. Flood Protections Assistance 4. Flood Protection Materials 5. Flood Protection Activities 6. Emergency Manager Training 7. Flood Warning and Preparedness 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness		Protect Life and Property
	Partnerships and Implementation		Emergency Management



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Hazard	Flood		
Project Name	Risk Assessment of Decentralized Wastewater Management in High Priority Areas of the City of Malibu		
Strategy	Review the findings of the Risk Assessment and create mitigation strategies to prevent future loss of life and property.		
Action Items	1. Review Risk Assessment and implement mitigation strategies accordingly.		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Flood		
Project Name	Cross Creek Road Redesign		
Strategy	Improve drainage area between Civic Center Way and Pacific Coast Highway		
Action Items	<ol style="list-style-type: none"> 1. Redesign Creek Road to improve drainage and reduce flooding. 2. Improve safety for pedestrians and vehicles 3. Improve traffic circulation 4. Beautify the commercial area between Civic Center Way and Pacific Coast Highway 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

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Hazard	Landslide, Flood		
Project Name	Big Rock Storm Drain Project		
Strategy	Improve drainage and prevent erosion on Big Rock Drive.		
Action Items	<ol style="list-style-type: none"> 1. Once approved, begin Bog Rock Storm Drain Project 2. Improve storm drains to prevent flooding during heavy rainfall 3. Implement strategies to prevent erosion and landslide event possibilities on Big Rock Drive. 		
Coordinating Department	Unknown at this time		
Timeline/Completion Date	Unknown at this time		
Total Cost	Unknown at this time		
Funding Source(s)	Unknown at this time		
Constraints	Unknown at this time		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management



SECTION 5

PLAN MAINTAINENCE

The plan maintenance section of this document details the formal process that will ensure that the Las Virgenes-Malibu COG Hazard Mitigation Plan remains an active and relevant document. This section includes a schedule for monitoring and evaluating the plan annually and producing a plan revision every five years. This section also describes how the Las Virgenes-Malibu region will integrate public participation throughout the plan maintenance process. Finally, the section includes an explanation of how the city governments in the Las Virgenes-Malibu COG intends to incorporate the mitigation strategies outlined in this plan into existing planning mechanisms such as the city's individual General Plans, Capital Improvement Plans, Building & Safety Codes and other programs and or plans within the cities.

MONITORING AND IMPLEMENTING THE PLAN AND PLAN ADOPTION

The Las Virgenes-Malibu Council of Governments and individual cities within the COG will be responsible for adopting the Las Virgenes-Malibu Hazard Mitigation Plan. This governing body has the authority to promote sound public policy regarding hazards. Once the plan has been adopted, the COG's Executive Director will be responsible for submitting it to the State Hazard Mitigation Officer at The Governor's Office of Emergency Management. The Governor's Office of Emergency Management will then submit the plan to the Federal Emergency Management Agency (FEMA) for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, Las Virgenes-Malibu will gain eligibility for Hazard Mitigation Grant Program funds.

Coordinating Body

The Las Virgenes-Malibu Hazard Mitigation Steering Committee will be responsible for coordinating and undertaking the formal review process.

Continued Public Involvement

Las Virgenes-Malibu regional cities are dedicated to involving the public directly and indirectly in the review and updates of the Hazard Mitigation Plan. The Steering Committee members are responsible for the annual review and update of the plan.

The public will also have the opportunity to provide feedback on plan. Copies of the plan will be catalogued and kept in appropriate departments as well in advertised locations so as to be easily accessible for public viewing.

A public meeting and Steering Commission update meetings will also be held after each annual evaluation or when deemed necessary by the Hazard Mitigation Steering Committee. The meetings will provide the public a forum where they can express their concerns, opinions, or ideas about the plan.

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Convener

The COG will adopt the Las Virgenes-Malibu Hazard Mitigation Plan, and the Hazard Mitigation Steering Committee will take responsibility for plan implementation. The Executive Director of the Las Virgenes-Malibu COG will serve as a convener to facilitate the Hazard Mitigation Steering Committee meetings. Plan implementation and evaluation will be a shared responsibility among all of the Hazard Mitigation Steering Committee Members. The Steering Committee shall be responsible for providing information gained from committees meetings with staff and community members in their respective cities.

IMPLEMENTATION THROUGH EXISTING PROGRAMS

Las Virgenes-Malibu addresses statewide planning goals and legislative requirements through their cities General Plans, Capital Improvement Projects, and City Building and Safety Codes. The Hazard Mitigation Plan provides a series of recommendations - many of which are closely related to the goals and objectives of existing planning programs within the cities. The Las Virgenes-Malibu regional cities will have the opportunity to implement recommended mitigation action items through existing programs and procedures.

The meetings of the Hazard Mitigation Steering Committee will provide an opportunity for committee members to report back on the progress made on the integration of mitigation planning elements into city planning documents and procedures.

ECONOMIC ANALYSIS OF MITIGATION PROJECTS

FEMA's approaches 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 the cities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. The individual cities will review all projects based on the cost and benefit analysis.

EVALUATING AND UPDATING THE PLAN AND THE FORMAL REVIEW PROCESS

The Las Virgenes-Malibu Hazard Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in development or programs that may affect mitigation priorities. Steering Committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the plan. The Steering committee will also be responsible for updating the plan.

The committee will review the goals and action items to determine their relevance to changing situations region, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The committee will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The city departments responsible for the various action items will report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised.

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PREVIOUS MITIGATION PLANS, PROJECTS AND ACTIONS

See the specific hazard sections (following) for previous and existing mitigation projects.



Part II.

Hazard Specific Information

Earthquake Hazards in the Las Virgenes-Malibu Region

**Las Virgenes-Malibu Council of Governments
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SECTION 6

EARTHQUAKES

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WHY ARE EARTHQUAKES A THREAT TO THE LAS VIRGENES-MALIBU REGION?

Recent reports from scientists with the U.S. Geological Survey and the Southern California Earthquake Center predict that the Los Angeles Area could expect to experience at least one earthquake every year of magnitude 5.0.

The Las Virgenes-Malibu is located in a region that is subject to frequent seismic activity. A major earthquake occurring on any one of several active faults could result in a substantial number of deaths and injuries and extensive damage to both public and private property. The Las Virgenes-Malibu is located along the boundary between the Transverse Ranges and Peninsular Ranges physiographic of Southern California. The Transverse Ranges consist of a complex series of elongate, east-west trending mountains, such as the Santa Monica Mountains, and intervening valleys. In contrast, the Peninsular Ranges province consists of northwest-southwest trending mountains, such as the Santa Ana Mountains, and intervening valleys. Both the Transverse Ranges and Peninsular Ranges physiographic provinces are seismically active and contain many active faults.

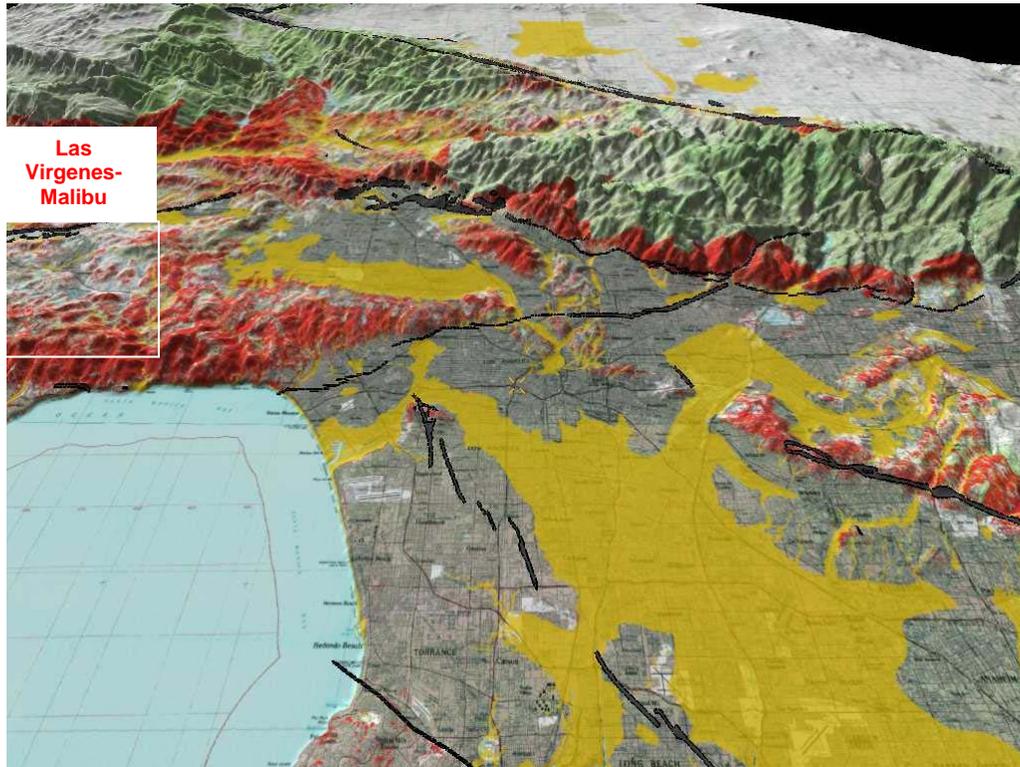
Building codes or earthquake design has evolved over the years and seismic design provisions have been added to or improved upon following major earthquakes. The following map is provided to show seismic hazards areas. Yellow areas are zones of potential liquefaction. Red areas are zones of potential landslides.

The Seismic Hazard Zones illustrated in the models are produced by the CGS Seismic Hazards Mapping Program and the Regional Geologic Hazards Mapping Program. The California Geological Survey's Earthquakes web page explains both programs in detail.



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MAP 4. SEISMIC HAZARDS 3-D ANIMATION OF THE LOS ANGELES AREA.



Source: http://www.consrv.ca.gov/cgs/geologic_hazards/earthquakes/3d_snaps.htm

Yellow areas are zones of potential liquefaction. **Red areas** are zones of potential landslides.

Background

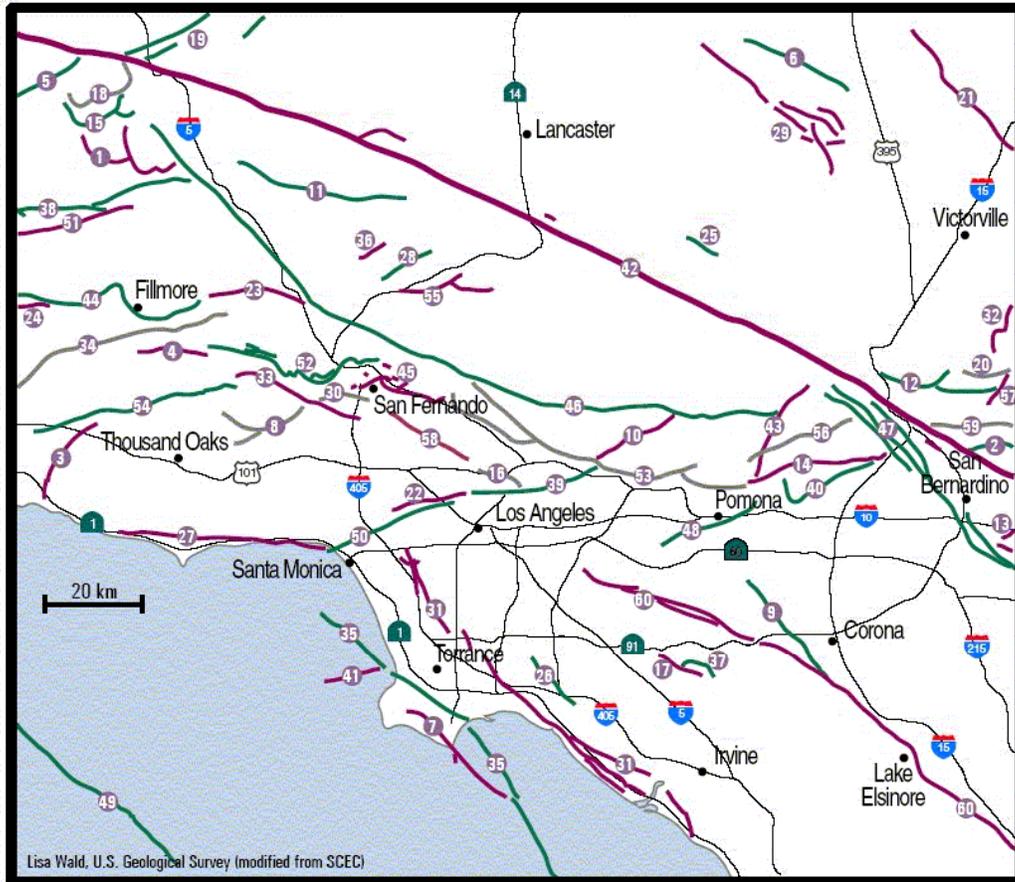
Earthquakes occur on faults. A fault is a thin zone of crushed rock separating blocks of the earth's crust. When an earthquake occurs on one of these faults, the rock on one side of the fault slips with respect to the other. Faults can be centimeters to thousands of kilometers (fractions of an inch to thousands of miles) long. The fault surface can be vertical, horizontal, or at some angle to the surface of the earth. Faults can extend deep into the earth and may or may not extend up to the earth's surface.

Stresses in the earth's outer layer push the side of the fault together. The friction across the surface of the fault holds the rocks together so they do not slip immediately when pushed sideways. Eventually enough stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the rock to cause the shaking that we feel during an earthquake. Earthquakes happen over an area of the fault, called the rupture surface. However, the whole fault plane does not slip at once. The rupture begins at a point on the fault plane called the hypocenter, a point usually deep down on the fault. The epicenter is the point on the surface directly above the hypocenter.

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MAP 5. FAULTS OF THE LOS ANGELES AREA (Source: USGS)

Faults of the Los Angeles Area



- | | | |
|-----------------------------|----------------------------------|---|
| 1 Alamo thrust | 21 Helendale fault | 41 Redondo Canyon fault |
| 2 Arrowhead fault | 22 Hollywood fault | 42 San Andreas Fault |
| 3 Bailey fault | 23 Holser fault | 43 San Antonio fault |
| 4 Big Mountain fault | 24 Lion Canyon fault | 44 San Cayetano fault |
| 5 Big Pine fault | 25 Llano fault | 45 San Fernando fault zone |
| 6 Blake Ranch fault | 26 Los Alamitos fault | 46 San Gabriel fault zone |
| 7 Cabrillo fault | 27 Malibu Coast fault | 47 San Jacinto fault |
| 8 Chatsworth fault | 28 Mint Canyon fault | 48 San Jose fault |
| 9 Chino fault | 29 Mirage Valley fault zone | 49 Santa Cruz-Santa Catalina Ridge f.z. |
| 10 Clamshell-Sawpit fault | 30 Mission Hills fault | 50 Santa Monica fault |
| 11 Clearwater fault | 31 Newport Inglewood fault zone | 51 Santa Ynez fault |
| 12 Cleghorn fault | 32 North Frontal fault zone | 52 Santa Susana fault zone |
| 13 Crafton Hills fault zone | 33 Northridge Hills fault | 53 Sierra Madre fault zone |
| 14 Cucamonga fault zone | 34 Oak Ridge fault | 54 Simi fault |
| 15 Dry Creek | 35 Palos Verdes fault zone | 55 Soledad Canyon fault |
| 16 Eagle Rock fault | 36 Pelona fault | 56 Stoddard Canyon fault |
| 17 El Modeno | 37 Peralta Hills fault | 57 Tunnel Ridge fault |
| 18 Frazier Mountain thrust | 38 Pine Mountain fault | 58 Verdugo fault |
| 19 Raymond fault zone | 39 Red Hill (Etiwanda Ave) fault | 59 Waterman Canyon fault |
| 20 Grass Valley fault | | 60 Whittier fault |

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HISTORY OF EARTHQUAKE EVENTS IN THE LAS VIRGENES-MALIBU REGION

MOST RECENT EARTHQUAKE IN SOUTHERN CALIFORNIA

A micro earthquake occurred at 10:53:49 PM (PDT) on Thursday, October 7, 2004. The magnitude 1.1 event occurred 2 km (1 miles) SSW of Studio City, CA. The hypocentral depth was 9 km (6 miles). This information according to the United States Geological Survey, Southern California Earthquake Hazards Program.

This earthquake differed from the deep thrust faulting earthquake sequences recorded in the last two decades in the Los Angeles area such as 1987 M5.9 Whittier Narrows and 1994 M6.7 Northridge. This current earthquake did not cause any notable damage however the potential exists.

The most recent major earthquake event in Southern California and affecting Los Angeles region was the 1994 Northridge Earthquake. At 4:31 A.M. on Monday, January 17, a moderate but very damaging earthquake with a magnitude of 6.7 struck the San Fernando Valley. In the following days and weeks, thousands of aftershocks occurred, causing additional damage to affected structures. 57 people were killed and more than 1,500 people seriously injured. For days afterward, thousands of homes and businesses were without electricity; tens of thousands had no gas; and nearly 50,000 had little or no water. Approximately 15,000 structures were moderately to severely damaged, which left thousands of people temporarily homeless. 66,500 buildings were inspected. Nearly 4,000 were severely damaged and over 11,000 were moderately damaged. Several collapsed bridges and overpasses created commuter havoc on the freeway system. Extensive damage was caused by ground shaking, but earthquake triggered liquefaction and dozens of fires also caused additional severe damage. This extremely strong ground motion in large portions of Los Angeles County resulted in record economic losses.

The earthquake occurred early in the morning on a holiday. This circumstance considerably reduced the potential effects. Many collapsed buildings were unoccupied, and most businesses were not yet open. The direct and indirect economic losses were estimated at \$40 billion.

The cities within the Las Virgenes-Malibu region were minimally affected by the earthquake, counting only nominal financial losses compared to the most affected parts of Los Angeles County. The City of Hidden Hills had a number of chimneys fall, one structure severely damaged and one home suffering major damage. The total dollar damage amount was \$1,377,500. As a result of the earthquake in a move to better assist the residents to repair their homes more expediently, the city of Hidden Hills waived all customary fees for permits sought for the primary purpose of repairing, reconstructing or restoring structures. The cost to the city because of this waiver was approximately \$61,750. The following is a list of the most significant earthquakes centered in Los Angeles County within the last 15 years.

**Las Virgenes-Malibu Council of Governments
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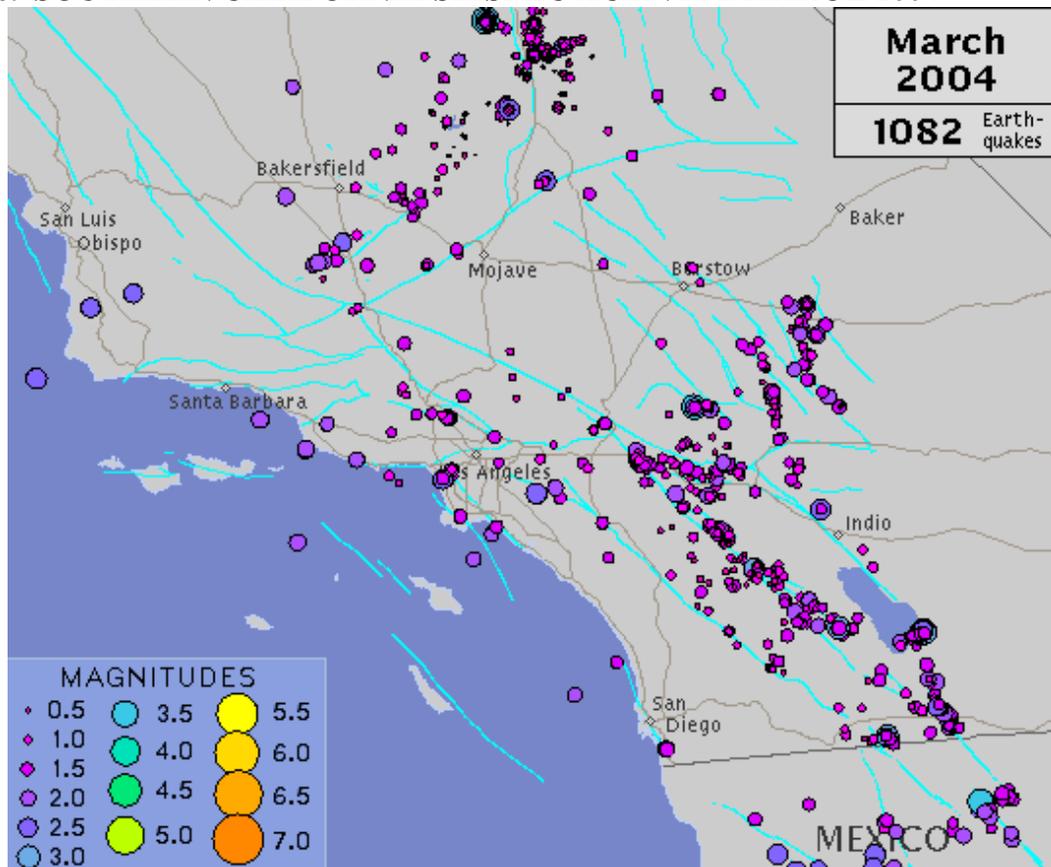
CHART 7. SIGNIFICANT LOS ANGELES COUNTY EARTHQUAKES

Year	Date	Location	Time	Richter	Mercalli	Deaths & Property Damage
1991	Jun 28	Sierra Madre	7:44am	5.8	---	2 deaths; \$40 million
1994	Jan 17	Northridge	4:31am	6.7	---	61 deaths Est. \$20 billion
2001	Sep 9	SE of West Hollywood	4:59pm	4.2	---	No deaths; moderate damage

Source: www.losangelesalmanac.com

The following map shows seismic activity within Southern California area in the month of March 2004. The Las Virgenes-Malibu region had a significant amount and activity proving that the area is susceptible to frequent seismic activity.

MAP 6. SOUTHERN CALIFORNIA SEISMIC ACTIVITY MARCH 2004



Source: <http://www.data.secc.org/Module/module.html>

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

CAUSES AND CHARACTERISTICS OF EARTHQUAKES IN THE LAS VIRGENES-MALIBU REGION

The Las Virgenes-Malibu exposure to geologic and seismic hazards is directly related to the location of the region relative to active faults. Numerous faults in Southern California can be attributed to the San Andreas Fault system. This system is a major crustal discontinuity that separates the southeast moving North American plate from the northwest moving Pacific plate, and extends for more than 1100 kilometers along nearly the entire length of the State of California.

The "Big Bend" of the San Andreas Fault is responsible for much of the complexity of faulting in Southern California. This bend is a convergent (restraining) bend, creating a localized collision of tectonic plates, and generates a tremendous amount of compressional stress. To release this stress, additional faults have formed over time. A typical response to large-scale compression is crustal shortening. This allows compression to continue by "squeezing" up the rocks in the compressional zone. This is accomplished by thrust faults - low-angle reverse faults that drive sections of crust over one another to create a thicker pile of crust with a shorter (horizontal) length. The surface traces of such faults are shown in pale yellow on the map view below. The 1994 Northridge earthquake (magnitude 6.7) occurred on one of these numerous thrust faults.

MAP 7. SAN ANDREAS FAULT "BIG BEND"



Source: http://www.consrv.ca.gov/cgs/geologic_hazards/earthquakes/3d_snaps.htm

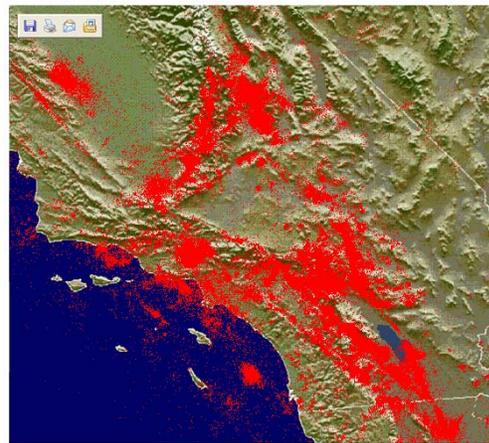
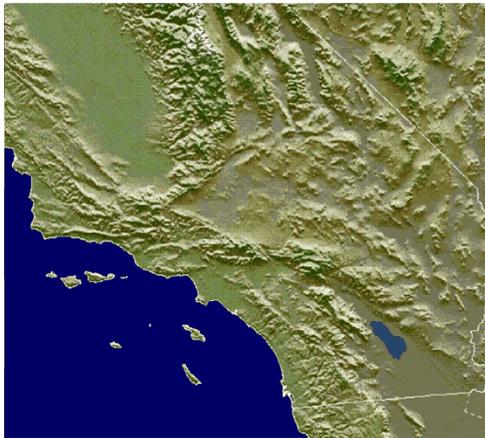
Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Not all the compressional force generated by the "Big Bend" of the San Andreas Fault goes into thrust faults. The collision boundary is not square with the plate motion, but at an angle, in such a way that some of the material "caught in the middle" has a chance to move laterally out of the way. This is exactly what happens. Large zones of left-lateral faulting, shown here in green, have formed in an effort to relieve some of the stress created by the fault bend. An example of this left-lateral faulting is the Hollywood / Santa Monica fault zone and the Garlock fault which intersects with the San Andreas near the northern end of the "Big Bend" and continues eastward for several hundred kilometers.

In addition, several right-lateral strike-slip faults south of the Big Bend, and west of the southern San Andreas Fault zone, seem to be managing some of the overall slip between the two tectonic plates. These fault zones, shown here in orange, are quite lengthy and roughly parallel the plate boundary.

But San Andreas is only one of dozens of known earthquake faults that crisscross Southern California. Some of the better known faults include the Newport-Inglewood, Santa Monica, Hollywood, Puente Hills, Whittier, Chatsworth, Elsinore, Los Alamitos, and Palos Verdes faults. Beyond the known faults, there are a potentially large number of "blind" faults that underlie the surface of Southern California. One such blind fault was involved in the Whittier Narrows Earthquake in October 1987.

MAP 8. TOPOGRAPHY OF THE LOS ANGELES BASIN (Red spots/areas represent earthquake occurrences 1932 – 1996).



source:<http://www.data.scec.org/Module/module.html>

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Local Soil Conditions

Certain soils greatly amplify the shaking in an earthquake. Passing from rock to soil, seismic waves slow down but get bigger. Hence a soft, loose soil may shake more intensely than hard rock at the same distance from the same earthquake.

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.

Earthquake Faults In or Near the Las Virgenes-Malibu Region

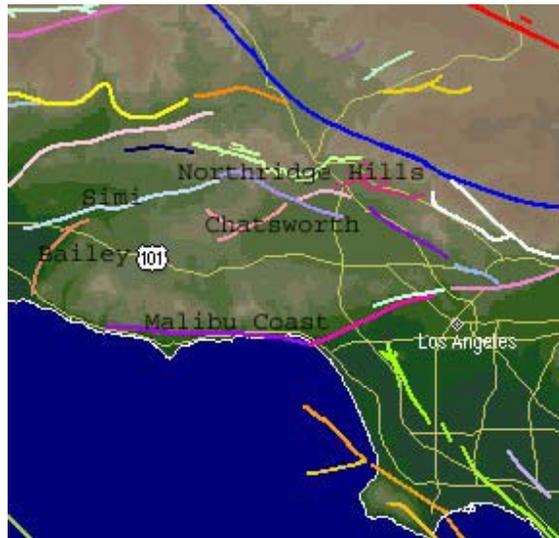
Numerous active earthquake faults present a potential danger to the Las Virgenes-Malibu. The following chart identifies faults that present the most probable danger to the Las Virgenes-Malibu region.

CHART 8. MAJOR FAULTS AROUND THE LAS VIRGENES-MALIBU REGION

Fault Name	Slip Rate (mm/yr)	Maximum Magnitude
Chatsworth	unknown	6.8
Malibu	0.3	6.7
Simi –Santa Rosa	1	6.7
Bailey	-	-
Northridge Hills	3	7

Source: http://www.consrv.ca.gov/CGS/rghm/psha/ofr9608/b_faults2.htm

MAP 9. KNOWN FAULTS IN AND AROUND THE LAS VIRGENES-MALIBU REGION



Source: <http://www.data.scec.org/faults/lafault.html>

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THE MALIBU COAST FAULT

This fault is located along the coast near the City of Malibu and has an east/west trajectory. It is 10 miles long and is considered an active fault. Its slip rate is roughly 0.3 mm/yr. This is a north-dipping fault. The slip rate may be higher at its eastern end, where it meets the Santa Monica fault, and develops left-reverse motion. This turns into the Santa Monica Fault.

SIMI FAULT (also known as Santa Rosa Fault)

The Simi Fault is approximately 40 km. long and has a reverse type of faulting. Nearby communities include Santa Susana, Simi Valley, Moorpark, Camarillo and the Las Virgenes-Malibu region. This fault dips to the north.

CHATSWORTH FAULT

This fault is 20 km. in length and has a reverse type of faulting. Its slip rate is unknown and has a probable magnitude that ranges from 6.0 -6.8. This is a north dipping fault.

BAILEY FAULT

The Bailey fault has a type of faulting that is left-lateral oblique reverse and is 20 km. in length. This fault marks the western edge of the Santa Monica Mountains.

NORTHRIDGE HILLS FAULT

The Northridge fault has a reverse type of faulting and is 25 km. in length. According to the Southern California Earthquake Center, the dip is probably to the north. This is not the fault on which the 1994 Northridge earthquake occurred. That was a south-dipping blind thrust fault, cut off at a depth of roughly 6 km by the Santa Susana fault zone, and probably connected at depth with the Oak Ridge fault.

OTHER NOTABLE FAULTS WITH PROXIMITY TO THE LAS VIRGENES-MALIBU REGION

The following are a list of faults that lie further from the Las Virgenes-Malibu region but may still affect the area.

THE NEWPORT/INGLEWOOD FAULT

This fault extends to just south/east of the region and is capable of producing a 6.9 magnitude earthquake with a slip rate at 1mm/yr. Because of its proximity to the region, it is thought to present a greater danger to the region in terms of death and destruction than the San Andreas.

The Newport-Inglewood is a right-lateral fault system. The movement on this fault caused the 1933 Long Beach magnitude 6.3 earthquake, and the 1920 Inglewood Earthquake (estimated magnitude 4.9).

The 1933 Long Beach Earthquake resulted in 120 deaths and over \$50 million in property damage in Los Angeles County. Most of the damaged buildings were of un-reinforced masonry. Many school buildings were destroyed.



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THE HOLLYWOOD FAULT

This fault is located near the base of the Santa Monica Mountains. The fault dips steeply to the north beneath the Santa Monica Mountains. Movement on the fault has juxtaposed the granitic, metamorphic, and sedimentary rocks of the Santa Monica Mountains up and over the sedimentary deposits south of the mountains. This fault has a slip rate of 1 mm/yr and is capable of producing a 6.4 magnitude earthquake. Thus, like the Newport/Inglewood Fault, the Hollywood Fault is also thought to present a great danger to the region. The Hollywood Fault is also a part of a major east-west trending, northward dipping, left lateral-reverse fault system that forms the southern boundary of the Transverse Ranges physiographic province. Other faults that appear to be a part of this system are the Anacapa (Dume) fault, Malibu Coast fault, Raymond fault (located to the east of the City of Pasadena area).

THE SANTA MONICA FAULT

This fault has a slip rate of 1 mm/yr; this fault is capable of producing a 6.6 magnitude earthquake. Thus, like the Newport/Inglewood Fault, the Santa Monica Fault is also thought to present a great danger to the region.

The Santa Monica Fault is a part of a major east-west trending, northward dipping, left lateral-reverse fault system that forms the southern boundary of the Transverse Ranges physiographic province. This system of faults is located along the southern front of the Santa Monica Mountains and extends from offshore in Santa Monica Bay to the San Gabriel Mountains. Other faults that appear to be a part of this system are the Anacapa (Dume) fault, Malibu Coast fault, Raymond fault (located to the east of the City in Pasadena area).

THE PUENTE HILLS FAULT

This fault system runs under downtown Los Angeles could generate an earthquake of magnitude 7.0 or greater. The fault snakes underground for at least 25 miles, from Puente Hills in northern Orange County through downtown Los Angeles and west toward Las Virgenes-Malibu region.

THE SIERRA MADRE/SAN FERNANDO FAULT SYSTEM

This fault system includes the Cucamonga, Sierra Madre, San Fernando and Santa Susana faults. Of this system of faults, the San Fernando Fault is most likely to present a danger to the Las Virgenes-Malibu region. Located approximately fourteen (14) miles to the north of the Las Virgenes-Malibu area, this fault, caused great destruction and numerous deaths and injuries in 1971. With a slip rate of 3 mm/yr, this fault is capable of producing a 7.0 magnitude earthquake.

THE WHITTIER FAULT

The Whittier Fault is located approximately twenty-three (23) miles to the southeast. This fault is capable of a 7.0 magnitude earthquake. During the Whittier Narrows earthquake of October 1987, which registered a magnitude of only 5.9, several buildings in Las Virgenes-Malibu region sustained damage, including one of the City's parking structures.

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THE SAN ANDREAS FAULT

Undoubtedly the most well known fault in California, the San Andreas Fault is located approximately nearly forty (40) miles to the east and with a slip rate of 24 mm/yr, this fault is capable of an 8.5 magnitude earthquake. Although capable of causing major damage throughout the Los Angeles Basin, it is now thought by many experts that because of its distance from Metropolitan Los Angeles (including Las Virgenes-Malibu region), it probably presents less danger to the COG region than some of the other faults mentioned above.

RAYMOND FAULT

Located near San Marino and South Pasadena, with a slip rate of 0.5 mm/yr, this fault is capable of producing a 6.5 magnitude earthquake. The exact nature of the slip along the Raymond fault has been a subject of debate for quite some time. The fault produces a very obvious south-facing scarp along much of its length, and this has made many favor reverse-slip as the predominant sense of fault motion. However, there are also places along this scarp where left-lateral stream offsets of several hundred meters can be seen. The matter will not be conclusively resolved until the Raymond fault ruptures at the surface, but some new light was shed on the debate in late 1988, when the Pasadena Earthquake occurred.

Apparently located on the Raymond fault, the motion of this quake was predominantly left-lateral, with a reverse component only about 1/15th the size of the lateral component. Curiously enough, this corresponds very well with a scarp height of about 30 meters (reverse slip) versus a left-lateral stream offset of about 400 meters (lateral slip), which are found along the scarp of the Raymond fault south of Pasadena. If the Raymond fault is indeed primarily a left-lateral fault, it could be responsible for transferring slip southward from the Sierra Madre fault zone to other fault systems.

EARTHQUAKE RELATED HAZARDS IN LAS VIRGENES-MALIBU REGION

The amount of damage to a building does not depend solely on how hard it is shaken. In general, smaller buildings such as houses are damaged more by higher frequencies, so usually a house must be relatively close to the hypocenter to be severely damaged. Larger structures such as high-rises are damaged more by lower frequencies and will be more noticeably affected by the largest earthquakes, even at considerable distances.

In addition to regional aspects of the earthquake hazard, there are location-specific hazards that can cause additional damage: surface rupture, ground shaking, amplification, settlement, liquefaction, and landslides. State laws require that every person buying a home or real property in California to be told if the property is in on one of these zones.

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



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(where the earthquake originates). Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock.

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. The Las Virgenes-Malibu has a high likelihood of encountering such risks, especially in areas with steep slopes. See earth movement (Landslide) section for more information.

Earthquake Induced 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 buildings and structures.

Liquefaction- induced ground failure has historically 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 was caused by liquefaction-induced ground displacement. Localities most susceptible to liquefaction-induced damage are underlain by loose, water saturated granular sediments at depths less than 40 feet subsurface. These geological and groundwater conditions exist in the Las Virgenes-Malibu.

Liquefaction Zone

Some areas in the region have a high water table. Where this condition occurs, it is possible for the ground to liquefy during an earthquake, becoming like quicksand. If this occurs, buildings may settle or tilt. Such damage occurred in the Marina District in San Francisco in the 1989 Loma Prieta earthquake.

Specific to the Las Virgenes-Malibu Region

Maps available on the United States Geological Survey (USGS) website indicate landslide and liquefaction zones within the cities in the Las Virgenes-Malibu region. Most of the cities and urban areas lie outside of the liquefaction and landslide areas.

The City of Agoura Hills seems to be in area that has the possibility of landslide events according to the regional map provided by the USGS. However in terms of liquefaction occurrences, the probability is low.

For the City of Calabasas, the closest liquefaction possibilities lie to the east of the city. As far as landslide areas, those are to the south, west and north of the city. The city seems to avoid any real exposure to the landslide areas.

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The City of Hidden Hills, according to their Safety Element of their general plan, is subject to moderate to high shaking from nearby faults, and the presence of sandy, fine grained soils may induce liquefaction. According to the USGS, liquefaction zones are located east of the city of Hidden Hills and landslide areas surround the city in various locations, but do not lie within the city. In regards to landslides, a few areas in the city of Hidden Hills may have potentially unstable slopes. Slope severity, soil conditions, and underlying geology contribute to these conditions in the event of seismic activity.

The City of Malibu is situated along areas more likely to experience landslide and liquefaction events. Because of Malibu’s fire history, the topography has been grossly changed over time. Native vegetation has been lost and made the soil more at risk to become soft in case of large rainfall. Seismic Hazard Map 10 (next page) for the City of Malibu and surrounding areas shows liquefaction and landslide areas in the City of Malibu and surrounding areas. To the north are the areas of Agoura Hills, Calabasas, Hidden Hills and Westlake Village. This map was provided to the City of Malibu by the California Department of Conservation, Division of Mines and Geology. For more information on methodology and rationale refer to www.consrv.ca.gov/dmg/.

The potential for liquefaction in areas of alluvium and shallow groundwater in the City of Westlake Village has been previously identified by the County of Los Angeles and more recently by the California Division of Mines and Geology (Davis, et al., 1982). However for liquefaction to actually occur, strong earthquake shaking, shallow groundwater, and poorly consolidated soils are all required. Since the latter can only be determined by detailed soils investigations on individual sites, the evaluation and mitigation of this potential hazard should occur as a part of the soils engineering investigation required for all development sites.

Refer to Seismic Hazard Map 10 (next page)

<p>The areas in blue denote areas that may experience earthquake induced landslides.</p>	<p>Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation defined in Public Resources Code Section 2693 (c) would be required.</p>
<p>The areas in green denote areas that may experience liquefaction.</p>	<p>Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693 (c) would be required. www.consrv.ca.gov/dmg/.</p>



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MAP 10. SEISMIC HAZARD ZONES

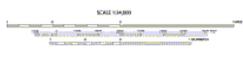


PURPOSE OF MAP
This map identifies and delineates in outline their responsibility for providing the public safety from the effects of earthquake triggered ground failure as required by the California Seismic Mapping Act (Public Resources Code Section 26200). This map is for informational purposes only and is not intended to be used as a guide for engineering or construction purposes. It is not intended to be used for engineering or construction purposes. It is not intended to be used for engineering or construction purposes.

IMPORTANT - PLEASE NOTE
1) This map may not show all areas that have been investigated for liquefaction, landslides, and landslides. This map is not intended to be used as a guide for engineering or construction purposes. It is not intended to be used for engineering or construction purposes.

STATE OF CALIFORNIA
SEISMIC HAZARD ZONES
Malibu Beach Quadrangle
Official Map
Released: October 17, 2001

Juanita Garcia
STATE GEOLOGIST



MAP EXPLANATION
Zones of Required Investigation:
Liquefaction
Landslides
Landslides

DATA AND METHODOLOGY USED TO DEVELOP THIS MAP ARE PROVIDED IN THE FOLLOWING:
Seismic Hazard Evaluation of the Malibu Beach 1:50,000 Quadrangle, Los Angeles County, California, Division of Mines and Geology, Scientific Report 100-100.
For additional information on seismic hazards in this map area, the entire report for zoning and additional references contained within this report should be used.
www.consrv.ca.gov/dmg/
Copyright © 2001 by the California Department of Conservation, Division of Mines and Geology. All rights reserved.

Source: <http://gmw.consrv.ca.gov/shmp/MapProcessor>



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The City of Westlake Village lies clear from any landslide or liquefaction areas; however due to the mountainous terrain of the entire region, landslides and liquefaction events are possibilities. Therefore the loss of life and property cannot be ignored in case of the effect of an indirect incident on the surrounding area. Geological maps provided by the State do not include any areas designated as liquefaction zones. However, there is some concern with potential liquefaction, especially in the lower areas of the City, due to the high water table.

Amplification

Soils and soft sedimentary rocks near the earth's surface can modify ground shaking caused by earthquakes. One of these modifications is amplification. Amplification increases the magnitude of the seismic waves generated by the earthquake. The amount of amplification is influenced by the thickness of geologic materials and their physical properties. Buildings and structures built on soft and unconsolidated soils can face greater risk. Amplification can also occur in areas with deep sediment filled basins and on ridge tops.

Settlements

Dissipation of seismically induced pore water pressure in saturated granular soils may lead to settlements after the shaking has stopped. The areas most susceptible to this potential hazard are the same areas that are in the liquefaction zone. Earthquake induced settlements can also occur in dry or moist granular materials simply as a result of shaking without pore water pressure buildup.

EARTHQUAKE HAZARD IDENTIFICATION

Southern California earthquakes have been identified by several sources including the Steering Committee, various representatives from the five cities staff and from the community to be the most likely disaster to occur within the Las Virgenes-Malibu.

RISK ANALYSIS

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 can generate estimates of the damages to the region 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 (**FEMA HAZUS <http://www.fema.gov/hazus/hazus2.htm> (May 2001)**). The HAZUS software is available in the certain cities but has not been used for this particular plan.



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For greater Southern California there are multiple worst case scenarios, depending on which fault might rupture, and which communities are in proximity to the fault. But damage will not necessarily be limited to immediately adjoining communities. Depending on the hypocenter of the earthquake, seismic waves may be transmitted through the ground to unsuspecting communities. In the Northridge 1994 earthquake, Santa Monica suffered extensive damage, even though there was a range of mountains between it and the origin of the earthquake.

Non-structural bracing of equipment and contents is often the most cost-effective type of seismic mitigation. Inexpensive bracing and anchoring may be the most cost effective way to protect expensive equipment. Non-structural bracing of equipment and furnishings will also reduce the chance of injury for the occupants of a building.

- 20 - 27% of wood frame single family homes would be lost for 120 - 200 days
- 19 – 22% of wood frame apartment building would be lost for 130 – 220 days
- 20 – 27% of steel frame office buildings would be lost.
- 27 – 35% of reinforced masonry buildings would be lost for 65-90 days

All of the built environment in the Las Virgenes-Malibu region follows the most current building codes and ordinances in regards to earthquakes.

PEAK GROUND ACCERLERATION IN LAS VIRGENES-MALIBU REGION

Peak ground acceleration (PGA) is when a small particle attached to the earth during an earthquake will be moved back and forth rather irregularly. This movement can be described by its changing position as a function of time, or by its changing velocity as a function of time, or by its changing acceleration as a function of time.

Since any one of these descriptions can be obtained from any other, we may choose whichever is most convenient. Acceleration is chosen, because the building codes prescribe how much horizontal force building should be able to withstand during an earthquake. This force is related to the ground acceleration. The peak acceleration is the maximum acceleration experienced by the particle during the course of the earthquake motion. (United States Geological Survey)

For PGA or 0.2g, earthquake loss estimation tables provide a simplified indication of the damages to different kinds of buildings (FEMA 386-2)

- Approximately 3% of wood frame single family homes would be lost for 9 – 15 days.
- Approximately 3% of wood frame apartment building would be lost for 10 – 16 days.
- 3 - 5% of steel frame office buildings would be lost.
- 6 - 8% of reinforced masonry buildings would be lost for 10 – 20 days.

Source: FEMA 386-2 – Understanding Your Risks identifying hazards and estimating losses.



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WHAT IS SUSCEPTIBLE TO EARTHQUAKES

Earthquake damage occurs because humans have built structures that cannot withstand severe shaking. Buildings, schools, and lifelines (roadways 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 COG.

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.
Infrastructure and Communication	Residents in the Las Virgenes-Malibu commute frequently by automobiles and public transportation such as buses. An earthquake can greatly damage bridge, tunnels 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,
Damage to Lifelines	Lifelines are the connections between communities and outside services. They include water and gas lines, transportation systems, 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 the police station, the fire stations, City Hall and other facilities that provide important services to the community. These facilities and their services need to be functional after an earthquake event.
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 the Federal Emergency Management Agency (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. (http://www.chamber101.com/programs_committee/natural_disasters/DisasterPreparedness/Forty.htm).



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EXISTING MITIGATION ACTIVITIES

Earthquake mitigation activities listed here include current mitigation programs and activities that are being implemented by the Las Virgenes-Malibu region.

Southern California Edison (SCE)

SCE's service territory is an area of high seismic activity. The company has specifically acted to mitigate the impacts of a seismic event on our electrical system. Recognizing that the location, time and magnitude of an earthquake cannot be precisely predicted, we forecast the maximum magnitudes and approximate boundaries of earthquakes on a probability basis by reviewing:

- Geological data and studies of earthquake records
- Depth, direction, geologic formation, location and proximity of faults that can induce earthquakes
- Accumulation of energy on a specific fault since its last major eruption
- Adoption of seismic-safe models and new material:
 - Live tank circuit breakers were replaced with dead tank circuit breakers at every opportunity to lower the center of gravity and reduce internal seismic loads.
 - Conventional porcelain insulators were replaced with polymer / silicon rubber insulators in selective applications to reduce seismic loads.
 - High-strength insulators are used more generously throughout the system.

CODE DEVELOPMENT

In California, each earthquake is followed by revisions and improvements in the Building Codes. The 1933 Long Beach resulted in the Field Act, affecting school construction. The 1971 Sylmar earthquake brought another set of increased structural standards. Similar re-evaluations occurred after the 1989 Loma Prieta and 1994 Northridge earthquakes. These code changes have resulted in stronger and more earthquake resistant structures.

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. This state law was a direct result of the 1971 San Fernando Earthquake, which was associated with extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures. Surface rupture is the most easily avoided seismic hazard. (<http://www.consrv.ca.gov/CGS/rghm/ap/>)

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides (**Ibid**). The State Department of Conservation operates the Seismic Mapping Program for California. Extensive information is available at their website: <http://gmw.consrv.ca.gov/shmp/index.htm>.

CALIFORNIA EARTHQUAKE MITIGATION LEGISLATION

As the State's population continues to grow, and urban areas become even more densely built up, the risk will continue to increase. For decades the Legislature has passed laws to strengthen the built environment and protect the citizens. Chart 9 below provides a sampling of some of the 200



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plus laws in the State’s codes. All new development within each of the individual cities within the Las Virgenes-Malibu complies with all current Los Angeles County Building codes. The following chart is a partial list of California laws on earthquake safety.

CHART 9. PARTIAL LIST OF CALIFORNIA LAWS ON EARTHQUAKE SAFETY

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.
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 2621.	Established the Alquist-Priolo Earthquake Fault Zoning Act.
Government Code Section 8878.50-8878.52 8878.50.	Created the Earthquake Safety and Public Buildings Rehabilitation Bond Act of 1990.
Education Code Section 35295-35297 35295.	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 un-reinforced 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.
Source: http://www.leginfo.ca.gov/calaw.html	



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AGOURA HILLS

The City of Agoura Hills implements LARUCP seismic Zone 4 requirements. The city also implements the following building codes in order to mitigate the impact of earthquake hazards. In regards to seismic requirements for the City, besides enforcing the currently adopted 2001 California Building Code, the City of Agoura Hills has adopted additional more restrictive seismic requirements noted in the following Agoura Hills Building Code sections, followed by the California Building Code section amended.

The following building codes are implemented as preventative measures for loss of life and property because of a seismic hazard event.

Section	Title
8103(i), 1612.2.1	Basic load combinations
8103(j), 1629.4.2	Seismic Zone 4 near-source factor
8103(k), 1630.8.2.2	Detailing requirements in Seismic Zones 3 and 4
8103(l) 1630.10.2	Calculated
8103(m) 1630.10.3	Limitations
8103(n) 1633.2.9	Diaphragms supporting concrete or masonry walls shall have continuous ties or struts between diaphragm chords to distribute the anchorage forces specified in Section 1633.2.8
8103(o) T-16-N	
8103(p) 1701.5	Lateral force resisting frames
8103(q) 1702	Structural observation
8103(r) 1703	Piling, drilled piers, caissons and connecting grade beams

CALABASAS

The City of Calabasas has not had any significant damages or costs during any earthquake event in recent history. However it is standard procedure in the Community Development Department is to ensure that existing and new structures are built to minimize the amount of damage that can be caused by natural disasters. Projects are required to go through an EIR (Environmental Impact Review) to determine what kind of hazards the project may encounter and how to mitigate the impact.

Examples include, conducting soil tests to determine the stability of the land and the need of extra support for the structure, requiring the use of special roofing materials, chimney spark arrestors, and vegetation clear zone buffers for fire prevention, access roads must meet a certain width requirement in order to allow safety vehicles through, and other safety precautions.



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As information becomes available, the City of Calabasas’ building codes that mitigate the loss of life and property during a seismic event will be included in the plan.

HIDDEN HILLS

The City of Hidden Hills is the smallest of the five cities within the Las Virgenes-Malibu Council of Governments. Within the Safety Element of their General Plan, the city implements an Emergency Evacuation Plan. The Safety Element tries to minimize damage in the event of a natural disaster.

The Housing and Land Use Elements of the General Plan ensure that structures are of standard design and building materials, and are not subject to undue hazard based on their location. These steps are preemptive measures taken by the City of Hidden Hills to protect life and property in case of an earthquake.

Along with these steps, in January 2003, all Charles Abbott building inspectors, plan checkers, and engineers, who are contracted by the City of Hidden Hills, attended a training hosted by the California Building Officials (CalBO) as part of the “Safety Assessment Program”. Attendees were certified by California Office of Emergency Services as “Certified Disaster Service Workers.”

The following building codes are implemented as preventative measures for loss of life and property because of a seismic hazard event.

Section	Title
3319.2	Geologic Hazard

MALIBU

The City of Malibu is located in the area of several known earthquake faults, active and potentially active, including the Malibu fault, Newport-Inglewood fault, San Andreas Fault, and Whittier-Elsinore fault. New faults are continuously being discovered, one hundred of which in the Los Angeles area alone are capable of a magnitude 6.0 or greater earthquake.

The City of Malibu has a Safety Element section of their general plan, such planning is a proactive approach to earthquake planning. The city also implements a comprehensive Emergency Operations Plan. As information becomes available, the City of Malibu’s building codes that mitigate the loss of life and property during a seismic event shall be included in the plan.

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WESTLAKE VILLAGE

The City of Westlake Village is located in the Transverse Ranges Geologic Province, a system of east-west trending valleys and mountain ranges that extends from Cajon Pass on the east to Point Conception on the west. These major physiographic features are controlled by the trends of major faults and folds in the rock units that also trend east-west.

Rock and soil units within the City consist of a “basement” rock composed primarily of volcanic units, but with a relatively limited area of sedimentary rocks, primarily shale and siltstone, in the hills north of the freeway. The volcanic units include basaltic lava flows and complex combinations of ash and other material ejected from ancient volcanoes. The units are overlain in the valleys of alluvium (stream deposits) composed of varying amounts of sand, silt and clay.

The geologic structure of the rock units consists primarily of a relatively consistent north and northeast inclination of the rock layers at angles generally in the range of 20 to 30 degrees. This simple arrangement is interrupted by a moderately complex pattern of faulting, and some rock units, particularly the sediments, are more intensely deformed near the faults. There is no direct evidence to indicate that any of these faults have been active in the recent geologic past, nor is there any reason to suspect from regional relationships that any of them should be considered hazardous.

Significant earthquakes which should be expected to occur in the foreseeable future are of two distinct types: (1) major events generated by movement on a very large but relatively distant fault, and (2) medium-sized events generated by movement on a closer fault.

With regard to the first type, the most likely event is a magnitude 8-8.5 earthquake on the San Andreas Fault within the next 100 years. The shaking that would accompany this earthquake is expected to be only moderately strong in Westlake Village because the source fault is 42 miles away at its nearest point. The maximum ground accelerations should be in the range of only 0.1-0.2g, where “g” is the decimal fraction of the acceleration of gravity. However, because of the length of the fault break and way in which ruptures propagate the shaking will probably last for at least one minute. For comparison purposes, the duration of the 1971 San Fernando earthquake was 12-15 seconds.

More intense, but shorter duration shaking should be expected from one of the active faults closer to the City. One possibility is the San Fernando fault, located approximately 20 miles to the northeast. A more likely candidate for the maximum intensity earthquake shaking that should be taken into account is the offshore Malibu fault. Movement on this fault zone generated the Richter magnitude 6.0 Point Mugu earthquake of 1973, and the future movement of a segment more southerly of Westlake Village could generate higher intensities of shaking than those which occurred in 1973. Little is known about the earthquake history of this fault zone, but a magnitude of 6.5 is reasonable considering the recent historic past.

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Recent reports from scientists of the U.S. Geological Survey and the Southern California Earthquake Center say that the Los Angeles Area could expect one earthquake every year of magnitude 5.0 or more for the foreseeable future. A major earthquake occurring in or near the COG Region may cause many deaths and casualties, extensive property damage, fires and hazardous material spills and other ensuing hazards. The effects could be aggravated by aftershocks and by the secondary affects of fire, hazardous material/chemical accidents and possible failure of the waterways and dams. The time of day and season of the year would have a profound effect on the number of dead and injured and the amount of property damage sustained. Such an earthquake would be catastrophic in its effect upon the population and could exceed the response capabilities of the individual cities, Los Angeles County Operational Area and the State of California Emergency Services. Damage control and disaster relief support would be required from other local governmental and private organizations, and from the state and federal governments.

Extensive search and rescue operations would be required to assist trapped or injured persons. Emergency medical care, food and temporary shelter could be required by injured or displaced persons. Identification and burial of many dead persons would pose difficult problems; public health would be a major concern. Mass evacuation may be essential to save lives, particularly in areas downwind from hazardous material releases. Many families would be separated particularly if the earthquake should occur during working hours, and a personal inquiry or locator system could 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.

The economic impact on the City of Westlake Village from a major earthquake could be considerable in terms of loss of employment and loss of tax base. A major earthquake could also cause serious damage and/or outage of computer facilities. The loss of such facilities could curtail or seriously disrupt the operations of banks, insurance companies and other elements of the financial community. In turn, this could affect the ability of local government, business and the population to make payments and purchases.

As information becomes available, building codes for the City of Westlake Village's that mitigate the loss of life and property during a seismic event will be included in the plan.



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INDIVIDUAL PREPAREDNESS

Because the potential for earthquake occurrences and earthquake related property damage is relatively high in the Las Virgenes-Malibu region, 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. Each city has taken different steps to inform the public on safety issues regarding earthquake preparedness.

Section 2 of the Plan contains the “Emergency Preparedness” information by city. Appendix D documents public awareness and education through public involvement.



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EARTHQUAKE MITIGATION STRATEGIES

See Section 4 for list of Mitigation Strategies.



Wildland/Urban Interface Fire Hazards the Las Virgenes- Malibu Region

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SECTION 7

WILDFIRE

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WHY ARE WILDFIRES A THREAT TO THE LAS VIRGENES-MALIBU REGION?

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 such as the Las Virgenes-Malibu region which are built within or adjacent to hillsides and mountainous areas. There is a huge potential for losses due to wildland/urban interface fires in the region. According to the California Division of Forestry and Fire Protection (CDF), there were over seven thousand reportable fires in California in 2003, with over one million acres burned (http://www.fire.ca.gov/php/2003fireseasonstats_v2.asp). According to CDF statistics, in the October, 2003 Firestorms, over 4,800 homes were destroyed and 22 lives were lost (http://www.fire.ca.gov/php/fire_er_content/downloads/2003LargeFires.pdf).

For the purposes of describing the severity of fire hazard areas, the Los Angeles County Fire Department classifies areas according to criteria established in the State legislation commonly referred to as the “Bates Bill”. The Bates Bill Process determines Very High Fire Hazard Severity Zones (VHFHSZs) in Local Responsibility Areas (LRAs). The Las Virgenes-Malibu region does contain some VHFHSZs. Fire zone areas are rated on a scale of I – IV, with IV representing the most severe fire hazard zone. The region contains both Zone III and Zone IV areas.

LACoFD BACKGROUND

The Las Virgenes-Malibu region is covered under Region VII, Central Region, of the Los Angeles County Department (LACoFD). Battalions 1 and 5 of the Los Angeles Fire Department are assigned to directly serve the Las Virgenes-Malibu region with a total of 17 stations assigned to serve six cities and over 65,000 residents. The cities include Agoura Hills, Calabasas, Hidden Hills, Malibu, West Hollywood and Westlake Village.

Battalion 5 is the main division since its stations are located within the region itself. They have a total of 11 stations throughout the region. Headquarters are located at 3970 Carbon Canyon Rd., Malibu 90265.

Operating 9 divisions, 20 battalions, 159 fire stations and 11 fire suppression camps, the County of Los Angeles Fire Department answers over 234,000 emergency calls annually. Additionally, the Department has Planning, Information Management, Fire Prevention, Air and Wildland, Lifeguard, Forestry and Health Hazardous Materials Divisions which provide valuable services to the more than 3.5 million people who reside in the 1.1 million housing units located throughout the Department’s 2,278 square mile area.

The Los Angeles County Fire Department currently has 159 fire stations, 235 fire engines, 21 ladder trucks, 20 quints, 85 paramedic squads, 11 wildland fire suppression camps, 8 bulldozers, 7 helicopters, 23 Prevention Offices, 12 Forestry Units and numerous other response vehicles and facilities. The Department serves 57 incorporated, as well as the unincorporated areas of the County.

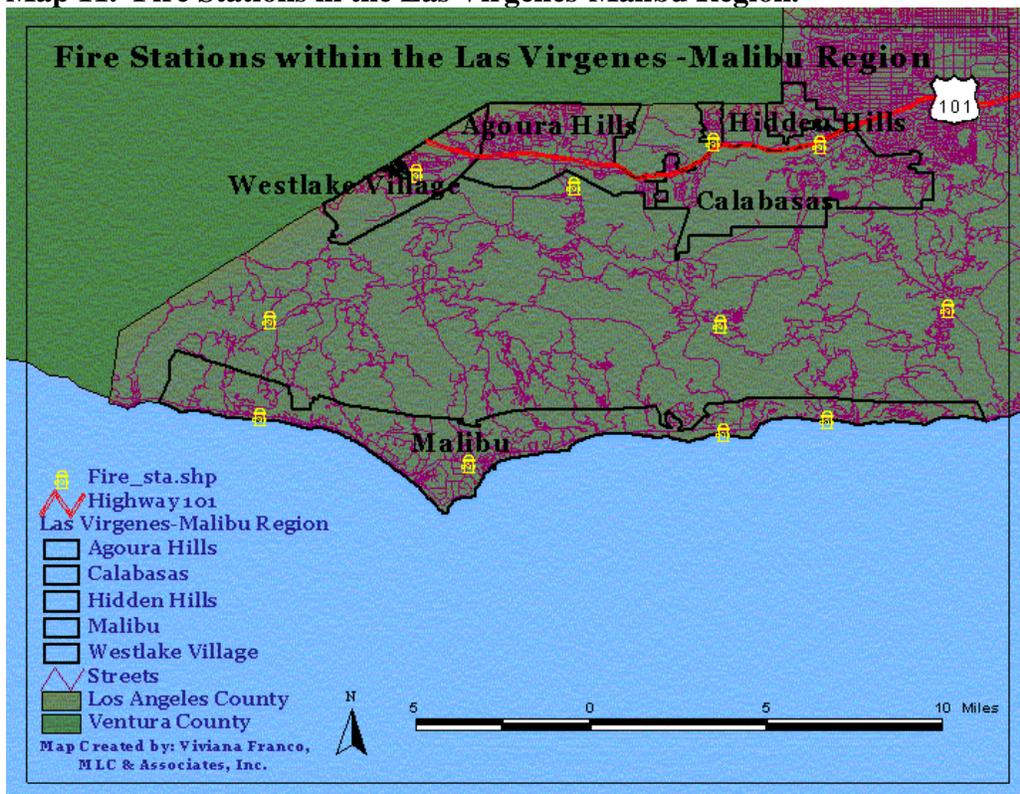
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The LACoFD is one of six Contract Counties that maintain a contractual relationship with California Department of Forestry and utilizes the California Fire Plan within Los Angeles County as the primary wildland fire protection plan. The Las Virgenes-Malibu region is served by Battalion 5 of the LACoFD. The following chart is a list of the fire stations in the Las Virgenes-Malibu region.

CHART 6. LAS VIRGENES-MALIBU COG FIRE STATIONS

FS 65	4206 N. Cornell Rd., Agoura 91301-2528
FS 67	25801 Piuma Rd., Calabasas 91302-2153
FS 68	24130 Calabasas Rd., Calabasas 91302-1511
FS 69	401 S. Topanga Cyn Blvd., Topanga 90290-9774
FS 70 (Div & Batln. HQ)	3970 Carbon Cyn Rd., Malibu 90265-5005
FS 71	28722 W. Pacific Coast Hwy., Malibu 90265-3902
FS 72	1832 S. Decker Rd., Malibu 90265-9613
FS 88	23720 W. Malibu Rd., Malibu 90265-4603
FS 99	32550 Pacific Coast Hwy., Malibu 90265-2432
FS 125	5215 N. Las Virgenes Rd., Calabasas 91302-1061
FS 144	31981 Foxfield Dr., Westlake Village 91361-4203

Map 11. Fire Stations in the Las Virgenes-Malibu Region.



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HISTORY OF FIRE EVENTS IN THE LAS VIRGENES-MALIBU REGION

Piru and Simi Fires of 2003

The most recent fire events occurred in the Las Virgenes-Malibu region in 1993, 1998 and 2003. In 2003, over 14,000 acres burned in the County of Los Angeles Fire Department coverage area, totaling \$130,633,624 in losses (<http://www.lacofd.org>).

The following map provides an overview of all the fires burning on November 4 2003. The closest fires to the Las Virgenes-Malibu region were the Simi and Piru fires, both in neighboring Ventura County. The Simi Fire burned approximately 108,000 acres in late October 2003. The region was also threatened by the Piru Fire, which burned nearly 64,000 acres in late October 2003. The fire burned hillsides behind houses, leaving them vulnerable to erosion and mud flows. See Chart 10 for additional information.

MAP 12. OCOTBER 2003 FIRES.

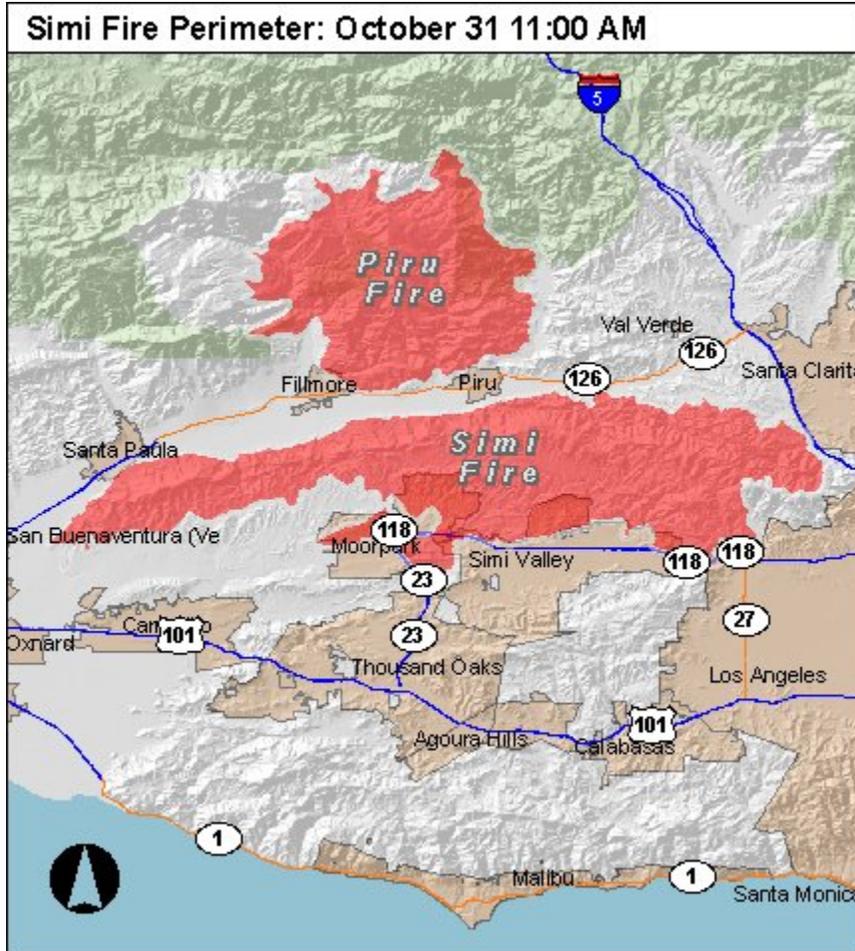


Source: <http://www.esri.com/jicfire/maps/#livemaps>

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The following map shows a more specific area of the Simi Fire on October 31, 2003. Notice its proximity to the Las Virgenes-Malibu region.

MAP 13. PIRU FIRE MAP



Source: <http://www.esri.com/jicfire/maps/#livemaps>

THE 2003 SOUTHERN CALIFORNIA FIRES

The fall of 2003 marked the most destructive wildfire season in California history. In a ten day period, 12 separate fires raged across Southern California in Los Angeles, Riverside, San Bernardino, San Diego and Ventura counties. The massive “Cedar” fire in San Diego County alone consumed of 2,800 homes and burned over a quarter of a million acres. Statistics from the 2003 firestorms are listed below in Chart 10.

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CHART 10. OCTOBER 2003 FIRESTORM STATISTICS

County	Fire Name	Date Began	Acres Burned	Homes Lost	Homes Damaged	Lives Lost
Riverside	Pass	10/21/03	2,397	3	7	0
Los Angeles	Padua	10/21/03	10,446	59	0	0
San Bernardino	Grand Prix	10/21/03	69,894	136	71	0
San Diego	Roblar 2	10/21/03	8,592	0	0	0
Ventura	Piru	10/23/03	63,991	8	0	0
Los Angeles	Verdale	10/24/03	8,650	1	0	0
Ventura	Simi	10/25/03	108,204	300	11	0
San Diego	Cedar	10/25/03	273,246	2,820	63	14
San Bernardino	Old	10/25/03	91,281	1,003	7	6
San Diego	Otay / Mine	10/26/03	46,000	6	11	0
Riverside	Mountain	10/26/03	10,000	61	0	0
San Diego	Paradise	10/26/03	56,700	415	15	2
Total Losses			749,401	4,812	185	22

Source: http://www.fire.ca.gov/php/fire_er_content/downloads/2003LargeFires.pdf

Pacific Fire

The City of Malibu also directly affected by the Pacific Fire of 2003. Although 450 homes were saved, over 2200 acres burned and a total private property damage assessment was made of \$421,500 dollars. (Incident # CA LAC 03-004293)

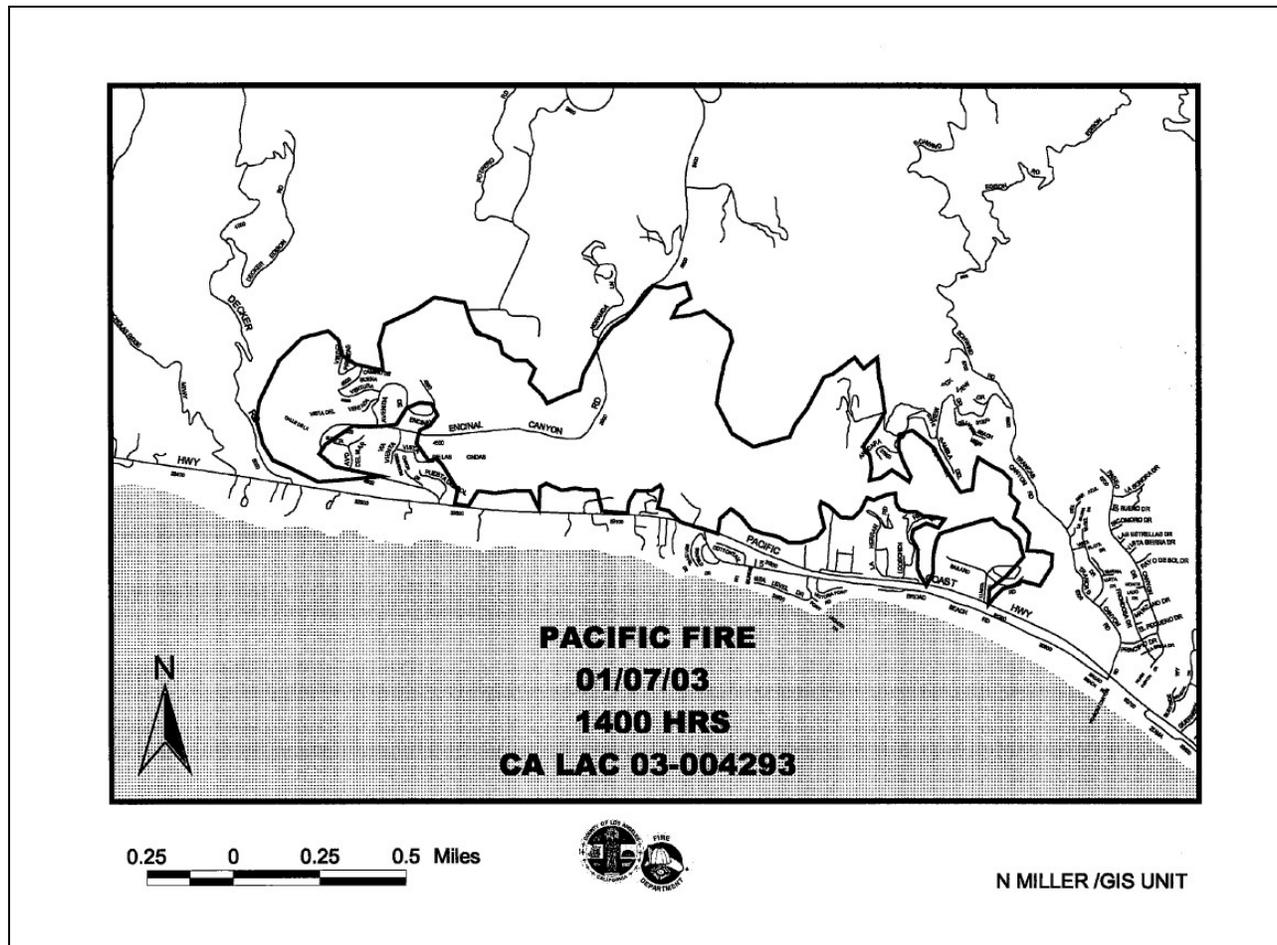
The Fire was 100% contained as of Wednesday, January 8, 2003. After containment, fire crews continued with mop up operations and monitored the area for hot spots. During the fire, Bluffs Park was closed in order to allow the Fire Department helicopters to use the Park as a landing zone. Charmlee Park was closed in order to assess fire and wind damage. Both parks were reopened by Wednesday morning. Malibu High School and Juan Cabrillo Elementary School were closed on Tuesday, January 7 but reopened on Wednesday January 8. A Red Cross evacuation shelter was set up at Malibu High School. An evacuation center was set up at Leo Cabrillo State Beach.

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Three homes and one vehicle were damaged. At the peak of the fire, over 1,000 emergency personnel were on duty. The fire was confined to the Trancas Canyon, Encinal Canyon and Decker Canyon areas.

Fighting the Pacific Fire was a collaborative effort which included 56 agencies responding to the incident. (<http://www.ci.malibu.ca.us/index.cfm?fuseaction=detailgroup&navid=182&cid=2035>) Note the following map which outlines in **black** the Pacific Fire area.

MAP 14. PACIFIC FIRE – CITY OF MALIBU



The Pacific Fire was a clear example that the region, but most notably the city of Malibu is prone to wildfires that can affect the urbanized areas in the city. Quick response, climate conditions and proper planning here were the cause of its successful containment. The following is a picture depicting damage by the fire and how brush clearance and fuel modification saved these homes.

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IMAGE 1. DAMAGE FROM THE PACIFIC FIRE – CITY OF MALIBU



HIDDEN HILLS

The City of Hidden Hills is vulnerable to small wildland fire hazards. Brush fires pose the primary threat due to the terrain and natural vegetation of the undeveloped areas adjacent to the City. Primary considerations for determining the severity of fire hazards in the City include fuel loading, fire weather and topography which is described in detail later in regards the region as well.

HISTORIC FIRES IN SOUTHERN CALIFORNIA

Large fires have always been part of the Southern California landscape. The Las Virgenes-Malibu terrain makes it an easy target for wildfire activity. In 1993, a very destructive fire came through the region and destroyed hundreds of homes and acres. The following chart list major fires in Los Angeles County from 1961-1993.

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CHART 11. LARGE HISTORIC FIRES IN LOS ANGELES COUNTY 1961-1993

Largest Los Angeles County Wildland Fires (Structures Destroyed)						
	Fire Name	Date	County	Acres	Structures	Deaths
8	Bel Air	November 1961	Los Angeles	6,090	484	0
13	Topanga	November 1993	Los Angeles	18,000	323	3
18	Kanan	October 1978	Los Angeles	25,385	224	0
19	Kinneloa	October 1993	Los Angeles	5,485	196	1

“Structures” is meant to include all loss - homes and outbuildings, etc.

Source: <http://www.fire.ca.gov/FireEmergencyResponse/HistoricalStatistics/PDF/20LSTRUCTURES.pdf>

During the 2002 fire season, more than 6.9 million acres of public and private lands burned in the US, resulting in loss of property, damage to resources and disruption of community services. Taxpayers spent more than \$1.6 billion to combat more than 88,400 fires nationwide (http://research.yale.edu/gisf/assets/pdf/ppf/wildfire_report.pdf). Many of these fires burned in wildland/urban interface areas and exceeded the fire suppression capabilities of those areas. Chart 12 illustrates fire suppression costs for state, private and federal lands.

CHART 12. NATIONAL FIRE SUPPRESSION COSTS

Year	Suppression Costs	Acres Burned	Structures Burned
2000	\$1.3 billion	8,422,237	861
2001	\$0.5 billion	3,570,911	731
2002	\$1.6 billion	6,937,584	815

Source: http://research.yale.edu/gisf/assets/pdf/ppf/wildfire_report.pdf

CAUSES AND CHARACTERISTICS OF WILDFIRES THE LAS VIRGENES-MALIBU REGION

There are three categories of 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; and 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

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large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought and development.

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

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

The City of Westlake Village is partially located in the mountainous watershed area which experiences periods of severe fire hazard when the weather is characterized by high temperatures, low humidity, and high wind velocities. Fire hazard within the City is primarily related to highly flammable brush which ignites readily, burns with intense heat and spreads rapidly. Large, destructive fires have burned through the Santa Monica Mountains and in and near the City of Westlake Village on a regular basis.

Areas of the City developed prior to the Non-Combustible Roofing Ordinance of 1977 include structures with combustible wood shingle/shake roofs. These roofs present a hazard and fire fighting problem during severe fire weather due to flying brands from a wildland or structure fire. Property owners are also required to maintain a firebreak around and adjacent to all buildings and structures by removing all flammable vegetation or other combustible growth for a minimum distance of 30 feet from the structure or to the property line, whichever is closer.

WILDFIRE HAZARD IDENTIFICATION

The cities within the Las Virgenes-Malibu region face an ongoing threat from wildfires along its hillsides and mountainous areas where wildland and residential areas interface. Fires can be sparked by human activity and natural causes. The next section will further describe the areas in which the hazard can occur.

THE INTERFACE

The Las Virgenes-Malibu region is like many Southern California communities that are challenged by the increasing number of houses being built on the urban/wildland interface. The National Wildland Coordinating Group defines urban/wildland interface as "the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel.

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In 1992, Assembly Bill -337, known as the “Bates Bill”, required all cities and counties in California to identify within their communities “The Very High Wildland Fire Hazard Severity Zones” or VHFHSZ.

Once the cities within the Las Virgenes-Malibu region identified this VHFHSZ and submitted it to the California Department of Forestry and Fire Protection, the state required that an ordinance be passed covering the following elements in the identified zone:

- Minimum standards on roof coverings
- Minimum standards on clearances around occupied dwellings by removal of combustible vegetation
- Minimum standards on clearances of tree limbs around chimneys
- Regulations regarding the maintenance of trees and their litter on and around structures

THE THREAT OF URBAN CONFLAGRATION

Although communities without an urban/wildland interface are much less likely to experience a catastrophic fire, in the Las Virgenes-Malibu region there is a scenario where any community might be exposed to an urban conflagration.

In the Las Virgenes-Malibu region this scenario highlights the need for fire mitigation activity in all sectors of the region, urban/wildland interface or not. The Las Virgenes-Malibu region could conceivably experience such a fire in the areas outside of the VHFHSZ either as a result of an earthquake or some other phenomenon. Possible scenarios include a disruption in the water system that could allow a normally controllable structure fire to escape containment by fire forces and spread to adjoining buildings. Another scenario is a fire that starts in the flatlands and could be wind driven from the roof of one building to the roofs of adjoining buildings. In the area outside the VHFHSZ, many wood shake or shingle roofs exist and there is a potential for fires being driven from roof to roof faster than firefighting efforts can keep up under strong Santa Ana wind conditions.

Other large dollar loss or large life loss fire potential exist within the region as well. The Las Virgenes-Malibu region is home to many large hotels having large occupancies per day and numerous high rise buildings. The region is also home to many business parks that house commercial structures at risk to lose millions in terms of structural damage in case of a large fire hazard.

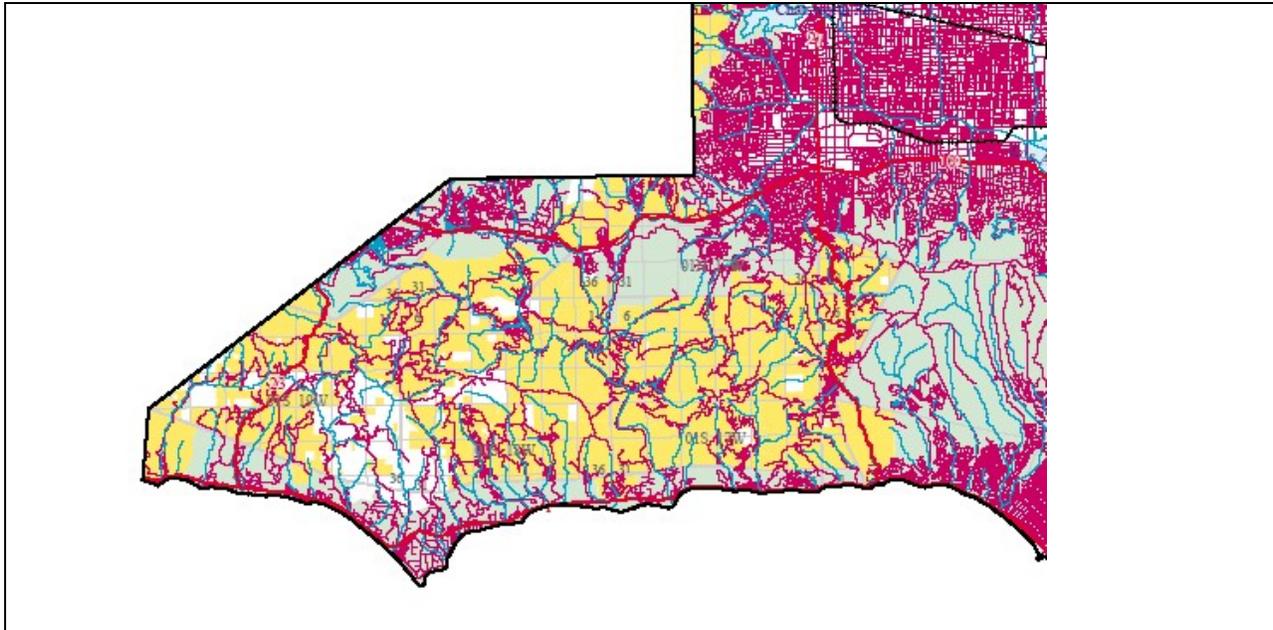
Identifying the hazard area as set forth above is the first step in assessing the cities’ vulnerability to wildland fires. Other key factors in assessing wildfire risk include ignition sources, building materials and design, community design, structural density, slope, vegetative fuel, fire occurrence and weather, as well as occurrences of drought. These factors can affect how quick a fire can spread.

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The following is a Natural Hazard Disclosure Map. Natural Hazard Disclosure (Fire) maps show the two types of fire hazard areas referred to in legislation as disclosure items in real estate transactions. These areas are:

- Wildland Areas that may contain substantial forest fire risks and hazards (Wildland Areas)
- Very High Fire Hazard Severity Zones (VHFHSZ)

MAP 15. WEST LOS ANGELES COUNTY FIRE MAP



**WILDLAND AREA THAT MAY CONTAIN
SUBSTANTIAL FOREST FIRE RISKS AND
HAZARDS**

Pursuant to Section 4125 of the Public Resources Code. The owner of this property is subject to the maintenance requirements of Section 4291 of the Public Resources Code. Additionally, it is not the state's responsibility to provide fire protection services to any building or structure located within the wildlands unless the Department of Forestry and Fire Protection has entered into a cooperative agreement with a local agency for those purposes pursuant to Section 4142 of the Public Resources Code.



**VERY HIGH FIRE HAZARD SEVERITY ZONE -
AB 337**

Pursuant to Section 51179 of the Government Code. The owner of this property is subject to the maintenance requirements of Section 51182 of the Government Code.

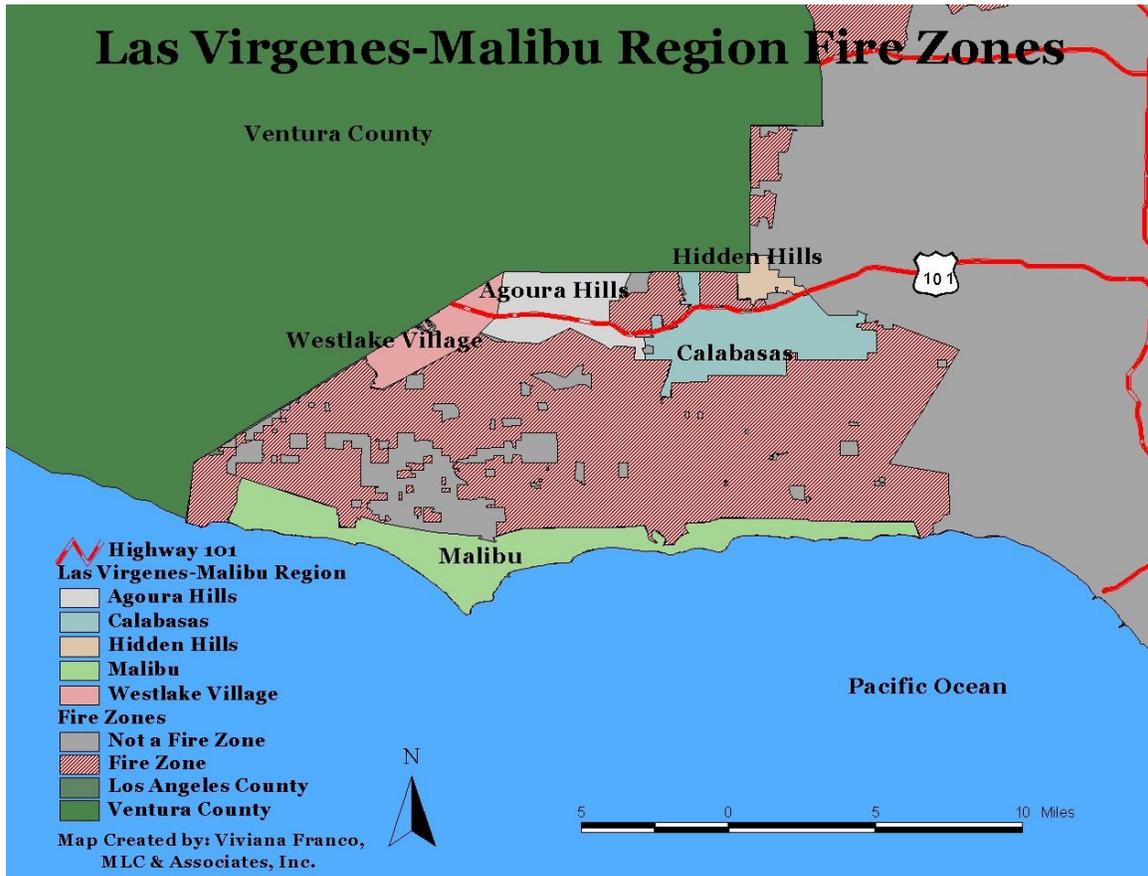
MAJOR HIGHWAYS	
ROADS	
RAILROADS	
POWERLINES	
AIRFIELDS	
HYDROGRAPHY	
SECTION LINE	
TOWNSHIP/RANGE	

source: <http://www.fire.ca.gov/ab6/ab61st.html>

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Using data provided by the California Department of Forestry and Fire Protection, the following map shows more specifically areas that may be prone to fire hazards in the Las Virgenes-Malibu region.

MAP 16. LAS VIRGENES-MALIBU REGION FIRE ZONES.



DROUGHT

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

DEVELOPMENT

Growth and development in scrubland and forested areas is increasing the number of human-made structures in the Las Virgenes-Malibu interface areas. Wildfire has an effect on

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development, yet development can also influence wildfire. Owners often prefer homes that are private, have scenic views, are nestled in vegetation and use natural materials. A private setting may be far from public roads, or hidden behind a narrow, curving driveway. These conditions, however, make evacuation and fire fighting 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. Narrow and winding roads in these developed areas tend to make evacuation of civilians slow and difficult especially when fire resources are trying to gain access to the area utilizing the same roads.

WILDFIRE HAZARD IDENTIFICATION

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.

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. Like much of Southern California, chaparral is a primary fuel prevalent in The Las Virgenes-Malibu region along with grasses, non-native vegetation and large trees such as Junipers, Palm, Eucalyptus and Pines. All of these fuel types are highly combustible. Added to this is the fact that a large percentage of the fuel beds in the Santa Monica Mountains contain dead and down vegetation. This “die back” condition as it is known is due largely to drought conditions that have been experienced in recent years. This condition makes these fuel beds far more receptive to ignition and spread of wildfires than if the vegetation were alive and healthy. This type of fuel model is of particular concern when the fires are wind driven as it can lead to short and long range spotting which can affect the entire region, not just the VHFHSZ.

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.

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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. 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.

Numerous canyons, saddles, and ridges in the VHFHSZ will also contribute to erratic fire behavior due to the funnel and subsequent acceleration effect it will have on wind traveling through the area.

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. This is a definite classification of the Las Virgenes-Malibu region.

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 “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.

The Las Virgenes-Malibu region experiences Santa Ana Wind conditions typically in the Fall months and this poses a threat in two ways. A fire starting in The Las Virgenes-Malibu region will spread rapidly and has the potential of overwhelming initial attack forces and destroying structures within minutes of ignition. A fire starting adjacent to the Las Virgenes-Malibu region could quickly burn into the region either by direct flame contact or by fire brands being carried by the winds and spotting onto structures or combustible vegetation. Wind bends the flames to pre-heat the fuel ahead and can carry fire brands up to ¼ mile or more ahead of the flame front. The majority of catastrophic fires that Southern California has experienced have occurred in the months of September, October, and November when Santa Ana Winds typically occur. Wind is considered to be the primary factor that influences fire spread.

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Chart 13 Illustrates a rating system to identify wildfire hazard risk (with a score of 3 equaling the most danger and a score of 1 equaling the least danger.)

CHART 13. SAMPLE HAZARD IDENTIFICATION RATING SYSTEM

Category	Indicator	Rating
Roads and Signage	Steep; narrow; poorly signed	
	One or two of the above	
	Meets all requirements	
Water Supply	None, except domestic	
	Hydrant, tank, or pool over 500 feet away	
	Hydrant, tank, or pool within 500 feet	
Location of the Structure	Top of steep slope with brush/grass below	
	Mid-slope with clearance	
	Level with lawn, or watered groundcover	
Exterior Construction	Combustible roofing, open eaves, Combustible siding	
	One or two of the above	
	Non-combustible roof, boxed eaves, non-combustible siding	

In order to comply with the Bates Bill, the cities within the Las Virgenes-Malibu region completed an evaluation of the following factors to determine the areas of the Region which would qualify as a Very High Wildland Fire Hazard Severity Zone.

- Fuel
- Topography
- Dwelling density
- Weather
- Infrastructure
- Fire codes and ordinances as they relate to brush issues

Each factor was given a value of 1-4 with a 4 being the highest danger rating. Any total score over 10 qualified the area as being one of VHFHSZ. Each of the three areas evaluated rated 10 or above with the highest area receiving a 12.

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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; and
- Water availability.

The use of Geographic Information System (GIS) technology in recent years has been a great asset to fire hazard assessment, allowing further integration of fuels, weather and topography data for such ends as fire behavior prediction, watershed evaluation, mitigation strategies and hazard mapping.

RISK ANALYSIS

Las Virgenes-Malibu region residents are served by a variety of fire stations from the County of Los Angeles Fire Department. 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, community 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>.

WHAT IS SUSCEPTIBLE TO WILDFIRE?

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;

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

Road Access

Road access is a major issue for all emergency service providers. As development encroaches into the rural areas of the county, the number of houses without adequate turn-around space is increasing. In many areas, there is not adequate space for emergency vehicle turnarounds in single-family residential neighborhoods, causing emergency workers to have difficulty doing their jobs because they cannot access houses. As fire trucks are large, 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

Water supply, both in terms of volume and pressure, is always a critical factor in fighting fires and particularly in keeping fires in the wildland/urban interface areas manageable by initial attack forces. Generally speaking the water supply to most areas of the region is very good.

PUBLIC INVOLVEMENT

Public Awareness

October is “Fire Prevention Month” within the Los Angeles County Fire Department. This is only part of the public awareness campaigns that the Fire Departments conduct within the Las Virgenes-Malibu region. The following are programs, activities and public awareness campaigns the LACFD implements.

A.W.A.R.E.

The goal of A.W.A.R.E., a community awareness and education program, is to use community education and involvement to help reduce the loss of life and property resulting from wildland brush fires.

The LACoFD also posts a variety of Safety Handouts for the public to view on their website and at various fire stations in the Las Virgenes-Malibu region. These pamphlets include but are not limited to:

- Home Fire Safety Tips
- Brush Clearance Tips
- Exit Drills in the Home
- Storm Safety Guidelines
- Rolling Electric Outage Safety

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- Link to So Cal Gas Co. for safety tips on gas appliances

The cities within the Las Virgenes-Malibu region provide ongoing community education on fire hazards through the following programs:

- CERT (Citizen Emergency Response Team) training
- The region of Calabasas offers CERP, Citizen’s Emergency Response Team, Disaster Triage Assistance Team (DTAT) and Medical Reserve Corps
- The region of Malibu offers an Emergency Preparedness Program
- The region of Westlake offers a Disaster Response Team and a Volunteers in Policing program

The Las Virgenes-Malibu regional cities along with the LACoFD educate the public in terms of fire and life Safety by providing the following special programs upon request. Fire Safety Education Programs that consist of the following:

- Local cable television education and informational programs are shown throughout the year, but most often during the months considered being fire season.
- Informational brochures have also been prepared and are distributed informing citizens about the need for evacuation plans and tips on home protection.
- Disaster Assistance Programs that are taught to the Las Virgenes-Malibu Unified School District employees
- Fire Safety and Prevention in schools

OTHER AGENCIES

It is important to work with other organizations and agencies to create a more comprehensive Hazard Mitigation Plan. There are numerous agencies that Region VII of the LACoFD works closely with, including but not limited to:

Political Entity	Jurisdiction
Los Angeles County Sheriff’s Department	Local Government/ Law Enforcement
City of Los Angeles	Local Government/LRA Fire Protection
Ventura County Fire Department	LRA and SRA Fire Protection
National Park Service	Public Land Ownership, DPA Fire Protection
City of Agoura Hills	Contract
City of Hidden Hills	Contract
City of Malibu	Contract
City of Westlake Village	Contract
City of Calabasas	Contract
California State Parks	Public Land Ownership, SRA Fire Protection



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Political Entity	Jurisdiction
Santa Monica Mountains Conservancy	Public Land Ownership, Recreational Use
Public Utility Companies	State/County
California Department of Forestry and Fire Protection	State/County
Malibu Lakeside	Homeowner's Association
Malibu Lake Mountain Club	Homeowner's Association
Horizon Hills	Homeowner's Association
Ganesha Hills	Homeowner's Association
The Country Estates	Homeowner's Association

FEDERAL PROGRAMS

The role of the federal land managing agencies in the wildland /urban interface is reducing fuel hazards on the lands they administer; cooperating in prevention and education programs; providing technical and financial assistance; and developing agreements, partnerships and relationships with property owners, local protection agencies, states and other stakeholders in wildland/urban interface areas. These relationships focus on activities before a fire occurs, which render structures and communities safer and better able to survive a fire occurrence.

Federal Emergency Management Agency (FEMA) Programs

FEMA is directly responsible for providing fire suppression assistance grants and, in certain cases, major disaster assistance and hazard mitigation grants in response to fires. The role of FEMA in the wildland /urban interface is to encourage comprehensive disaster preparedness plans and programs, increase the capability of state and local governments and provide for a greater understanding of FEMA programs at the federal, state and local levels.

Fire Suppression Assistance Grants

Fire Suppression Assistance Grants may be provided to a state with an approved hazard mitigation plan for the suppression of a forest or grassland fire that threatens to become a major disaster on public or private lands. These grants are provided to protect life and improved property and encourage the development and implementation of viable multi-hazard mitigation measures and provide training to clarify FEMA's programs. The grant may include funds for equipment, supplies and personnel. A Fire Suppression Assistance Grant is the form of assistance most often provided by FEMA to a state for a fire. The grants are cost-shared with states. FEMA's US Fire Administration (USFA) provides public education materials addressing wildland/urban interface issues and the USFA's National Fire Academy provides training programs.



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Hazard Mitigation Grant Program

Following a major disaster declaration, the FEMA Hazard Mitigation Grant Program provides funding for long-term hazard mitigation projects and activities to reduce the possibility of damages from all future fire hazards and to reduce the costs to the nation for responding to and recovering from the disaster.

National Wildland/Urban Interface Fire Protection Program

Federal agencies can use the National Wildland/Urban Interface Fire Protection Program to focus on wildland/urban interface fire protection issues and actions. The Western Governors' Association (WGA) can act as a catalyst to involve state agencies, as well as local and private stakeholders, with the objective of developing an implementation plan to achieve a uniform, integrated national approach to hazard and risk assessment and fire prevention and protection in the wildland/urban interface. The program helps states develop viable and comprehensive wildland fire mitigation plans and performance-based partnerships.

U.S. Forest Service

The U. S. Forest Service (USFS) is involved in a fuel-loading program implemented to assess fuels and reduce hazardous buildup on forest lands. The USFS is a cooperating agency and, while it has little to no jurisdiction in the lower valleys, it has an interest in preventing fires in the interface, as fires often burn up the hills and into the higher elevation US forest lands.

EXISTING MITIGATION ACTIVITIES

Region VII of the LACoFD takes many steps in order to prevent the event of a wildfire occurring within the Las Virgenes-Malibu region. The following are a sample of the programs, activities and practices they implement.

Prescribed Burning

The health and condition of a forest will determine the magnitude of wildfire. The LACoFD does practice prescribed burning. If fuels - slash, dry or dead vegetation, fallen limbs and branches - are allowed to accumulate over long periods of time without being methodically cleared, fire can move more quickly and destroy everything in its path. The results are more catastrophic than if the fuels are periodically eliminated. Prescribed burning is the most efficient method to get rid of these fuels. In California during 2003, various fire agencies conducted over 200 prescribed fires and burned over 33,000 acres to reduce the wildland fire hazard.

Pre-Fire Management Plan

As a preventative measure, the LACoFD also implements a Pre-Fire Management Plan whose overall goal is to reduce total cost and losses from wildland fire in California by protecting assets at risk through focused pre-fire management prescriptions and increased initial attack success.

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Special Operations Bureau

The Special Operations Bureau provides many highly technical operational functions to County residents, including Emergency Medical Services, Urban Search and Rescue, Hazardous Materials, Air Operations, Fire Camps for wildland firefighting, Heavy Equipment and central Dispatch. Also included in Special Operations is the Department's Terrorism Response Section, which coordinates the Department's response to incidents involving Weapons of Mass Destruction.

Fire Prevention Region

The Las Virgenes-Malibu region is part of the LACoFD Fire Prevention Region led by Captain Jim Jordan in the Region of Malibu. Fire prevention and code enforcement in these regions historically requires concentrated efforts on the provisions for water supply for fire protection, and vehicular access for fire apparatus. Geographic and terrain limitations as well as the lack of water supply in mountainous terrain, present challenges that our Inspectors review and inspect, and often times provide alternative solutions for the owners/occupants to consider.

Fire codes have been amended throughout the years to assist fire department personnel with wildland fire fighting in the rural urban interface zones. Building construction in these areas may have additional requirements for non-combustible construction components and water supply. Inspectors assigned to these regional offices can best inform the developers and homeowners with information for fire safe construction and fire protection systems.

In California, the Los Angeles County Fire Department has retrofitted more than 100 fire engines with fire retardant foam capability and Orange County is evaluating a pilot insurance grading and rating schedule specific to the wildland/urban interface. All are examples successful programs that demonstrate the value of pre-suppression and prevention efforts when combined with property owner support to mitigate hazards within the wildland/urban interface.

Fuel Modification Plan

Part of the Forestry Division of the LACoFD, this publication was prepared to establish a set of guidelines and landscape criteria for all new construction that would implement an ordinance relating to fuel modification planning and help reduce the threat of fire in high hazard areas.

Vegetation Management Program

The County of Los Angeles Department of Forester and Fire Warden created the Vegetation Management Program in 1979 to develop strategies for responding to the growing fire hazard problem. These include:

- An ongoing effort to analyze the history of wildland fires in Los Angeles County
- Experimentation with different methods of reducing and removing fuels in fire prone areas.
- Evaluation of the environmental impacts and effects of these practices.

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Brush Clearance Inspection Program

The LACoFd participates in a brush clearance program in order to prevent hazardous situations. Detailed suggestions and instructions on how to prevent a fire hazard situation and protect homes is available as a hard copy and on the LACoFD website. The LACoFD requires a 100 foot clearance around structures of all native brush, grass and hazardous vegetation to minimize fire hazards.

Teleminder System

To assist in the notification and early warning of the residents in the high-hazard zone, an automated computer dialing system called Teleminder is used. This system can make hundreds of calls to a geographical area within minutes and will broadcast a customized message to whomever, or whatever answers the phone.



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AGOURA HILLS

The City of Agoura Hills implements separate fire codes than the ones already required. They include:

Section	Title
112(6)	Fire Sprinkler Revisions
6402.2	Roof Covering Revisions
6402.3,6402.4,6402.6,6402.7,6402.8	Fire Zone 4 Revisions

CALABASAS

The City of Calabasas has not had any significant damages or costs during any fire event in recent history.

The City of Calabasas has recently begun a program that grants free Oak Tree / Brush clearance permits. The intent of this program is to encourage proper maintenance of Oak Trees that may create a public safety hazard.

HIDDEN HILLS

The City of Hidden Hills has an extensive fire prevention program. The city reviews each new development to ensure that structures are adequately separated and that fire retardant materials are used in construction. Fire retardant Class A roofs are required. In addition, the Hidden Hills Municipal Code requires that property owners maintain right-of-way improvements and public works in a clean, hazard-free condition to ensure safety.

The following building codes are implemented as preventative measures for loss of life and property because of a fire hazard event.

Section	Title
Section 1. Chapter 3 of Title 4	Fire Code

MALIBU

Rambla Pacifico Alternative Access Project

This project will provide direct access from Rambla to Las Flores Canyon, greatly reducing the commute for Rambla residents and improving fire safety. Additionally, this project is providing alternative emergency routes in case of any hazard emergency.

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BAER (Burned Area Emergency Rehabilitation)

Los Angeles County Fire Department, working in cooperation with the City of Malibu, Public Works and Conservation, will survey the burned areas of the Pacific Fire and determine what mitigation efforts are necessary to avoid mudslides in the event of a large rainfall (ex. strategically placing K-rails to deter mudslides) and to begin revegetation.

WESTLAKE VILLAGE

As information becomes available, building codes for the City of Westlake Village's that mitigate the loss of life and property during a fire event shall be included in the plan.

WILDFIRE MITIGATION STRATEGIES

See Section 4 for a list of Mitigation Strategies.

Terrorist Hazards in the Las Virgenes-Malibu Region

SECTION 8

TERRORISM

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WHY IS TERRORISM A THREAT TO THE LAS VIRGENES-MALIBU REGION

Terrorism is a continuing threat throughout the world and within the United States. A variety of political, social, religious, cultural, and economic factors underlie terrorist activities. Terrorists target civilian targets to spread their message or communicate dissatisfaction with the status quo. The media interest generated by terrorist attacks makes this a high visibility threat.

HISTORY OF TERRORIST EVENTS IN THE LAS VIRGENES-MALIBU REGION

The Las Virgenes-Malibu region is an internationally known community with strong political and economic ties. There are a variety of businesses and high-profile individuals who live within the region. For example, the City of Westlake Village, it is not home to any particular group or operation that would appear to be a terrorist threat; however, given a number of corporate headquarters and an affluent population, such a threat always exists to some degree. Factors such as these make the Las Virgenes-Malibu region an attractive potential target. Although there is not history of terrorist events within the region, the possibility exists.

The Las Virgenes-Malibu region receives their police protection services from the Los Angeles County Sheriff's Department Malibu/Lost Hills Station located at 27050 Agoura Road, Agoura, CA 91301. All five cities contract with the Los Angeles County Sheriff's Department. They shall be the lead agency for region response/crisis management. Individual cities will be responsible for consequence management. The Malibu/Lost Hills Division patrol areas include the western portion of Los Angeles County, including Agoura Hills, Calabasas, Hidden Hills, Malibu, and Westlake Village.

SPECIFIC THREATS

Recent trends toward large scale incidents generating significant casualties make preparedness and the mechanisms for effective response essential. In addition to large scale attacks, a full range of assault styles must be considered. Contemporary terrorist activity runs the gamut from simple letter bombings, assassinations with small arms, bio-chemical attacks, car, and suicide and building bombings to full-out attacks.

Bombings and arson remain significant sources of terrorist activity. Related threats include bomb threats, which disrupt the normal operations. Venues likely to suffer the impact of terrorism include government facilities, entertainment and cultural facilities and business canters. Conventional political motivations for terrorism continue, however, issues involving weapons proliferation, organized crime and narcotics trafficking are seen as having increasing influence. The potential for nuclear, biological, or chemical (NBC) is a concern. Recent events make NBC emergencies a plausible scenario necessitating the detailed contingency planning and preparation of emergency responders to protect the civilian populace in the Las Virgenes-Malibu region and in Los Angeles County.

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CAUSES AND CHARACTERISTICS OF TERRORIST EVENTS IN THE LAS VIRGENES-MALIBU REGION

Defining Terrorism

The United States Code defines terrorism as premeditated, politically motivated violence perpetrated against noncombatant targets by sub-national groups or clandestine agents usually intended to influence an audience. The United States Department of Justice defines terrorism as a violent act dangerous to human life, in violation of the criminal laws of the U.S. or any segment to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives. The FBI defines terrorism as the unlawful use of force or violence against persons or property to intimidate or coerce government, the civilian population, or any segment thereof, in furtherance of political or social objectives. Terrorists are categorized based on their actions, not beliefs. Even if we have sympathy for their cause, they are still criminals.

All three of these definitions share important components:

1. Criminal action
2. The action must include violence against civilians
3. The action is carried out in order to further political or social objectives
4. The action is intended to coerce a government or civilian population

TERRORISM IN THE UNITED STATES

Terrorism has touched U.S. soil at several locations over the years. After the September 11, 2001 World Trade Center airplane bombing, terrorism was no longer an international problem. In recent years, terrorism has taken on new form with the introduction of chemical, biological, and radiological weapons. The first step in preparing to respond to incidents of this kind is to understand the nature of the threat.

TERRORISM HAZARD IDENTIFICATION

The following are the types of terrorist groups:

Domestic Terrorism

Right Wing Terrorist Groups	Often engage in survivalist/ paramilitary training to ensure the survival of the U.S. as a white, Christian nation. Many extremists work through political involvement; however, some are members of the “militia” or “patriot” movement, and cannot work within existing structures of government. It is not illegal activity to belong to a militia. Many members of militias express that an impending armed conflict with the federal government necessitates paramilitary training and the stockpiling of weapons. The growth of the militia movement can be attributed to an effective communication system through the use of the Internet, videotape, gun shows, etc. Another phenomenon related to militias is “Common Law Courts.”
Left-wing	Typically, left-wing groups profess a revolutionary socialist doctrine and



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Terrorist Groups	view themselves as protectors of the American people against capitalism and imperialism. They believe that bombings alone will not result in change, but are tools to gain public recognition for their cause.
Special Interest Terrorist Groups	Differs from traditional right- and left-wing groups in that they pursue specific objectives. These terrorist groups attempt, through their violent criminal actions, to force members of society to change their attitudes about issues considered important to them. Such groups who defend animal rights, right to life, environmental preservation and abortion rights are some examples.

International Terrorist Groups

International terrorism against the U.S. is foreign based and/or directed by countries or groups outside the U.S. State sponsors view terrorism as a tool of foreign policy. State sponsors continue to engage in anti-Western terrorist activities by funding, organizing, networking, and providing other support to many extremists.

WHAT IS SUSCEPTIBLE TO TERRORISM

In the Las Virgenes-Malibu region there are several critical facilities that may be targets for terrorism. Because of safety and security concerns, these targets will not be named specifically. Probability that an individual/location will be targeted by a terrorist is a function of several factors including the attractiveness of target, the potential for success of the event and potential for avoiding identification and capture. Samples of general targets are provided below.

General Targets

1. Symbolic buildings
2. Federal, state, and local government buildings
3. Mass-transit facilities
4. Public buildings and assembly areas
5. Controversial businesses
6. Communication and utility facilities
7. Water supply locations
8. Research laboratories
9. Places where large groups of people congregate

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WEAPONS OF MASS DESTRUCTION (WMD)

Most law enforcement officers know very little about WMD because, up until recently, no one seriously thought that WMD would ever be used against U.S. targets. Law enforcement agencies with more immediate problems have had little time to prepare for a potential WMD attack. It is essential that law enforcement officers, who are likely to be first responders, become familiar with WMD. Additional training can occur once officers are aware of these WMD and how they can be used.

Five Types of WMD That Could be Employed by Terrorists

WMD can be categorized into five categories using the acronym B-NICE: Biological, nuclear, incendiary, chemical and explosive.

1. Four common types of biological agents are bacteria, viruses, rickettsia, and toxins.
2. Nuclear terrorism can occur in two different ways.
 - a. Detonation or threat of detonation of a nuclear bomb
 - b. Dispersion of radiological material using a conventional explosive or other dispersal device
3. An incendiary device is any mechanical, electrical, or chemical device used to intentionally initiate combustion and start a fire.
4. Chemical agents can be classified into five categories: nerve agents, blister agents, blood agents, choking agents, and irritating agents.
5. Explosive devices are the most common WMD (70% of all terrorist attacks).

LAW ENFORCEMENT ROLE IN COMBATING TERRORISM

The following are steps and efforts that various law enforcement agencies are taking to combat terrorist activities.

1. On-going attention to known potential targets within the service area
2. Identification of new potential targets within the service area
3. Identification of suspicious persons, places, or things which may be related to potential terrorist activity
4. Recognition of potential surveillance and intelligence-gathering activities
5. Recognition of potential terrorist involvement in routine crimes (ID theft, shoplifting, credit card fraud, forgeries, etc.)
6. Organizing and informing community resources regarding anti- terrorism
7. Ability to respond safely and effectively to a terrorist incident or a terrorist use of a WMD.
8. Identify the terrorist group
9. Monitor weapons/materials
10. Threat/vulnerability assessment
11. Counter surveillance
12. Target hardening
13. Awareness of suspicious behavior as terrorists egress from target

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EXISTING MITIGATION ACTIVITIES

Currently the Malibu/Lost Hills Sheriff's station and individual city's implement projects and or programs to help prevent a terrorist situation or be highly prepared if one were to occur. The following are practices or projects that are currently active in the region. As more information becomes available, it shall be included in the plan.

MALIBU

Ongoing Public Information Program

- A monthly series on the City website features a different theme each month. These are adapted from the monthly Emergency Survival Program bulletins on preparing for and responding to terrorism incidents.
- A series of messages on the City's cable TV channel urge viewers to take emergency response training, to write a family emergency plan, and to contact the Emergency Preparedness Coordinator for further information.
- Ongoing meetings and presentations about emergency preparedness are made to the public at meetings of Homeowner's Associations and Emergency Preparedness Fairs.

Emergency warnings and information will be provided to the public in the event of a terrorist incident. This will be accomplished via the City of Malibu website, Cable TV channel-3, the City's AM Radio Station (1620 AM), a telephone Hotline service (456-9982), a call center located at City's Emergency Operations Center, and an email subscription service which notifies subscribers whenever emergency information is updated on the City website

Explosive Sniffing Canine

A canine trained to sniff out explosives is available in the Los Angeles County Sheriff's Department through the departments of Arson/Explosive Detail.

Terrorism Training

The Los Angeles County Sheriff's Department is currently updating its training for terrorist attacks.

TERRORISM MITIGATION STRATEGIES

See Section 4 for Mitigation Strategies.

Flooding Hazards in the Las Virgenes-Malibu Region

SECTION 9

FLOOD

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WHY ARE FLOODS A THREAT TO THE LAS VIRGENES-MALIBU REGION?

Flooding poses a threat to life and safety, and can cause severe damage to public and private property. Because of wildfire and changes in the natural landscape, flooding has been a factor in the history of the region. There is much mountainous terrain which creates water runoff during storms. The Las Virgenes-Malibu region was most recently significantly affected by flooding in the winter storms of 1998, also known as El Nino.

HISTORY OF FLOODING IN THE LAS VIRGENES-MALIBU REGION AND THE LOS ANGELES AREA

The Las Virgenes-Malibu region, which is located within Los Angeles County, which has historically experienced flooding from major winter storm events. The region is at the western edge of the Santa Monica Mountain range.

Long-term precipitation (1950 – 2002) in this area is based on data collected and recorded by the Los Angeles County Department of Public Works (LACDPW). Annual precipitation ranges from a minimum of zero (recorded in 1989) to a maximum of 59.13 inches (1998 El Nino). Very little precipitation is recorded between the months of May and October although an average of 17.3 inches of rain is measured annually. Rain fall increases northward toward the Santa Monica Mountains to the north and northwest, and decreases toward the center of the Coastal Plain.

Historical annual precipitation and cumulative departure from mean annual precipitation for The Las Virgenes-Malibu region demonstrate the severity and extent of dry and wet periods, the information below indicate five cyclical variations in the precipitation pattern between 1930 and 2003.

1. 1930 to 1976: a dry period
2. 1978 to 1983: an overall wet period
3. 1984 to 1990: a relatively dry period
4. 1991 to 1998: a relatively wet period
5. 1999 to present: beginning of a dry period

The most significant flooding events to affect the region occurred in 1994, 1995 and 1998. In 1998 a phenomenon known as El Nino hit Southern California and broke several rainfall records across Los Angeles County.

FEMA has declared the following to be significant floods. A significant event is one with 1,500 or more paid losses, or occasionally one added for other reasons. Events have been named according to the most popular name at the time the events occurred, or if there is no apparent name, one has been created for this report.

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CHART 14. SIGNIFICANT FLOOD EVENTS IN SOUTHERN CALIFORNIA 1978 - 2004

Event	Year	# Pd Losses	Amount Pd (\$)	Avg Pd Loss
California Flood - Southern	Jan-98	1,523	\$18,539,717	\$12,173
California Flood December 1996	Dec-96	1,831	\$39,433,756	\$21,537
S. California Flood	Jan-95	2,732	\$64,928,365	\$23,766

These events had a definite impact on the cities within the Las Virgenes-Malibu region. Mitigation activities are key to prevent any further incidents and mitigate the loss of property and life.

The following chart represents flood losses for the five cities within the Las Virgenes-Malibu COG from January 1, 1978 to December 31, 2003.

CHART 15. FLOOD LOSS STATISTICS FROM NFIP FOR THE STATE OF CALIFORNIA (From January 1, 1978 to December 31, 2003)

Community Name	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
Agoura Hills	46	27	0	19	\$289,436.36
Calabasas	5	2	0	3	\$16,227.71
Hidden Hills	31	18	0	13	\$165,649.37
Malibu	50	26	1	18	\$582,594.45
Westlake Village	2	1	0	1	\$566.83
TOTAL	134	74	1	54	\$ 1,054,474.72

(Source: <http://www.fema.gov/nfip/10400312.shtm#06>)

AGOURA HILLS

The city of Agoura Hills has one reservoir within city boundaries. The city has no major record of flooding activity in the city within the last decade.

CALABASAS

The city of Calabasas has an estimated amount of \$700,000 dollars in damages in the floods created by El Nino in 1998.

HIDDEN HILLS

The Malibu Hydrographic Unit, located in the northwestern portion of the Los Angeles River Basin contains the City of Hidden Hills. The Malibu Hydrographic Unit occupies approximately



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242 square miles in the western portion of Los Angeles County and the southeastern portion of Ventura County. The city is part of the Arroyo Calabasas Drainage Basin.

There are no year round streams or ponds within the city. Surface water runoff only occurs during and after periods of intense rainfall. The city's topography and soil conditions subject the City to flood hazards from storm drain overflow, as well as from erosions, mudflows and debris deposits.

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps indicate that the City of Hidden Hills is located in Zone C, meaning it has a low potential for flooding. The Master Plan for Storm Drains map illustrates the existing flood control facilities. The Los Angeles County Flood Control District maintains these facilities.

WESTLAKE VILLAGE

Flood hazard areas within the City of Westlake Village are limited to the Triunfo Canyon drainage below Westlake Lake and the banks of the lake itself. A storm drain system has been constructed in the vicinity of the canyon to moderate the effects of storm runoff. The Los Angeles County Flood Control District has prepared a Triunfo Creek Floodway Map (LACFCD 154-ML2, Ord. 81-0021), which defines the physical limits of the flood hazard and the minimum floor elevations required for structures outside the hazard area. Any development within the canyon will be subject to the review and approval of the District.

Development on the shores of Westlake Lake has been set back several feet from the highest water level which could be expected to occur. This setback is recognized as a flood hazard area and is maintained as open space. The "spillover" design of the Westlake Lake dam ensures that flooding beyond the lake's banks cannot occur.

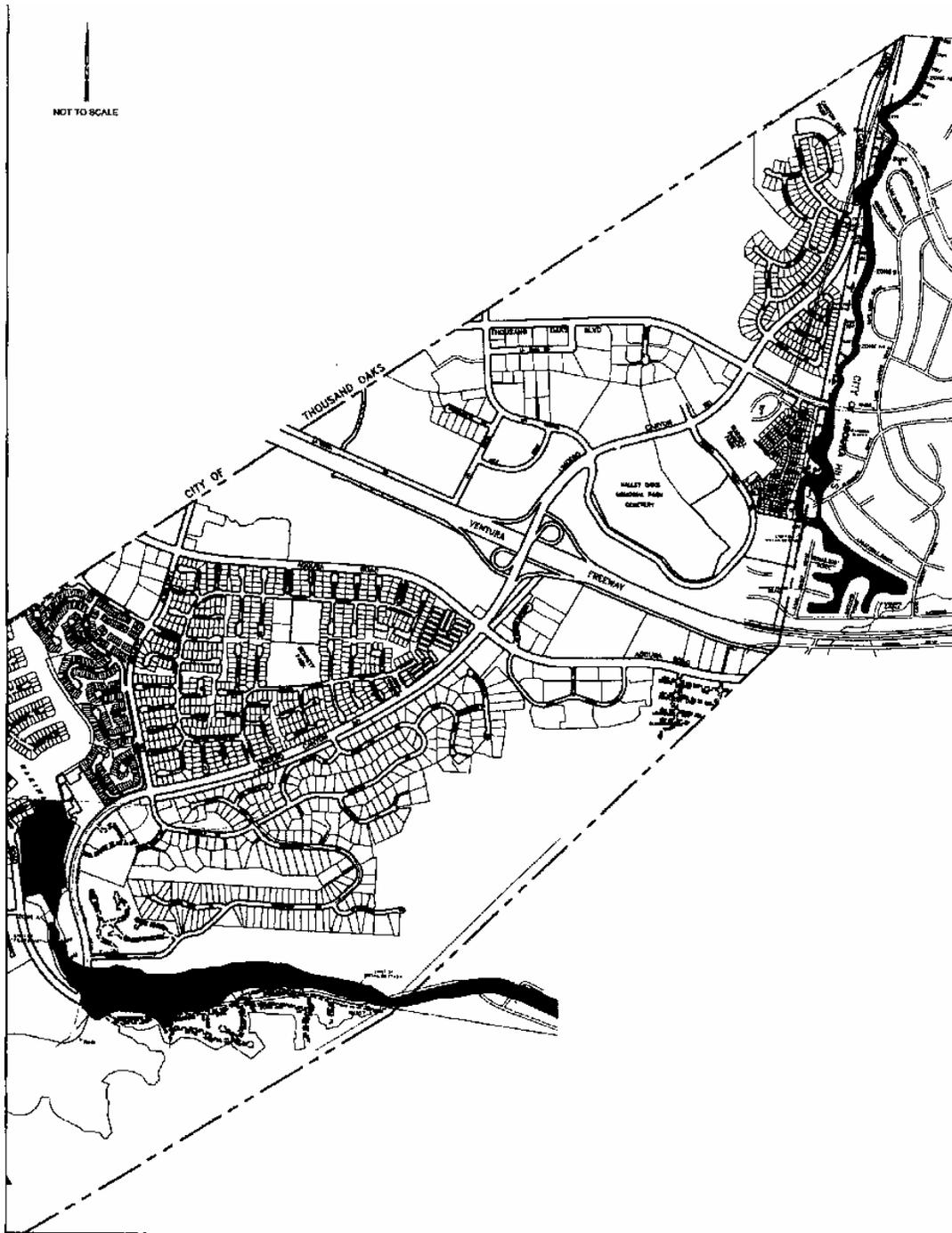
Urban flooding can sometimes be possible due to debris accumulation on storm drains and in flood control channels and basins, over burdened pumping stations and aged drainage systems. Low-lying areas are particularly susceptible to urban flooding.

There are no specific areas identified as frequent drainage problems. However, the general areas most susceptible are those around the Westlake Lake since this is the lowest elevation level in the City. These areas include First Neighborhood, Lakeshore, and Southshore.

The following map is known flood areas in the City. The dark areas show areas that may experience potential flooding.

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MAP 17. CITY OF WESTLAKE VILLAGE FLOOD ZONES



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MALIBU

Malibu's flood hazard stems from two primary sources: rainfall and high surf. Both these types of flooding pose significant problems.

Factors affecting flooding:

Drainage capacity, duration of rainfall, intensity of rainfall, absorbency of the soil, drain blockage, mitigation techniques utilized.

The city of Malibu has conducted a full Flood Mitigation Plan in 2001. Along with that the City also implements a Master Plan of Drainage. The City has a history of repetitive flooding caused by a variety of conditions. There are 21 major water courses within the city's boundaries.

Malibu Creek is the largest of the watershed areas with an area of 119 square miles. Wildfires in canyon areas have destroyed over the years most of the native vegetation, increased runoff, erosion and sedimentation and caused heavy flooding in 1993, 1994, 1995 and 1998. (See Malibu Flood Mitigation Plan Appendix E).

CAUSES AND CHARACTERISTICS OF FLOODS IN THE LAS VIRGENES-MALIBU REGION

Typically, the Las Virgenes-Malibu region experiences flooding during or after a large rain storm. This is usually the case. However, flooding may occur as a result of large wave activity on the coast, reservoir or dam failure. However these events have no record of causing major flood situations.

The Las Virgenes-Malibu region is susceptible to flash or fast rise flooding because a high percentage of the surface area is composed of canyons, hills and mountainous terrain. The runoff caused by heavy rains potentially leads to flooding.

The standard for flooding is the so called "100 year flood" a benchmark used by the Federal Emergency Management Agency (FEMA) to establish a standard flood control throughout the country. Thus, the 100- year flood is also referred to as the regulatory or baseline for all flooding events.

A flood, as defined by the National Flood Insurance Program is: A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from: overflow of inland or tidal waters; unusual or rapid accumulation or runoff of surface waters from any source, or mudflow.

Urban flooding primarily affects the Las Virgenes-Malibu region. Flooding of areas may occur when the amount of water generated from rainfall and runoff exceeds a storm water system's capability to remove it. In addition, low- lying and areas at the foot of mountainous terrain have the potential to flood.

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Winter Rainfall

Over the last 125 years, the average annual rainfall in Los Angeles is 14.9 inches. But the term “average” means very little as the annual rainfall during this time period has ranged from only 4.35 inches in 2001-2002 to 38.2 inches in 1883-1884. In fact, in only fifteen of the past 125 years, has the annual rainfall been within plus or minus 10% of the 14.9 inch average. And in only 38 years has the annual rainfall been within plus or minus 20% of the 14.9 inch average. This makes the Los Angeles basin a land of extremes in terms of annual precipitation.

FLOOD HAZARD IDENTIFICATION

Flooding occurs when climate, geology, and hydrology combine to create conditions where water flows outside of its usual course.

As described earlier, due to the close proximity to the Santa Monica Mountain range and the variations of topography ranging from an elevation of 1600 feet to 250 feet, flood waters have the potential to contribute to flooding hazards. Furthermore, due to continued growth, economic development and an increase of impermeable areas, the regions storm water collection and conveyance system were fast becoming incapable of safely disposing urban runoff. Thus, contributing to flooding conditions in the region and in particular, the flood zone areas earlier described

As a result of the need for flood control, the Los Angeles County Flood Control District was established in 1915. Currently, the Los Angeles County Flood Control District’s Drainage Area flood control system is one of the world’s largest and most extensive flood protection infrastructures.

Another relatively regular source for heavy rainfall, particularly in the mountains and adjoining cities is from summer tropical storms. These tropical storms usually coincide with El Nino years.

El Nino is a disruption of the ocean-atmosphere system in the tropical Pacific having important consequences for weather in California. Among these consequences are increased rainfall across the southern tier of the US and Peru, which has caused destructive flooding and drought in the West Pacific. During El Nino, the trade winds begin to relax in the central and western Pacific leading to a depression of the thermocline in the eastern Pacific and an elevation of the thermocline in the west. The result was a rise in sea surface temperature and a drastic decline in primary productivity, the latter of which adversely affected higher tropic levels of the food chain, including commercial fisheries as well. The weakening of the easterly trade winds during El Nino and the increase of rain fall follows the warm water eastwards, with associated flooding in the west. The eastward displacement of the atmospheric heat source overlaying the warmest water results in large changes in the global atmospheric circulation, which in turn forces changes in weather far removed from the tropical Pacific. December 1997 was near the peak of a strong El Nino year. There was also El Nino in 1991 – 1992, 1993-1994 and 1994-1995.

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Long-term annual precipitation

Two striking features of Los Angeles rainfall are its seasonal nature and its reflection of topographic effects.

Over the entire Los Angeles Basin, excluding mountain locations, the average annual precipitation ranges less than 12 inches at the immediate coast to more than 20 inches at the foothills. The normal seasonal rainfall measured at downtown Los Angeles is 15.14 inches.

On average, 92 percent of the seasonal precipitation falls between November 1st and April 30th. This percentage is roughly the same for all stations, regardless of elevation or distance from the ocean.

Seasonal rainfall variability was strongly demonstrated once again in Los Angeles during the 1998 calendar year. LAX received 352 % of normal rainfall within the first six months of 1998, but only 63% of normal in the second half of the year. The end of a very wet El Nino episode and the transition to a dry La Nina circulation was responsible for the change.

On a longer term, the 100- year change in rainfall rates within California in general and Los Angeles County in particular is practically nil, however there was an apparent increase in the number of heavy precipitation in the last two decades of the twentieth century. From 1943 to 1992 (a period of almost fifty years) extreme rain falls occurred in southern California on only five occasions. This time span covered an era of incredible growth with the Los Angeles Basin and the concurrent flood control construction projects has tamed the flood-prone communities of Los Angeles. Heavy rainfall events were noted in the basin during the years 1992, '93, '95, '97, and '98 – helping to make the decade of the nineties the wettest since the 1930's and early '40s.

Geography and Geology

The greater Los Angeles Basin is the product of rainstorms and erosion for hundreds of years. Much of the coastal plain rests on the ancient rock debris and sediment washed down from the mountains. This sediment can act as a sponge, absorbing vast quantities of rain in those years when heavy rains follow a dry period. But like a sponge that is near saturation, the same soil fills up rapidly when a heavy rain follows a period of relatively wet weather. So even in some years of heavy rain, flooding is minimal because the ground is relatively dry. The same amount of rain following a wet period of time can cause extensive flooding.

The Las Virgenes-Malibu region geologic features consist of mainly un-consolidated and semi-consolidated alluvial materials underlain and bounded on the north and east by consolidated sediments and crystalline rocks. The deposits consist of a shallow layer of Quaternary fill that has been washed down from the Santa Monica Mountains.

The materials are generally poorly sorted sands and gravels, intermingled with silts and clays. This lack of open ground forces water to remain on the surface and rapidly accumulate. If it were not for the massive flood control system with its concrete lined river and stream beds, flooding

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would be a much more common occurrence. And the tendency is towards even less and less open land. In- fill building is becoming a much more common practice in many areas. Developers tear down an older home which typically covers up to 40% of the lot size and replacing it with three or four town homes or apartments which may cover 90-95% of the lot.

Another potential source of flooding is “asphalt creep.” The street space between the curbs of a street is a part of the flood control system. Water leaves property and accumulates in the streets, where it is directed towards the underground portion of the flood control system. The carrying capacity of the street is determined by the width of the street and the height of the curbs along the street. Often, when streets are being resurfaced, a one to two inch layer of asphalt is laid down over the existing asphalt. This added layer of asphalt subtracts from the rated capacity of the street to carry water. Thus the original engineered capacity of the entire storm drain system is marginally reduced over time. Subsequent re-paving of the street will further reduce the engineered capacity even more.

FLOODWAY/FLOOD CHANNELS

DAM AND RESERVOIR FAILURE FLOODING

Two factors influence the potential severity of a full or partial reservoir or dam failure: the amount of water impounded, and the density, type, and value of development and infrastructure located downstream.

Loss of life and damage to structures, roads, and utilities may result from a reservoir or dam failure. Economic losses can also result from a lowered tax base and lack of utility profits. These effects would certainly accompany the failure of one of the reservoirs in the Las Virgenes-Malibu region.

There are many above and partially below-ground storage reservoirs. Because reservoir failure can have severe consequences, FEMA requires that all reservoir owners develop Emergency Action Plans (EAP) for warning, evacuation, and post- flood actions. Although there may be coordination with county officials in the development of the EAP, the responsibility for developing potential flood inundation maps and facilitation of emergency response is the responsibility of the reservoir owner. For more detailed information regarding reservoir failure flooding, and potential flood inundation zones, refer to the city’s Disaster Plans.

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There have been a total of 45 reservoir failures in California, since the 19th century. The significant reservoir failures in Southern California are summarized below.

CHART 16. SIGNIFICANT RESERVOIR FAILURES IN CALIFORNIA

Dam	Location	Year	Cause
Sheffield	Santa Barbara	1925	Earthquake slide
Puddingstone	Pomona	1926	Overtopping during construction
Lake Hemet	Palm Springs	1927	Overtopping
Saint Francis	San Francisquito Canyon	1928	Sudden failure at full capacity through foundation, 426 deaths
Cogswell	Monrovia	1934	Breaching of concrete cover
Baldwin Hills	Los Angeles	1963	Leak through embankment turned into washout, 3 deaths

Source: http://cee.engr.ucdavis.edu/faculty/lund/reservoirs/Reservoir_History_Page/Failures.htm

The two most significant reservoir failures in Los Angeles County are the St. Francis Reservoir in 1928, which killed over 500 people and caused damage estimates topped \$20 million and the Baldwin Hills Reservoir in 1963. Five people were killed. Sixty-five hillside houses were ripped apart, and 210 homes and apartments were damaged.

DEBRIS FLOWS

Debris flows referred to as mudslides, mudflows, lahars, or debris avalanches, are common types of fast-moving landslides. Debris flows are discussed in Section 10 Earth Movements of this plan.

HOW ARE FLOOD-PRONE AREAS IDENTIFIED

Flood maps and Flood Insurance Studies (FIS) are often used to identify flood-prone areas. The NFIP was established in 1968 as a means of providing low-cost flood insurance to the nation's flood-prone communities. The NFIP also reduces flood losses through regulations that focus on building codes and sound floodplain management. The NFIP and related building code regulations went into effect on March 1, 1978. NFIP regulations (44 Code of Federal Regulations (CFR) Chapter 1, Section 60, 3) require that all new construction in floodplains must be elevated at or above base flood level

The Las Virgenes-Malibu regional cities have municipal codes that provide for the protection of residential and non-residential structures in Flood Hazard areas.

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FLOOD INSURANCE RATE MAPS (FIRM) AND FLOOD INSURANCE STUDIES (FIS)
 FEMA has classified the Region under Zone “C”, which does not require mandatory flood mitigation enforcement. Properties are therefore not required to carry flood insurance. The cities within the Las Virgenes-Region however to participate in FEMA’s National Flood Insurance Program (NFIP). Below is a chart of their date of entry.

CHART 17. NATIONAL FLOOD INSURANCE PROGRAM COMMUNITES

CID	Community Name	County	Date of Entry [Emer or Reg]	Current Effective Map
065072#	AGOURA HILLS	Los Angeles	03/04/86(R)	8/3/1998
060749#	CALABASAS	Los Angeles	03/10/93(R)	
060125#	HIDEN HILLS	Los Angeles	09/07/84(R)	11/21/2001
060745#	MALIBU	Los Angeles	10/01/92(R)	
060744#	WESTLAKE VILLAGE	Los Angeles	10/01/92(R)	

The Community Identification (CID) number is a unique 6 digit number assigned to each community that has been identified under the National Flood Insurance Program. The CID number is shown on each FIRM panel and is the first 6 digits of all non-countywide format FIRM panel numbers.

Floodplain maps are the basis for implementing floodplain regulations and for delineating flood insurance purchase requirements. A Flood Insurance Rate Map (FIRM) is the official map produced by FEMA which delineates communities where NFIP regulations apply. FIRMs are also used by insurance agents and mortgage lenders to determine if flood insurance is required and what insurance rates should apply.

Water surface elevations are combined with topographic data to develop FIRMs. FIRMs illustrate areas that would be inundated during a 100-year flood, floodway areas, and elevations marking the 100-year-flood level. In some cases they also include base flood elevations (BFEs) and areas located within the 500-year floodplain. Flood Insurance Studies and FIRMs produced for the NFIP provide assessments of the probability of flooding at a given location. FEMA conducted many Flood Insurance Studies in the late 1970s and early 1980s. These studies and maps represent flood risk at the point in time when FEMA completed the studies. However, it is important to note that not all 100-year or 500-year floodplains have been mapped by FEMA. FEMA flood maps, like many maps, are not entirely accurate. These studies and maps represent flood risk at the point in time when FEMA completed the studies, and does not incorporate planning for floodplain changes in the future due to new development. Although FEMA is considering changing that policy, it is optional for local communities. Man-made and natural changes to the environment have changed the dynamics of storm water run-off since then.

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DATA SOURCES

FEMA mapped the 100 -year and 500-year floodplains through the Flood Insurance Study (FIS) in conjunction with the United States Army Corps of Engineers (USACE) in August of 1987. There were previous studies done, including a Housing and Urban Development (HUD) study, which mapped the floodplain in March of 1978, The County has updated portions of the USACE and FEMA maps through smaller drainage studies in the county since that time.

RISK ANALYSIS

Within the broad components of a risk analysis, it is possible to predict the severity of damage from a range of events. Flow velocity models can assist in predicting the amount of damage expected from different magnitudes of flood events. The data used to develop these models is based on hydrological analysis of landscape features. Changes in the landscape, often associated with human development, can alter the flow velocity and the severity of damage that can be expected from a flood event. Using GIS technology and flow velocity models, it is possible to map the damage that can be expected from flood events over time. It is also possible to pinpoint the effects of certain flood events on individual properties.

At the time of publication of this plan, data was insufficient to conduct a risk analysis for flood events in the Las Virgenes-Malibu region. However, the current mapping projects will result in better data that will assist in understanding risk.

WHAT IS SUSCEPTIBLE TO DAMAGE DURING A FLOOD EVENT

The largest impact on communities from flood events is the loss of life and property. In addition, other losses include vehicles in subterranean garages, loss of electrical and gas services, municipal services (i.e. water, wastewater, solid waste collection and disposal) and transportation.

Property Loss Resulting from Flooding Events

The type of property damage caused by flood events depends on the depth and velocity of the flood waters. Faster moving flood waters can wash buildings off their foundations and sweep cars downstream. Pipelines and other infrastructure can be damaged when high waters combine with flood debris. Extensive damage can be caused by flooding and landslide damage related to soil saturation from flood events. Most flood damage is caused by water saturating materials susceptible to loss (i.e., wood, insulation, wallboard, fabric, furnishings, floor coverings, appliances and vehicles parked in subterranean garages).

Business/Industry

Flood events impact businesses by damaging property and by interrupting business. Flood events can cut off customer access to a business as well as close a business for repairs. A quick response to the needs of businesses affected by flood events can help a community maintain economic vitality in the face of flood damage. There has been no significant long term effect to the business and industry sector.

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Public Infrastructure

Publicly owned facilities are a key component of daily life for all citizens of the county. Damage to public water and sewer systems, transportation networks, emergency facilities, and offices can hinder the ability of the government to deliver services. Previous mitigation measures have fixed many of the problems in flooding around government facilities. The Region's water distribution and the wastewater conveyance systems are self-maintained. During natural hazard events, or any type of emergency or disaster, dependable road connections are critical for providing emergency services. Roads systems in the Las Virgenes-Malibu region are self-maintained.

Storm Water Systems

There is a drainage master plan, and Las Virgenes-Malibu region Public Works staff is aware of local drainage threats and deficiencies. The problems are often present where storm water runoff enters culverts or goes underground into storm sewers. Inadequate maintenance can also contribute to the flood hazard in urban areas. The Las Virgenes-Malibu region operates a wastewater collection system, which conveys the wastewater to a regional wastewater treatment plant (Hyperion) that is owned and operated by the Region of Los Angeles. The Las Virgenes-Malibu region wastewater is treated by this facility. The Las Virgenes-Malibu region also provides domestic drinking water to the residents as part of region services.

Water quality problems include bacteria, toxins, and pollution. The Las Virgenes-Malibu region imports approximately 85 percent of its drinking water from the Metropolitan Water District of Southern California. The remaining 15 percent is produced locally from four municipal water wells and treated at a 3MGD water treatment plant that is owned and operated by Earth Tech, Inc. a subsidiary of Tyco International.

EXISTING MITIGATION ACTIVITIES

Flood mitigation activities listed here include current mitigation programs and activities that are being implemented by the Las Virgenes-Malibu region.

The Las Virgenes-Malibu region uses building codes, zoning codes, and various planning strategies to address development in areas of known hazards, and applying the appropriate safeguards.

AGOURA HILLS

The City of Agoura Hills implements a Flood Hazard Building code (8103.110.1).

CALABASAS

As information becomes available, existing mitigation strategies for the City of Calabasas that mitigate the loss of life and property during a flood event shall be included in the plan.

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HIDDEN HILLS

The City of Hidden Hills has implemented the following building codes as preventative measures for loss of life and property because of a flood hazard event.

Section	Title
3319.1	Flood Hazard

MALIBU

Malibu Road Drainage and Pavement Rehabilitation Project

This project will relieve the drainage problem behind Malibu Colony Plaza, and repair pavement to Malibu Road. Construction is expected to begin in the summer of 2003.

Big Rock Storm Drain Project

This project will improve drainage and prevent erosion on Big Rock Drive. The design is currently being reviewed by the California Office of Emergency Services (OES) and the Federal Emergency Management Agency (FEMA) for funding approval. Construction is expected to begin in the Spring of 2004.

Cross Creek Road Redesign

This project is intended to improve safety for pedestrians and vehicles, improve traffic circulation, and beautify the commercial area between Civic Center Way and the Pacific Coast Highway. It will also improve drainage in the area, thereby reducing flooding. The conceptual design was approved by the City Council in December, 2001. Detailed design is expected to begin in early 2003 followed by the permitting process. Construction is planned for early 2005.

WESTLAKE VILLAGE

As information becomes available, existing mitigation strategies for the City of Westlake Village that mitigate the loss of life and property during a flood event shall be included in the plan.

FLOOD MITIGATION STRATEGIES

See Section 4 for Mitigation Strategies.

Landslide Hazards in the Las Virgenes-Malibu Region

Section 10

LANDSLIDES

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WHY ARE LANDSLIDES A THREAT TO THE LAS VIRGENES-MALIBU REGION?

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

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

Topography of the Las Virgenes-Malibu region is greatly influenced by the Santa Monica Mountains and the Los Angeles Coastal Basin. Hillside areas north of Sunset Boulevard are characterized as rugged topography with steep sided ridges and narrow ravines and these areas have the highest potential of landslide. Areas south of Sunset Boulevard are flat with a mild slope approximately 2 to 3 percent in the south-southwest direction and these areas have little to no danger of landslide.

WHAT IS A LANDSLIDE?

“A landslide is defined as, the movement of a mass of rock, debris, or earth flow 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 can be initiated by rainfall, earthquakes, volcanic activity, changes in groundwater, disturbance and change of a slope by man-made construction activities, or any combination of these factors. Landslides can also occur underwater, causing tidal waves and damage to coastal areas. These landslides are called submarine landslides.” (FEMA)

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 can occur on

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relatively gentle slopes and can cause significant property damage, but are far less likely to result in serious injuries than rapidly moving landslides (<http://pubs.usgs.gov/fs/fs-0071-00/>).

“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 can move slowly, (millimeters per year) or can move quickly and disastrously, as is the case with debris-flows. Debris-flows can travel 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 can 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.” (Interagency Hazard Mitigation Team, **State Hazard Mitigation Plan (2000) Oregon Emergency Management**).

Several slope failures have been reported in the northern hillside areas of the Region. The major cause of the slope failures were reported to be heavy rainfalls and soil erosion. Also the hillside residential development has placed additional loads on the subsurface bedrock which contributed to the slope failure. These failure planes are few feet deep and it extended through the soils overlaying bedrock. The reported slope failures occurred in the Santa Monica slate area that are characterized as having landslide potential due to the existence of bedding planes dipping out of the slope.

WHAT IS 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 can often move much faster (http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_33/). This high rate of speed makes debris flows extremely dangerous to people and property in its path.

No significant debris flow resulting from landslide activity is recorded in the Las Virgenes-Malibu region. In the event of a major landslide in the hillside area, debris flow will destroy roadway pavement and fill the storm drain catch basins. Any significant surface movement along the streets will however isolate residents in those areas. The City of Malibu is most prone to landslide, and hence, debris flow activity. This is covered in greater detail later in this section.

HISTORY OF LANDSLIDE EVENTS IN THE LAS VIRGENES-MALIBU

The cities of the Las Virgenes-Malibu Region have experienced landslide events due to heavy rains although these have not resulted in large amounts of loss or property or life. The City of Malibu has experienced the most landslide events of the five cities with the Calle del Barco, Kanan, Pacific Coast Highway, Las Flores, Love, and Malibu Road landslides.

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The City of Agoura Hills landslide events since 1990 include the Morrison Ranch, Liberty Canyon Slope Failure, Laura La Plante, Laro and Chateau Park landslides.

In 1999, the city experienced the Kanan Slope Repair as a result of the El Nino storms of 1998; total cost to the city was \$170,000. Another landslide incident, named the Via Amistosa, cost the city \$1,800,000 in damages.

The Northridge Earthquake caused minimal landslide damage totaling \$158,000. During the 1993 storms, the city incurred \$177,000 in damage in terms of landslide events. The following chart provides a description of the total landslide event damages to the city and to private entities in the City of Agoura Hills since 1980.

CHART 18. CITY OF AGOURA HILLS LANDSLIDE EVENTS since 1980

Costs to the City of Agoura Hills	Costs
1. Kanan Slope Repair(1999 El Nino)	\$170,000.00
2. Via Amistosa	\$1,800,000.00
3. Northridge Earthquake (miscellaneous)	\$158,000.00
4. 1993 Storms	\$177,000.00
Total	\$2,305,000.00
Costs to Private Developers	Costs
1. Morrison Ranch Slide	\$8,000,000.00
2. Liberty Cyn Slope	\$1,000,000.00
3. Laro Landslide	\$1,500,000.00
4. Chateau Park slide	\$1,000,000.00
Total	\$11,500,000.00

Southern California is prone to landslide events. The following is a list of landslide events since 1980.

HISTORIC SOUTHERN CALIFORNIA LANDSLIDES

1980 Southern California Slides

\$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 8 inches of rain fell in a 6 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 2 days.



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1983 Big Rock Mesa, California

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

1978-1979, 1980 San Diego County, California

Experienced major damage from storms in 1978, 1979, and 1979-80, as did neighboring areas of Los Angeles and Orange County, California. 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, California Earthquake Landslides

As a result of the magnitude 6.7 Northridge, California, earthquake, more than 11,000 landslides occurred over an area of 10,000 km². Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. The earth movement destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. It also 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, Southern California

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 2 years before.
Source: (http://landslides.usgs.gov.html_files/pubs/report1/Landslides_pass_508.pdf)

CAUSES AND CHARACTERISTICS OF LANDSLIDES IN THE LAS VIRGENES-MALIBU REGION

LANDSLIDE EVENTS AND IMPACTS

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 will continue to threaten the safety of people, property, and

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infrastructure, but without proper planning, landslide hazards will be even more common and more destructive.

The increasing scarcity of build-able 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, can 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 also tend to increase in volume as they scour out the channel (**Robert Olson Associates, Metro Regional Hazard Mitigation and Planning Guide, June 1999**). Flows often occur during heavy rainfall, can occur on gentle slopes, and can move rapidly for large distances.

The slope failures reported in the Region were caused by heavy rainfalls and the saturated soil eroded down slope. Debris from these slope failures was localized and it was cleaned up by the Region's Public Works crew. No major loss of property or personal injury reported.

LANDSLIDE CONDITIONS

Landslides are often triggered by periods of heavy rainfall. Earthquakes, subterranean water flows and excavations may 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 can be rapid.

Although landslides are a natural geologic process, the incidence of landslides and their impacts on people can be exacerbated by human activities. Grading for road construction and development can increase slope steepness. Grading and construction can decrease 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 activities effecting landslides include: excavation, drainage and groundwater alterations, and 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 can create 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

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of soil in to a sheet of mud and debris. Debris flows can often originate miles away from unsuspecting persons, and approach them at a high rate of speed with little warning.

A few areas in the City of Hidden Hills may have potentially unstable slopes. Slope severity, soil conditions, and underlying geology contribute to these conditions in the event of high rainfall.

In the City of Westlake Village, potential landslide hazards are primarily limited to the areas of sedimentary rocks in the northeast tip of the City.

NATURAL CONDITIONS

Natural processes can cause landslides or re-activate historical landslide sites. Seismic tremors can trigger landslides on slopes historically known to have landslide movement. Earthquakes can also cause additional failure (lateral spreading) that can occur on gentle slopes above steep streams and riverbanks.

PARTICULARY HAZARDOUS LANDSLIDE AREAS

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

1. On or close to steep hills;
2. Steep road-cuts or excavations;
3. 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);
4. Steep areas where surface runoff is channeled, such as below culverts, V-shaped valleys, canyon bottoms, and steep stream channels; and
5. Fan-shaped areas of sediment and boulder accumulation at the outlets of canyons.
6. Canyon areas below hillside and mountains that have recently (within 1-6 years) been subjected to a wildland fire.

IMPACTS OF DEVELOPMENT

Although landslides are a natural occurrence, residential development can substantially affect the potential for landslide failures in Las Virgenes-Malibu region. Proper planning and geotechnical engineering can be exercised to reduce the threat of safety of people, property, and infrastructure.

HIDDEN HILLS

The major pressures on hillside development in the City of Hidden Hills are caused by intensification of existing development on residential lots throughout the City and the resultant expansion into currently undeveloped areas. Intensification consists of additional construction and modification of existing construction or the complete demolition and redevelopment of a residential lot.

Intensification expands that developed pad area into previously “natural” hillslope areas and

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often involves a corresponding increase in the size and volume of the onsite sewage disposal systems. The potential consequence of such development suggests that appropriate retroactive and proactive measures that govern the long term stability of potentially active landslides should be part of a comprehensive hillslope management program, a program that recognizes the concern for future property damages incurred by residents.

EXCAVATION AND GRADING

Slope excavation is common in the development of home sites or roads on sloping terrain. Grading these slopes can result in some slopes that are steeper than the pre-existing natural slopes. Since slope steepness is a major factor in landslides, these steeper slopes can be at an increased risk for landslides. The added weight of fill placed on slopes can also result in an increased landslide hazard. Small landslides can be 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.

The Las Virgenes-Malibu region Building Department requires a geotechnical report for grading activities for the hillside developments. Grading plan is designed and certified by a licensed geotechnical engineer in accordance with the requirements of the Las Virgenes-Malibu region Building Codes. The site grading and excavation will be inspected by the Building Inspector during construction. Proper planning and geotechnical engineering will greatly reduce the potential for landslide and slope failure.

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 can increase landslide hazards. Broken or leaking water or sewer lines can be especially problematic, as can water retention facilities that direct water onto slopes. However, even lawn irrigation in landslide prone locations can result in damaging landslides. Ineffective storm water management and excess runoff can also cause erosion and increase the risk of landslide hazards. Drainage can be 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 may redirect water to other areas. Channels, streams, ponding, and erosion on slopes all indicate potential slope problems.

Road and driveway drains, gutters, downspouts, and other constructed drainage facilities can concentrate and accelerate flow. Ground saturation and concentrated velocity flow are major causes of slope problems and may trigger landslides.

Building Codes require drainage devices to dispose storm runoff from the hillside development. Ultimately the storm runoff is discharged into the storm drain system. Storm drain catch basins are maintained by Public Works Departments and they were cleaned to prevent any flooding or ponding.

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan - DRAFT 1

CHANGES IN VEGETATION

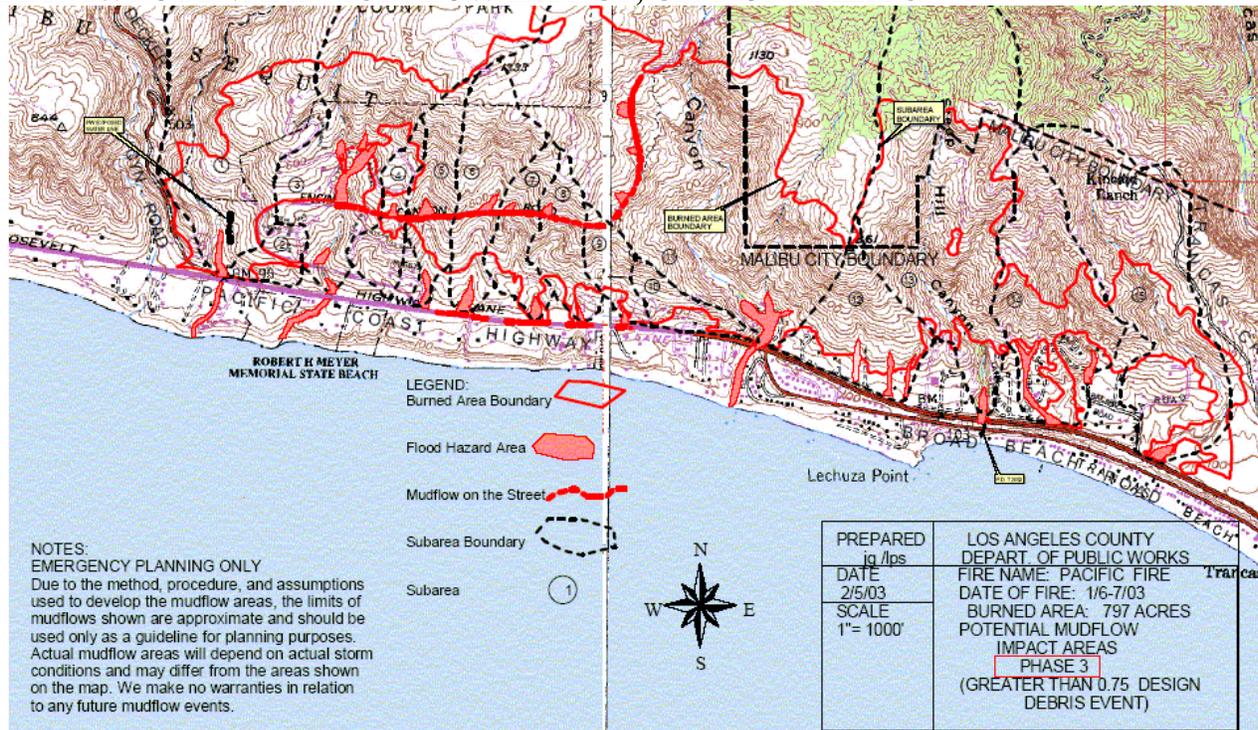
If the vegetation on very steep slopes has been removed by either fire or man, this can cause for increase risk of a landslide hazard. Additionally, if certain vegetation exists that requires much watering; this may also change the condition of the soil. Changing away from native ground cover plants may increase the risk of landslide.

LANDSLIDE HAZARD IDENTIFICATION

Identifying hazardous locations is an essential step towards implementing more informed mitigation activities. The Las Virgenes-Malibu region contains many areas that may be susceptible to landslide because of slopes and mountainous terrain. However, development in landslide risk areas is prohibited in the five cities.

For the City of Malibu, a mudflow risk assessment was conducted by the Los Angeles County Department of Public Works as a result of the Pacific Fire. The fire destroyed much native vegetation and left the soil and terrain vulnerable to absorbing much water from possible rainfall, therefore creating a chance for a landslide hazard. The following map shows Phase III of the Potential Mudflow Impact Areas, which reflects a worst case scenario, greater than .75 design debris event.

MAP 18. POTENTIAL MUDFLOW IMPACT, CITY OF MALIBU



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RISK ANALYSIS

Vulnerability assessment for landslides 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 region can be used to assess the population and total value of property at risk from future landslide occurrences.

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 Las Virgenes-Malibu region landslide events, there are many qualitative factors that point to potential vulnerability. Landslides can impact major transportation arteries, blocking residents from essential services and businesses.

Past landslide events have caused major property damage or significantly impacted region residents, and continuing to map region landslide and debris flow areas will help in preventing future loss.

Factors included in assessing landslide risk 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 region due to a specific landslide or debris flow event.

WHAT IS SUSCEPTIBLE TO LANDSLIDES?

Landslides can affect a variety of everyday life functions including utility services, transportation systems, and critical lifelines. Communities may suffer immediate damages and loss of service. Disruption of infrastructure, roads, and critical facilities may 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. Natural gas pipes may also be at risk of breakage from landslide movements as small as an inch or two.

Roads

Public Works Departments along with other departments within the cities in the Las Virgenes-Malibu region are responsible to clean up slides that inhibit the flow of traffic or are damaging the roadway. These departments do their best to communicate with residents impacted by landslides, but can usually only repair the roadway itself, as well as the areas adjacent to the slide where the region has the right of way. Individual property damage does fall under their immediate attention.

Landslide hazards can be alleviated by grading slides, by posting load bearing walls on roadsides and by installing new drainage systems on the slopes to divert water from the landslides. This type of response activity is often the most cost-effective in the short-term, but is only temporary. Unfortunately, many property owners are unaware of slides and the dangers associated with them.

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Lifelines and critical facilities

Lifelines and critical facilities should remain accessible, if possible, during a natural hazard event. The impact of closed transportation arteries may be increased if the closed road or bridge is critical for hospitals and other emergency facilities. Therefore, inspection and repair of critical transportation facilities and routes is essential and should receive high priority. 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. Flood events can also cause landslides, which can have serious impacts on gas lines that are located in vulnerable soils.

EXISTING MITIGATION ACTIVITIES

Landslide mitigation activities include current mitigation programs and activities that are being implemented by local or region organizations.

AGOURA HILLS

The following building codes are implemented as preventative measures for loss of life and property because of a landslide hazard event.

Section	Title
8103(a)110.2	Geologic Hazard
8103(u)1806.5	Foundations on Adjacent Slopes
8103(aaa)3304.6.11	Debris Prohibited

The city also implements the following ordinances:

- A. Requirement for geotechnical and geologic report submittal and review prior to development entitlement.
- B. Requirement for graded slopes to be landscaped for stability.

In addition the city also has slope set-back requirements and expansive soil requirements.

Landslide Building/Zoning Codes

All cities within the Las Virgenes-Malibu region follow the CBC. The CBC requires geotechnical investigation of the potential soil liquefaction and soil strength loss during earthquakes for development in the liquefaction zones. The geotechnical report shall address potential consequences of any liquefaction and soil strength loss and discuss mitigating measures.

CALABASAS

There have been no significant landslide events in recent history in the City of Calabasas that have caused costs or damages.

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HIDDEN HILLS

The following building codes are implemented as preventative measures for loss of life and property because of a landslide hazard event.

Section	Title
3316	Erosion Control
1806.11	Foundations on Expansive Soil

MALIBU

Landslide Building/Zoning Codes

The City of Malibu Building Code addresses development on steep slopes. This section outlines standards for steep slope hazard areas on slopes of 20 percent or more. Generally, the ordinance requires soils and engineering geologic studies for developments proposed on slopes of 20 percent or greater. More detailed surface and subsurface investigations shall be warranted if indicated by engineering and geologic studies to sufficiently describe existing conditions. This may include soils, vegetation, geologic formations, and drainage patterns. Site evaluations may also occur where stability might be lessened by proposed grading/filling or land clearing.

WESTLAKE VILLAGE

As information becomes available, existing mitigation strategies for the City of Westlake Village that mitigate the loss of life and property during a landslide event shall be included in the plan.

LANDSLIDE MITIGATION STRATEGIES

See Section 4 for a list of Mitigation Strategies.

Windstorm
Hazards
in
The Las Virgenes-
Malibu Region

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SECTION 11

WINDSTORMS

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WHY ARE WINDSTORMS A THREAT TO THE LAS VIRGENES-MALIBU REGION

Severe wind storms pose a significant risk to life and property in the region by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds have the potential to cause damage to local homes and businesses. High winds, over prolonged periods of time, can increase the risk of urban wildfire as moisture content decreases in brush on hillsides and at urban interface areas. High winds can displace or interrupt building structural elements, trees, electrical lines and other utility services.

CAUSES AND CHARACTERISTICS OF WINDSTORMS IN THE LAS VIRGENES-MALIBU REGION

High winds are generally related to thunderstorm activity, strong frontal systems or pressure gradient differences created at an interface of high and low pressure weather fronts. Most significant wind related events in the Las Virgenes-Malibu region are generally related to a climate condition termed “Santa Ana Winds”. Between October and February, residents face the threat of the hot, dry Santa Ana winds, particularly in the fire-prone chaparral country.

Santa Ana wind conditions are a concern for the general Las Virgenes-Malibu area. The diverse topography within the Las Virgenes-Malibu region seems to favor isolated wind events whereas the hillside areas may be windy.

WINDSTORM HAZARD IDENTIFICATION

A windstorm event in the Las Virgenes-Malibu region can come in the form of short term, topographically influenced, high wind gusts to extended duration Santa Ana wind conditions. Significant wind events in the Las Virgenes-Malibu region could pose a significant concern to trees and structural elements of buildings, especially as wind thrown trees and detached structural elements block or disrupt roadways and utility delivery systems. The following chart is the Beaufort scale and has been used for 200 years to estimate wind strengths.

CHART 19. BEAUFORT SCALE

Beaufort Force	Speed (mph)	Wind Description - State of Sea - Effects on Land
0	Less 1	Calm - Mirror-like - Smoke rises vertically
1	1-3	Light - Air Ripples look like scales; No crests of foam - Smoke drift shows direction of wind, but wind vanes do not
2	4-7	Light Breeze - Small but pronounced wavelets; Crests do not break - Wind vanes move; Leaves rustle; You can feel wind on the face
3	8-12	Gentle Breeze - Large Wavelets; Crests break; Glassy foam; A few whitecaps - Leaves and small twigs move constantly; Small, light flags are extended

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Beaufort Force	Speed (mph)	Wind Description - State of Sea - Effects on Land
4	13-18	Moderate Breeze - Longer waves; Whitecaps - Wind lifts dust and loose paper; Small branches move
5	19-24	Fresh Breeze - Moderate, long waves; Many whitecaps; Some spray - Small trees with leaves begin to move
6	25-31	Strong Breeze - Some large waves; Crests of white foam; Spray - Large branches move; Telegraph wires whistle; Hard to hold umbrellas
7	32-38	Near Gale - White foam from breaking waves blows in streaks with the wind - Whole trees move; Resistance felt walking into wind
8	39-46	Gale - Waves high and moderately long; Crests break into spin drift, blowing foam in well marked streaks - Twigs and small branches break off trees; Difficult to walk
9	47-54	Strong Gale - High waves with wave crests that tumble; Dense streaks of foam in wind; Poor visibility from spray - Slight structural damage
10	55-63	Storm - Very high waves with long, curling crests; Sea surface appears white from blowing foam; Heavy tumbling of sea; Poor visibility - Trees broken or uprooted; Considerable structural damage
11	64-73	Violent Storm - Waves high enough to hide small and medium sized ships; Sea covered with patches of white foam; Edges of wave crests blown into froth; Poor visibility - Seldom experienced inland; Considerable structural damage
12	>74	Hurricane - Sea white with spray. Foam and spray render visibility almost non-existent – Widespread damage. Very rarely experienced on land.

Source: <http://www.compuweather.com/decoder-charts.html>

In terms of region resources, trees come to mind as potential hazards during high wind events. The leafy canopy and structural elements of a tree crown present a drag type barrier to winds. Trees are naturally engineered to minimize wind drag through the re-orientation of leaves and through the independent motion of limbs and branches to minimize the transfer of uniform sway motion forces to the trunk during wind events. The Beaufort Wind Scale (BWS-see Chart 16) specifically notes problems with trees as wind speeds increase. The BWS references the likelihood of whole tree motion as wind speeds exceed thirty two (32) miles per hour (MPH), twig breakage at thirty nine (39) MPH and whole tree windthrow as wind speeds exceed fifty five (55) MPH. The susceptibility of trees to windthrow can be influenced by the general structural condition of the trees, the location of the trees in reference to wind patterns and the level and frequency of pruning maintenance given the trees.

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In the case of building structures, the likelihood of structural element detachment may be influenced by local construction code requirements, the location of buildings in reference to wind patterns and in the level of maintenance upkeep provided buildings by owners. Given the location of the Las Virgenes-Malibu in relation to historic Santa Ana wind flows, coupled with the topography of some areas of the region that favor the development of isolated high wind conditions; the effects of windstorms will be a continuing management concern in the region.

While the historic impact of these events on the Las Virgenes-Malibu region seems low, these events always stand to pose a threat to life, property, utility delivery systems, infrastructure elements and transportation. In the case that a wind event results in a major utility disruption, it may prove necessary to utilize private and region resources to aid in the care and sheltering of displaced residents. In the case of a severe event, the economic impact of providing these services on a long term basis could prove taxing. Additionally, the cost to restore disrupted or damaged region infrastructure or utility elements could be significant.

RISK ANALYSIS

Historically, windblown debris liability claims in relation to trees are considered “acts of God” from a risk management perspective, unless a known condition existed that lent to an accident. In addition to a the rare frequency of this type of problem as seen in the previous analysis, the Las Virgenes-Malibu region has made no claim payments to address this type of problem.

The level of expenditures for all emergency type tree services (i.e. limb failures, clearance of private property tree failures into roadways, etc.) has decreased over the past few years from two (2) percent of the total funding availability to a current level of less than one (1) percent. As the previous analysis showed, few of the responses are directly related to wind events. In regards to wind related damage to region structures; the region has no record of claim payments related to structural damage during windstorms during the last decade.

In summary, historical data suggests that the vulnerability and risk levels for windstorm related damage and liability in the Las Virgenes-Malibu region is low.

WHAT IS SUSEPTIBLE TO WINSTORMS

Life and Property

Based on the known wind patterns in the Los Angeles area, windstorms can be expected. As wind speeds increase, the likelihood that trees will be uprooted, building structural elements torn away and utility delivery elements damaged. Detached tree limbs and building elements present a significant hazard to life. As large trees are uprooted, the likelihood that loss of life or significant damage to structures and vehicles will occur increases dramatically.

Utilities and infrastructure

Many times, when power poles and lines fall to the ground, it is because a tree has fallen across the lines. The region’s electricity provider is Southern California Edison (SCE). SCE implements its own Hazard Mitigation Plan.

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Live power lines on the ground can pose a deadly electrical shock hazard to pedestrians or people trapped in vehicles. Displaced tree limbs or flying structural debris can cause power line arching and subsequent utility delivery disruptions. Windstorms can cause structural damage to buildings and other critical infrastructure, especially as trees are wind thrown. With this damage comes the potential for disruption of communications and technological systems, especially as disruption timeframes become lengthy.

Transportation

Windblown debris, tree limbs and wind thrown trees can damage traffic control apparatus, block roadways, damage vehicles and limit the accessibility of emergency vehicles. Power lines that have been knocked down by falling trees create the potential for fire and electrocution hazards.

Increased Fire Threat

The Las Virgenes-Malibu region has had problems with Santa Winds in terms of fire hazards. When the winds come in, they can potentially be a catalyst in the canyons to spread fire at a rapid rate.

Prolonged winds during the warmer months of the year can decrease foliar moisture levels and increase the ignition potential in drying underbrush. When urban/wildland interface fires occur, Santa Ana wind conditions can drive the flames and increase the spread speed and severity of the fire. This is a concern near homes, especially where brush clearance has been lax.

AGOURA HILLS

The City of Agoura Hills has no record of loss of life and property due to a windstorm. The city has a record of 8,000 trees.

MALIBU

The most recent windstorm event to affect the City of Malibu was in 1994 and the city incurred \$50,000 dollars in damages.

EXISTING MITIGATION ACTIVITIES

CALABASAS

The City of Calabasas has a Tree Board. The purpose of the board is to consider and propose recommendations for the adoption of the urban forestry master plan and to make recommendations to carry out the policies and goals of that plan.

The objectives of the Commission are:

1. Making recommendations for updates to the plan;
2. Continued education for the care and welfare of trees;
3. At the request of the City Council, the board shall consider, investigate, make findings, report and recommend upon any special matter or question coming within the scope of its work.

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Additionally, the City has recently begun a program that grants free Oak Tree / Brush clearance permits. The intent of this program is to encourage proper maintenance of oak trees that create a public safety hazard.

EXISTING WINDSTORM MITIGATION ACTIVITIES – INTERAGENCY EFFORTS

As stated, one of the most common problems associated with windstorms are power outages. High winds commonly occur during winter storms, and can cause trees to bend, sag, or fail (tree limbs or entire trees), coming into contact with nearby distribution power lines. Fallen trees can cause short-circuiting and conductor overloading. Wind-induced damage to the power system causes power outages to customers, incurs cost to make repairs, and in some cases can lead to ignitions that start wild land fires.

One of the strongest and most widespread existing mitigation strategies pertains to tree clearance. Currently, California State Law requires utility companies to maintain specific clearances (depending on the type of voltage running through the line) between electric power lines and all vegetation. Enforcement of the following California Public Resource Code Sections provides guidance on tree pruning regulations.

4293: Power Line Clearance Required
4292: Power Line Hazard Reduction
4291: Reduction of Fire Hazards around Buildings
4171: Public Nuisances

The following pertain to tree pruning regulations and are taken from the California Code of Regulations:

Title 14: Minimum Clearance Provisions
Sections 1250-1258
General Industry Safety Orders
Title 8: Group 3: Articles 12, 13, 36, 37, 38
California Penal Code Section 385

Finally, the following California Public Utilities Commission section has additional guidance:

California Public Utilities Commission
General Order 95: Rule 35
Homeowner Liability:
Failure to allow a utility company to comply with the law can result in liability to the homeowner for damages or injuries resulting from a vegetation hazard. Many insurance companies do not cover these types of damages if the policy owner has refused to allow the hazard to be eliminated.

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POWER SERVICES

Southern California Edison (SCE) has taken steps in an attempt to prevent power failure due to down infrastructures in the case of a hazard such as earthquake or windstorm. Some of the activities SCE has undertaken to mitigate potential damage include:

- Reinforcement of existing equipment / structures
- Shock absorbing capability was added at base of transformer bushings.
- Anchorages were reinforced at base of transformers.
- Braces were added at bottom of transformer radiators.

Changes in equipment layouts to reduce interactions among substation equipment

- Surge arrestors were relocated away from transformers to independent supports.
- Extra length of conductors (cables) was provided between equipment.

Adoption of seismic-safe models and new material

- Live tank circuit breakers were replaced with dead tank circuit breakers at every opportunity to lower the center of gravity and reduce internal seismic loads.
- Conventional porcelain insulators were replaced with polymer / silicon rubber insulators in selective applications to reduce seismic loads.
- High-strength insulators are used more generously throughout the system.

Continuous upgrades to engineering design criteria based on the latest industrial progress, geotechnical findings, and Code revisions are being conducted. For instance, Dynamic Shake Table Tests were recently made mandatory for certain equipment in addition to analytical design.

WINDSTORM MITIGATION STRATEGIES

See Section 4 for the list of Mitigation Strategies.

Part III.

Resources

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APPENDIX A

PLAN RESOURCE DIRECTORY

Along with [various city documents including but not limited to General Plans, Master Plans, SEMS Plans, reports and studies](#) the following are sources referenced directly or indirectly in the creation of the Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan.

EARTHQUAKE

Local and regional Resources

Los Angeles County Public Works Department

900 S. Fremont Ave.
Alhambra, CA 91803
626-458-5100
<http://ladpw.org>

Southern California Earthquake Center (SCEC)

3651 Trousdale Parkway
Los Angeles, CA. 90089
213-740-5843
www.scec.org

State Resources

California Department of Transportation (CalTrans)

120 S. Spring Street
Los Angeles, CA. 90012
213-897-3656
<http://www.dot.ca.gov/>

California Resources Agency

1416 Ninth Street
Sacramento, CA. 95814
916-653-5656
<http://resources.ca.gov/>

California Division of Mines and Geology (DMG)

801 K Street
Sacramento, CA. 95814
916-4451825
www.consrv.ca.gov/cgs/index.htm

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California Department of Conservation: Southern California Regional Office

655 S. Hope Street
Los Angeles, CA 90017
Ph: 213-239-0878
www.consrv.ca.gov

Governor's Office of Emergency Services (OES)

P.O. Box 419047
Rancho Cordova, CA 95741-9047
Ph: 916 845- 8911
www.oes.ca.gov

Federal and National Resources

Building Seismic Safety Council (BSSC)

1090 Vermont Ave., NW
Washington, DC 20005
Ph: 202-289-7800
www.bssconline.org

Federal Emergency Management Agency, Region IX

1111 Broadway
Oakland, CA 94607
Ph: 510-627-7100
www.fema.gov

Federal Emergency Management Agency, Mitigation Division

500 C Street, S.W.
Washington, D.C. 20472
Ph: 202-566-1600
www.fema.gov/fima/planhowto.shtm

United States Geological Survey

345 Middlefield Road
Menlo Park, CA 94025
Ph: 650-853-8300
<http://www.usgs.gov/>

Western States Seismic Policy Council (WSSPC)

125 California Avenue
Palo Alto, CA 94306
Ph: 650-330-1101
www.wsspc.org/home.html



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Publications

“Land Use Planning for Earthquake Hazard Mitigation: Handbook for Planners”

Wolfe, Myer R. et. al., (1986) University of Colorado, Institute of Behavioral Science, **National Science Foundation**.

This handbook provides techniques that planners and others can utilize to help mitigate for seismic hazards. It provides information on the effects of earthquakes, sources on risk assessment, and effects of earthquakes on the built environment. The handbook also gives examples on application and implementation of planning techniques to be used by local communities.

Contact: Natural Hazards Research and Applications Information Center

Address: University of Colorado, 482 UCB,

Boulder, CO 80309-0482

Phone: (303) 492-6818

Fax: (303) 492-2151

Website: <http://www.colorado.edu/UCB/Research/IBS/hazards>

“Public Assistance Debris Management Guide”, FEMA (July 2000).

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The “Public Assistance Debris Management Guide” is available in hard copy or on the FEMA website.

FIRE

Regional Resources

Los Angeles County Fire Department

1320 N. Eastern Ave.

Los Angeles, CA, 90063

Telephone: 323.881.2411

<http://www.lacofd.org/default.htm>

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State Resources

California Division of Forestry & Fire Protection

1416 9th Street
PO Box 944246
Sacramento California 94244-2460
(916)653-5123
<http://www.fire.ca.gov/php/index.php>

Office of the State Fire Marshal (OSFM)

1131 "S" Street
Sacramento, CA 95814
PO Box 944246
Sacramento, CA 94244-2460
Tel. (916) 445-8200
Fax. (916) 445-8509

Governor's Office of Emergency Services (OES)

P.O. Box 419047
Rancho Cordova, CA 95741-9047
Ph: 916 845- 8911
www.oes.ca.gov

Federal Resources and Programs

The following are a list of federal resources available to the Las Virgenes-Malibu region:
Federal Emergency Management Agency (FEMA) Programs:

Fire Suppression Assistance Grants

Hazard Mitigation Grant Program
National Wildland/Urban Interface Fire Protection Program
Federal Wildland Fire Policy, Wildland/Urban Interface Protection
<http://www.fs.fed.us/land/wdfire7c.htm>

National Fire Protection Association (NFPA)

Public Fire Protection Division
1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000

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National Interagency Fire Center (NIFC)

National Interagency Fire Center
3833 S. Development Ave.
Boise, Idaho 83705
208-387-5512
<http://www.nifc.gov/>

United States Fire Administration (USFA) of the Federal Emergency Management Agency (FEMA)

USFA, Planning Branch, Mitigation Directorate
16825 S. Seton Ave.
Emmitsburg, MD 21727
(301) 447-1000
<http://www.fema.gov/hazards/fires/wildfires.shtm> - Wildfire Mitigation
<http://www.usfa.fema.gov/index.htm> - U.S. Fire Administration

Additional Resources

Firewise

1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000
<http://www.firewise.org/>

Publications

National Fire Protection Association Standard 299: Protection of Life and Property from Wildfire, National Wildland/Urban Interface Fire Protection Program, (1991), National Fire Protection Association, Washington, D.C.
National Fire Protection Association Publications
(800) 344-3555
<http://www.nfpa.org> or <http://www.firewise.org>

An International Collection of Wildland- Urban Interface Resource Materials (Information Report NOR- 344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.
Canadian Forest Service, Northern Forestry Centre, I-Zone Series
Phone: (780) 435-7210
<http://www.prefire.ucfpl.ucop.edu/uwibib.htm>

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Wildland/Urban Interface Fire Hazard Assessment Methodology.
National Wildland/Urban Interface Fire Protection Program, (1998).
NFPA, Washington, D.C.
Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
<http://www.firewise.org>

Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility.
National Wildland/Urban Interface Fire Protection Program, (1998). Washington, D. C.
Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
<http://www.firewise.org>

Planning for Natural Hazards: The Oregon Technical Resource Guide, (July 2000) Department
of Land Conservation and Development

TERRORISM

Local Resources

Los Angeles Sheriff's Department
Malibu/Lost Hills Station
27050 Agoura Road
Agoura, CA 91301-5336
Station Phone: 818-878-1808

State Resources

Office of Emergency Services
www.oes.ca.gov

Federal and National Resources

Department of Homeland Security
www.dhs.gov

The National Disaster Communication Response Team
www.ndcrt.org/alphabetical.html

Federal Bureau of Investigation
www.fbi.gov

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FLOOD

County Resources

Los Angeles County Public Works Department

900 S. Fremont Ave.
Alhambra, CA 91803
Ph: 626-458-5100

Sanitation Districts of Los Angeles County

1955 Workman Mill Road
Whittier, CA 90607
Ph: 562-699-7411 x2301

State Resources

Governor's Office of Emergency Services (OES)

P.O. Box 419047 Rancho Cordova, CA 95741
Ph: 916 845- 8911
Fax: 916 845- 8910

California Resources Agency

1416 Ninth Street, Suite 1311
Sacramento, CA 95814
Ph: 916-653-5656

California Department of Water Resources (DWR)

1416 9th Street
Sacramento, CA 95814
Ph: 916-653-6192

California Department of Conservation: Southern California Regional Office

655 S. Hope Street, #700
Los Angeles, CA 90017-2321
Ph: 213-239-0878
Fax: 213-239-0984

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Federal Resources and Programs

Federal Emergency Management Agency (FEMA)

Federal Emergency Management Agency, Region IX1111
Broadway, Suite 1200 Oakland, CA 94607
Ph: 510-627-7100
Fax: 510-627-7112

Federal Emergency Management Agency, Mitigation Division

500 C Street, S.W.
Washington, D.C. 20472
Ph: 202-566-1600

FEMA's List of Flood Related Websites

This site contains a long list of flood related Internet sites from “American Heritage Rivers” to “The Weather Channel” and is a good starting point for flood information on the Internet.
Contact: Federal Emergency Management Agency, Phone: (800) 480-2520
Website: <http://www.fema.gov/nfip/related.htm>

National Flood Insurance Program (NFIP)

In Southern California many cities lie within flood zones as defined in FEMA Flood Maps. The Las Virgenes-Malibu region is (or is not) a community within a designated flood zone. Flood insurance is available to citizens in communities that adopt and implement NFIP building standards. The standards are applied to development that occurs within a delineated floodplain, a drainage hazard area, and properties' within 250 feet of a floodplain boundary. These areas are depicted on federal Flood Insurance Rate Maps available through the county.

National Floodplain Insurance Program (NFIP)

500 C Street, S.W.
Washington, D.C. 20472
Ph: 202-566-1600

The Floodplain Management Association

The Floodplain Management website was established by the Floodplain Management Association (FMA) to serve the entire floodplain management community. It includes full-text articles, a calendar of upcoming events, a list of positions available, an index of publications available free or at nominal cost, a list of associations, a list of firms and consultants in floodplain management, an index of newsletters dealing with flood issues (with hypertext links if available), a section on the basics of floodplain management, a list of frequently asked questions (Fans) about the Website, and a catalog of Web links.

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P.O. Box 50891
Sparks, NV 89435-0891
Ph: 775-626-6389
Fax: 775-626-6389

The Association of State Floodplain Managers

The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning, and recovery. ASFPM fosters communication among those responsible for flood hazard activities, provides technical advice to governments and other entities about proposed actions or policies that will affect flood hazards, and encourages flood hazard research, education, and training. The ASFPM Web site includes information on how to become a member, the organization's constitution and bylaws, directories of officers and committees, a publications list, information on upcoming conferences, a history of the association, and other useful information and Internet links.

Contact: The Association of State Floodplain Managers
Address: 2809 Fish Hatchery Road, Madison, WI 53713 Phone: (608) 274-0123
Website: <http://www.floods.org>

National Weather Service

The National Weather Service provides flood watches, warnings, and informational statements for rivers in the Las Virgenes-Malibu region. National Weather Service
520 North Eleven Street
Oxnard, CA 93030
Ph: 805-988- 6615

Office of Hydrology, National Weather Service

The National Weather Service's Office of Hydrology (OH) and its Hydrological Information Center offer information on floods and other aquatic disasters. This site offers current and historical data including an archive of past flood summaries, information on current hydrologic conditions, water supply outlooks, an Automated Local Flood Warning Systems Handbook, Natural Disaster Survey Reports, and other scientific publications on hydrology and flooding.

1325 East West Highway, SSMC2
Silver Spring, MD 20910
Ph: 301-713-1658
Fax: 301-713-0963



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National Resources Conservation Service (NRCS), US Department of Agriculture

NRCS provides a suite of federal programs designed to assist state and local governments and landowners in mitigating the impacts of flood events. The Watershed Surveys and Planning Program and the Small Watershed Program provide technical and financial assistance to help participants solve natural resource and related economic problems on a watershed basis. The Wetlands Reserve Program and the Flood Risk Reduction Program provide financial incentives to landowners to put aside land that is either a wetland resource, or that experiences frequent flooding. The Emergency Watershed Protection Program (EWP) provides technical and financial assistance to clear debris from clogged waterways, restore vegetation, and stabilizing riverbanks. The measures taken under EWP must be environmentally and economically sound and generally benefit more than one property.

14th and Independence Ave., SW, Room 5105-A
Washington, DC 20250
Ph: 202-720-7246
Fax: 202-720-7690

USGS Water Resources

This web page offers current US water news; extensive current (including real-time) and historical water data; numerous fact sheets and other publications; various technical resources; descriptions of ongoing water survey programs; local water information; and connections to other sources of water information.

6000 J Street Placer Hall
Sacramento, CA 95819-6129
Ph: 916-278-3000
Fax: 916-278-3070

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. The Bureau provides leadership and technical expertise in water resources development and in the efficient use of water through initiatives including conservation, reuse, and research. It protects the public and the environment through the adequate maintenance and appropriate operation of Reclamation's facilities and manages Reclamation's facilities to fulfill water user contracts and protect and/or enhance conditions for fish, wildlife, land, and cultural resources.

Mid Pacific Regional Office

Federal Office Building
2800 Cottage Way
Sacramento CA 95825-1898
Ph: 916- 978-5000
Fax 916- 978-5599



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<http://www.usbr.gov/>

Army Corps of Engineers

The Corps of Engineers administers a permit program to ensure that the nation's waterways are used in the public interest. Any person, firm, or agency planning to work in waters of the United States must first obtain a permit from the Army Corps of Engineers. The Corps is responsible for the protection and development of the nation's water resources, including navigation, flood control, energy production through hydropower management, water supply storage and recreation.

US Army Corps of Engineers
P.O. Box 532711
Los Angeles CA 90053- 2325
Ph: 213-452- 3921

Other Natural Resources

American Public Works Association

2345 Grand Boulevard, Suite 500
Kansas Region, MO 64108-2641
Ph: 816-472-6100
Fax: 816-472-1610

Publications

NFIP Community Rating System Coordinator's Manual

Indianapolis, IN.

This informative brochure explains how the Community Rating System works and what the benefits are to communities. It explains in detail the CRS point system, and what activities communities can pursue to earn points. These points then add up to the "rating" for the community, and flood insurance premium discounts are calculated based upon that "rating." The brochure also provides a table on the percent discount realized for each rating (1-10). Instructions on how to apply to be a CRS community are also included.

Contact: NFIP Community Rating System
Phone: (800) 480-2520 or (317) 848-2898
Website: <http://www.fema.gov/nfip/crs>

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Floodplain Management: A Local Floodplain Administrator's Guide to the NFIP.

This document discusses floodplain processes and terminology. It contains floodplain management and mitigation strategies, as well as information on the NFIP, CRS, Community Assistance Visits, and floodplain development standards.

Contact: National Flood Insurance Program

Phone: (800) 480-2520

Website: <http://www.fema.gov/nfip/>

Flood Hazard Mitigation Planning: A Community Guide, (June 1997).Massachusetts Department of Environmental Management.

This informative guide offers a 10-step process for successful flood hazard mitigation. Steps include: map hazards, determine potential damage areas, take an inventory of facilities in the flood zone, determine what is or is not being done about flooding, identify gaps in protection, brainstorm alternatives and actions, determine feasible actions, coordinate with others, prioritize actions, develop strategies for implementation, and adopt and monitor the plan.

Contact: Massachusetts Flood Hazard Management Program Phone: (617) 626-1250

Website: <http://www.magnetstate.ma.us/dem/programs/mitigate>

Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials, (February 1987), FEMA-116.

This guidebook offers a table on actions that communities can take to reduce flood losses. It also offers a table with sources for floodplain mapping assistance for the various types of flooding hazards, there is information on various types of flood hazards with regard to existing mitigation efforts and options for action (policy and programs, mapping, regulatory, non-regulatory). Types of flooding which are covered include alluvial fan, areas behind levees, areas below unsafe reservoirs, coastal flooding, flash floods, fluctuating lake level floods, ground failure triggered by earthquakes, ice jam flooding, and mudslides.

Contact: Federal Emergency Management Agency

Phone: (800) 480-2520

Website: <http://www.fema.gov>

LANDSLIDE

County Resource

Los Angeles County Department of Public Works

900 S. Fremont Ave.

Alhambra, CA 91803

626-458-5100

<http://ladpw.org>

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State Resources

- Department of Conservation Headquarters
- California Geological Survey Headquarters/Office of the State Geologist
- California Division of Forestry
- Department of Water Resources
- Governor's Office of Emergency Services
- California Department of Transportation (Cal Trans)

Federal Resources

- Federal Emergency Management Agency (FEMA)
- Natural Resource Conservation Service (NRCS)
- US Geological Survey, National Landslide Information Center

Publications

Olshansky, Robert B., Planning for Hillside Development (1996) American Planning Association.

This document describes the history, purpose, and functions of hillside development and regulation and the role of planning, and provides excerpts from hillside plans, ordinances, and guidelines from communities throughout the US.

Olshansky, Robert B. & Rogers, J. David, Unstable Ground: Landslide Policy in the United States (1987) Ecology Law Quarterly.

This is about the history and policy of landslide mitigation in the US.

Public Assistance Debris Management Guide (July 2000) Federal Emergency Management Agency.

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and region emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The Guide is available in hard copy or on the FEMA website.

USGS Landslide Program Brochure. National Landslide Information Center (NLIC), United States Geologic Survey.

The brochure provides good, general information in simple terminology on the importance of landslide studies and a list of databases, outreach, and exhibits maintained by the NLLC. The brochure also includes information on the types and causes of landslides, rock falls, and earth flows.

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WINDSTORMS

State Resources

California Division of Forestry & Fire Protection

1416 9th Street
PO Box 944246
Sacramento California 94244-2460
916-653-5123
<http://www.fire.ca.gov/php/index.php>

Federal Resources and Programs

National Weather Service

Los Angeles/Oxnard Weather Forecast Office
520 North Elevar Street
Oxnard, CA 93030
Forecast and weather info: 805-988-6610
Administrative issues: 805-988-6615
E- mail: Webmaster.LOX@noaa.gov
<http://weather.noaa.gov/>

Additional Resources

Las Virgenes-Malibu region: Property Owner's Guide to Protecting Street Trees:

http://www.beverlyhills.org/presence/connect/CoBH/Homepage/For+Residents/Region+Services/Trees/RESRP-COPY-Protecting_Trees_English

Las Virgenes-Malibu region: Protecting Region Parkway Trees During Private Property Construction:

<http://www.beverlyhills.org/presence/resources/file/eb00030cb234c06/treesprotection.pdf>

International Society of Arboriculture

P.O. Box 3129
Champaign, IL 61826-3129
Phone: 217.355.9411
Fax: 217.355.9516
Web: www.isa-arbor.com
E- mail: isa@isa-arbor.com

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Publications

Windstorms: Protect Your Family and Property from the Hazards of Violent Windstorms:
<http://emd.wa.gov/5-prep/trng/pubed/Windstrm.pdf>

Preparing Your Home for Severe Windstorms:
http://www.chubb.com/personal/html/helpful_tips_home_windstorm.html



APPENDIX B.

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Instructions for Using the Plan Review Crosswalk for Review of Local Mitigation Plans

Attached is a Plan Review Crosswalk based on the *Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000*, published by FEMA, dated March 2004. This Plan Review Crosswalk is consistent with the *Disaster Mitigation Act of 2000* (P.L. 106-390), enacted October 30, 2000 and *44 CFR Part 201 – Mitigation Planning, Interim Final Rule* (the Rule), published February 26, 2002.

SCORING SYSTEM

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer’s comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer’s comments are encouraged, but not required.

Each requirement includes separate elements. All elements of a requirement must be rated “Satisfactory” in order for the requirement to be fulfilled and receive a summary score of “Satisfactory.”

A “Needs Improvement” score on elements shaded in gray (recommended but not required) will not preclude the plan from passing.

When reviewing single jurisdiction plans, reviewers may want to put an N/A in the boxes for multi-jurisdictional plan requirements. When reviewing multi-jurisdictional plans, reviewers may want to put an N/A in the prerequisite box for single jurisdiction plans.

States that have additional requirements can add them in the appropriate sections of the *Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

Optional matrices for assisting in the review of sections on profiling hazards, assessing vulnerability, and identifying and analyzing mitigation actions are found at the end of the Plan Review Crosswalk.

The example below illustrates how to fill in the Plan Review Crosswalk.

Example

Assessing Vulnerability: Overview

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

Element	Location in the Plan (section or annex and page #)	Reviewer’s Comments	SCORE	
			N	S
A. Does the plan include an overall summary description of the jurisdiction’s vulnerability to each hazard?	Section II, pp. 4-10	The plan describes the types of assets that are located within geographically defined hazard areas as well as those that would be affected by winter storms.		✓
B. Does the plan address the impact of each hazard on the jurisdiction?	Section II, pp. 10-20	The plan does not address the impact of two of the five hazards addressed in the plan. Required Revisions: <ul style="list-style-type: none"> • Include a description of the impact of floods and earthquakes on the assets. • Recommended Revisions: • This information can be presented in terms of dollar value or percentages of damage. 	✓	
SUMMARY SCORE			✓	

**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

Local Mitigation Plan Review and Approval Status

Jurisdiction:	Title of Plan:	Date of Plan:
Local Point of Contact:	Address:	
Title:		
Agency:		
Phone Number:		
	E-Mail:	

State Reviewer:	Title:	Date:
------------------------	---------------	--------------

FEMA Reviewer:	Title:	Date:
Date Received in FEMA Region [Insert #]		
Plan Not Approved		
Plan Approved		
Date Approved		

Jurisdiction:	NFIP Status*			
	Y	N	N/A	CRS Class
1.				
2.				
3.				
4.				
5. [ATTACH PAGE(S) WITH ADDITIONAL JURISDICTIONS]				

* Notes: **Y = Participating** **N = Not Participating** **N/A = Not Mapped**



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LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a "Needs Improvement" score.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement.

Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Prerequisite(s) (Check Applicable Box)

Adoption by the Local Governing Body:
§201.6(c)(5) **OR**
Multi-Jurisdictional Plan Adoption: §201.6(c)(5)
AND
Multi-Jurisdictional Planning Participation:
§201.6(a)(3)

NOT MET	MET
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

Planning Process

Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)
Local Capabilities Assessment §201.4(c)(ii) and §201.6(c)(1)

N	S
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

Risk Assessment

Identifying Hazards: §201.6(c)(2)(i)
Profiling Hazards: §201.6(c)(2)(i)
Assessing Vulnerability: Overview: §201.6(c)(2)(ii)
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)

N	S
<input type="checkbox"/>	<input type="checkbox"/>

Multi-Jurisdictional Risk Assessment:
§201.6(c)(2)(iii)

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

Mitigation Strategy

Local Hazard Mitigation Goals: §201.6(c)(3)(i)
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)
Implementation of Mitigation Actions: §201.6(c)(3)(iii)
Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)

N	S
<input type="checkbox"/>	<input type="checkbox"/>

Plan Maintenance Process

Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)
Continued Public Involvement: §201.6(c)(4)(iii)

N	S
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

Additional State Requirements*

See **Planning Process**, Local Capabilities Assessment
Insert State Requirement
Insert State Requirement

N	S
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

LOCAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED

PLAN APPROVED

*States that have additional requirements can add them in the appropriate sections of the *Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.
See Reviewer's Comments



**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

PREREQUISITE(S)

Adoption by the Local Governing Body

Requirement §201.6(c)(5): *[The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			NOT MET	MET
A. Has the local governing body adopted the plan?				
B. Is supporting documentation, such as a resolution, included?				
SUMMARY SCORE				

Multi-Jurisdictional Plan Adoption

Requirement §201.6(c)(5): *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			NOT MET	MET
A. Does the plan indicate the specific jurisdictions represented in the plan?				
B. For each jurisdiction, has the local governing body adopted the plan?				
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?				
SUMMARY SCORE				

Multi-Jurisdictional Planning Participation

Requirement §201.6(a)(3): *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process ... Statewide plans will not be accepted as multi-jurisdictional plans.*

Location in the

SCORE



**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

Element	Plan (section or annex and page #)	Reviewer's Comments	NOT	
			MET	MET
A. Does the plan describe how each jurisdiction participated in the plan's development?				
SUMMARY SCORE				

PLANNING PROCESS: §201.6(b): *An open public involvement process is essential to the development of an effective plan.*

Documentation of the Planning Process

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

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

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

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the plan provide a narrative description of the process followed to prepare the plan?				
B. Does the plan indicate who was involved in the planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)				
C. Does the plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)				
D. Was there an opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?				
E. Does the planning process describe the review and				



Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

incorporation, if appropriate, of existing plans, studies, reports, and technical information?				
SUMMARY SCORE				

Local Capabilities Assessment (State OES Requirement)

Requirement §201.4(c)(3)(ii): – *Of the Federal Register Interim Final Rule 44 CFR Parts 201 and 206 states, “[The State mitigation strategy shall include] a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.*

... .

Element	Location in the Plan (section or annex and page #)	Reviewer’s Comments	SCORE	
			N	S
A. Does the plan provide a description of the human, technical and financial resources available within this jurisdiction to engage in a mitigation planning process and to develop a local hazard mitigation plan? (These resources are described in Section 2.2 of the OES LHMP Development Guide).		<i>Note: A “Needs Improvement” score on this requirement will not preclude the plan from passing.</i>		
B. Does the plan list local mitigation funding sources (taxes, fees, assessments or fines) which affect or promote mitigation within the reporting jurisdiction?		<i>Note: A “Needs Improvement” score on this requirement will not preclude the plan from passing.</i>		
C. Does the plan list local ordinances which affect or promote disaster mitigation, preparedness, response or recovery within the reporting jurisdiction?		<i>Note: A “Needs Improvement” score on this requirement will not preclude the plan from passing.</i>		
D. Does the plan describe the details of ongoing mitigation projects and programs within the reporting jurisdiction?		<i>Note: A “Needs Improvement” score on this requirement will not preclude the plan from passing.</i>		



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RISK ASSESSMENT: §201.6(c)(2): *The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

Identifying Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment shall include a] description of the type ... of all natural hazards that can affect the jurisdiction.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the plan include a description of the types of all natural hazards that affect the jurisdiction? If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the jurisdiction, this part of the plan cannot receive a Satisfactory score. Consult with the State Hazard Mitigation Officer to identify applicable hazards that may occur in the planning area.				
SUMMARY SCORE				

Profiling Hazards

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

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazard addressed in the plan?				
B. Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the plan?				
C. Does the plan provide information on previous occurrences of each hazard addressed in the plan?				
D. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the plan?				



**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

SUMMARY SCORE

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Assessing Vulnerability: Overview

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

Element	Location in the Plan (section or annex and page #)	Reviewer’s Comments	SCORE	
			N	S
A. Does the plan include an overall summary description of the jurisdiction’s vulnerability to each hazard?				
B. Does the plan address the impact of each hazard on the jurisdiction?				
SUMMARY SCORE				

Assessing Vulnerability: Identifying Structures

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

			N	S
A. Does the plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?		<i>Note: A “Needs Improvement” score on this requirement will not preclude the plan from passing.</i>		
B. Does the plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?		<i>Note: A “Needs Improvement” score on this requirement will not preclude the plan from passing.</i>		
SUMMARY SCORE				



Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Assessing Vulnerability: Estimating Potential Losses

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

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the plan estimate potential dollar losses to vulnerable structures?		<i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i>		
B. Does the plan describe the methodology used to prepare the estimate?		<i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i>		
SUMMARY SCORE				

Assessing Vulnerability: Analyzing Development Trends

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

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the plan describe land uses and development trends?		<i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i>		
SUMMARY SCORE				

Multi-Jurisdictional Risk Assessment

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

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?				
SUMMARY SCORE				

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

MITIGATION STRATEGY: §201.6(c)(3): *The plan shall include a mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

Local Hazard Mitigation Goals

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

Element	Location in the Plan (section or annex and page #)	Reviewer’s Comments	SCORE	
			N	S
A Does the plan include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards? (GOALS are long-term; represent what the community wants to achieve, such as “eliminate flood damage”; and are based on the risk assessment findings.)				
SUMMARY SCORE				

Identification and Analysis of Mitigation Actions

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

Element	Location in the Plan	Reviewer’s Comments	SCORE	
			N	S
A. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?				
B Do the identified actions and projects address reducing the effects of hazards on new buildings and infrastructure?				
C. Do the identified actions and projects address reducing the effects of hazards on existing buildings and infrastructure?				
SUMMARY SCORE				



**Las Virgenes-Malibu Council of Governments
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Implementation of Mitigation Actions

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

Element	Location in the Plan	Reviewer's Comments	SCORE	
			N	S
A. Does the mitigation strategy include how the actions are prioritized ? (For example, is there a discussion of the process and criteria used?)				
B. Does the mitigation strategy address how the actions will be implemented and administered ? (For example, does it identify the responsible department, existing and potential resources, and timeframe?)				
C. Does the prioritization process include an emphasis on the use of a cost-benefit review (see page 3-36 of <i>Multi-Hazard Mitigation Planning Guidance</i>) to maximize benefits?				
SUMMARY SCORE				

Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A Does the plan include at least one identifiable action item for each jurisdiction requesting FEMA approval of the plan?				
SUMMARY SCORE				



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PLAN MAINTENANCE PROCESS

Monitoring, Evaluating, and Updating the Plan

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

Element	Location in the Plan	Reviewer's Comments	SCORE	
			N	S
A. Does the plan describe the method and schedule for monitoring the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?)				
B. Does the plan describe the method and schedule for evaluating the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?)				
C. Does the plan describe the method and schedule for updating the plan within the five-year cycle?				
SUMMARY SCORE				

Incorporation into Existing Planning Mechanisms

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

			N	S
			A. Does the plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan?	
B. Does the plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?				
SUMMARY SCORE				



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Continued Public Involvement

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

			N	S
A. Does the plan explain how continued public participation will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)				
SUMMARY SCORE				



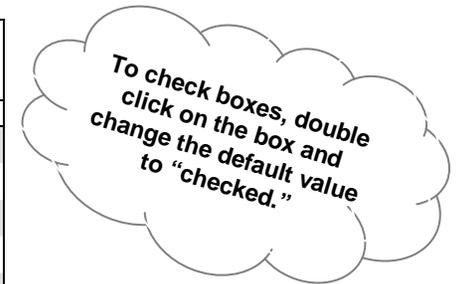
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Matrix A: Profiling Hazards

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the jurisdiction. **Completing the matrix is not required.**

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each applicable hazard. An “N” for any element of any identified hazard will result in a “Needs Improvement” score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Location		B. Extent		C. Previous Occurrences		D. Probability of Future Events	
	Yes	N	S	N	S	N	S	N	S
Avalanche	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Erosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dam Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drought	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expansive Soils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extreme Heat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hailstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hurricane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land Subsidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landslide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Winter Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tornado	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tsunami	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volcano	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildfire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Windstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Other _____	<input type="checkbox"/>								
Other _____	<input type="checkbox"/>								

Legend:

§201.6(c)(2)(i) Profiling Hazards

- A. Does the risk assessment identify the location (i.e., geographic area affected) of each hazard addressed in the plan?
- B. Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the plan?
- C. Does the plan provide information on previous occurrences of each natural hazard addressed in the plan?
- D. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the plan?

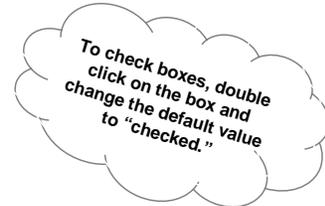
Matrix B: Assessing Vulnerability

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each requirement.

Completing the matrix is not required.

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each **applicable** hazard. An “N” for any element of any identified hazard will result in a “Needs Improvement” score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Note: Receiving an N in the shaded columns will not preclude the plan from passing.



Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	§201.6(c)(2)(ii) Assessing Vulnerability: Overview	A. Overall Summary Description of Vulnerability		B. Hazard Impact		§201.6(c)(2)(ii) Assessing Vulnerability: Identifying Structures	A. Types and Number of Existing Structures in Hazard Area (Estimate)		B. Types and Number of Future Structures in Hazard Area (Estimate)		§201.6(c)(2)(ii) Assessing Vulnerability: Estimating Potential Losses	A. Loss Estimate		B. Methodology	
	Yes		N	S	N	S		N	S	N	S		N	S	N	S
Avalanche	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Erosion	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Storm	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dam Failure	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drought	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expansive Soils	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extreme Heat	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hailstorm	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hurricane	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land Subsidence	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landslide	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Winter Storm	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tornado	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tsunami	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volcano	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Wildfire	<input type="checkbox"/>		<input type="checkbox"/>														
Windstorm	<input type="checkbox"/>		<input type="checkbox"/>														
Other _____	<input type="checkbox"/>		<input type="checkbox"/>														
Other _____	<input type="checkbox"/>		<input type="checkbox"/>														
Other _____	<input type="checkbox"/>		<input type="checkbox"/>														

Legend:

§201.6(c)(2)(ii) Assessing Vulnerability: Overview

- A. Does the plan include an overall summary description of the jurisdiction's vulnerability to each hazard?
- B. Does the plan address the impact of each hazard on the jurisdiction?

- B. Does the plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

§201.6(c)(2)(ii)(A) Assessing Vulnerability: Identifying Structures

- A. Does the plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?

§201.6(c)(2)(ii)(B) Assessing Vulnerability: Estimating Potential Losses

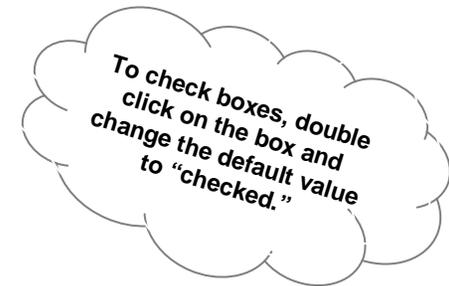
- A. Does the plan estimate potential dollar losses to vulnerable structures?
- B. Does the plan describe the methodology used to prepare the estimate?

Matrix C: Identification and Analysis of Mitigation Actions

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure consideration of a range of actions for each hazard. **Completing the matrix is not required.**

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each applicable hazard. An "N" for any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Comprehensive Range of Actions and Projects	
	Yes	N	S
Avalanche	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Erosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dam Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drought	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expansive Soils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extreme Heat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Comprehensive Range of Actions and Projects	
	Yes	N	S
Hailstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hurricane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land Subsidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landslide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Winter Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tornado	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tsunami	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volcano	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildfire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Windstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Legend:
 §201.6(c)(3)(ii) Identification and Analysis of Mitigation Actions
 A. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?



**Las Virgenes-Malibu Council of Governments
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APPENDIX C.

NATURAL HAZARD RISK ANALYSIS RATING FORM (Community Survey)

Instructions for Hazard Mitigation Rating Form

Give each hazard priority risk category listed as a rating from 0 to 3; 0 = no risk, 3 meaning a high risk.

0	=	No hazard risk in accordance with the definitions for hazard prioritization on page 3 through 5 of this form.
1	=	Low Risk in accordance with the hazard prioritization definitions on pages 3 through 5 of this form.
2	=	Moderate Risk in accordance with the hazard definitions on pages 3 through 5 of this form.
3	=	High Risk in accordance with the hazard risk definitions on pages 3 though 5 of this form.

Total the numbers horizontally for each hazard category. The highest possible score for a hazard is 24; the lowest potential score is 0.

After the completion of the matrix, the committee will assign the numerical values for the four categories of risk: 1-highest priority risks, 2-moderate priority risks, 3-low risk priority risks and 0-no risk rating values for prioritization.

Examples: A score of ➡	17 to 24 could be considered high-priority risk.
	9 to 16 could be considered moderate-priority risk.
	0 to 8 could be considered low-priority risk.

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Hazard	Magnitude	Length of Event and Impact Including Recovery Time	Distribution	Area Affected	Frequency	Probability	Degree of Vulnerability	Community Priority	Total Score
Earthquake									
Fire: Wildland / Urban									
Flood									
Landslide / Mudslides									
Windstorms									
Terrorism									
Power Outages									

0	No hazard risk in accordance with the definitions for hazard prioritization on page 3 through 5 of this form.
1	Low Risk in accordance with the hazard prioritization definitions on pages 3 through 5 of this form.
2	Moderate Risk in accordance with the hazard definitions on pages 3 through 5 of this form.
3	High Risk in accordance with the hazard risk definitions on pages 3 though 5 of this form.



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Definitions for Hazard Prioritization

Magnitude

Physical and economic greatness (impact) of the event

Factors to consider

- Size of event
- Threat to life
- Threat to Property
 1. Individual
 2. Public sector
 3. Business and manufacturing
 4. Tourism

Length of Event and Impact Including Recovery Time

The risk that the length of time of the event and continued impact will last more than one week.

Factors to consider

- Length of physical duration during emergency phase
- Length of threat to life and property
- Length of physical duration during recovery phase
- Length of effects on individual citizen and community recovery
- Length of effects on economic recovery, tax base, business and manufacturing recovery, tourism, threat to tax base and threat to employment

Distribution

The depth of the effects among all sectors of the community and State

Factors to consider:

- How wide spread across the state and community are the effects of the disaster
- Are all sectors of the community affected equally or disproportionately

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Area Affected

How large an area is physically threatened and potentially impaired or by a disaster risk

Factors to consider:

- Geographic area affected by primary event
- Geographic, physical, economic areas affected by primary risk and the potential secondary effects.

Frequency

The historic and predicted rate of recurrence of a risk caused event (generally expressed in years such as the 100 year flood)

Factors to consider:

- Historic events and recurrences of events in a measured time frame
- Scientifically based predictions of an occurrence of an event in a given period of time.

Degree of Vulnerability

How susceptible is the population, community infrastructure and state resources to the effects of the risk.

Factors to Consider:

- History of the impact of similar events
- Mitigation steps taken to lessen impact
- Community and State preparedness to respond to and recover from the event

Community Priorities

The importance placed on a particular risk by the citizens and their elected officials:

- Willingness to prepare for and respond to a particular risk
- More widespread concerns over a particular risk than other risks
- Cultural significance of the threat and associated risks
- Opportunity to mitigate for one risk before others due to resource availability
- Distribution of resources

**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

APPENDIX D.

**LAS VIRGENES-MALIBU COUNCIL OF GOVERNMENTS PLANNING
& PUBLIC INVOLVEMENT MEETINGS**

The following are meetings, events, activities and trainings that directly or indirectly aided in the creation of the Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan that occurred approximately within the course of 2003-2004.

PLANNING MEETINGS

DATE: October 19, 2004

DESCRIPTION: The Las Virgenes-Malibu Council of Governments discussed the progress of the Hazard Mitigation Plan

ATTENDEES: Cherie L. Paglia, City Manager of the City of Hidden Hills, Greg Ramirez City Manager of the City of Agoura Hills, Katie Lichtig, City Manager of the City of Malibu, Ray Taylor, City Manager for the City of Westlake Village, Susan Nissman, Deputy to LA County Supervisor Zev Yaroslavsky, Maria Grycan, Community Services Representative from the County of Los Angeles Fire Department, John Mundy, General Manager of the Las Virgenes Municipal Water District

LOCATION: City of Hidden Hills Conference Room

DATE: September 30th, 2004

DESCRIPTION: **City of Calabasas** staff provided information for the Hazard Mitigation Plan

ATTENDEES: Tom Wheeler, Risk Management, Sandy Milin, Executive Assistant, Maureen Tamuri, Community Development Director, Robin Hull, Environmental services Assistant, Terry Dipple, Executive Director of the Las Virgenes-Malibu Council of Governments (COG), Viviana Franco, Consultant with MLC & Associates

LOCATION: City of Calabasas City Hall Conference Room

DATE: September 30th, 2004

DESCRIPTION: **City of Westlake Village** staff provided information for the Hazard Mitigation Plan

ATTENDEES: John Knipe, Public Works Consultant, Robert Theobold, Planning Director, Terry Dipple, Executive Director of the Las Virgenes-Malibu COG, Viviana Franco, Consultant with MLC & Associates

LOCATION: City of Westlake Village City Hall

DATE: September 29th, 2004

DESCRIPTION: **City of Agoura Hills** staff provided information for the Hazard Mitigation Plan

ATTENDEES: Carol Tubelis, Assistant to the City Manager/City Clerk, Kelly Fisher,

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Engineering Aide, Doug Hooper, Principal Planner, Terry Dipple, Executive Director of the Las Virgenes-Malibu COG, Viviana Franco, Consultant with MLC & Associates

LOCATION: City of Agoura Hills City Hall Conference Room

DATE: September 29th, 2004

DESCRIPTION: City of Hidden Hills staff provided information for the Hazard Mitigation Plan

ATTENDEES: Cherie L. Paglia, City Manager, Dirk Lovett, City Engineer, Jim Doran, Emergency Services Director

LOCATION: City of Hidden Hills City Hall

DATE: September 28th, 2004

DESCRIPTION: City of Malibu staff provided information for the Hazard Mitigation Plan

ATTENDEES: Brad Davis, Emergency Preparedness Coordinator, Stacey Rice, Senior Planner, Viviana Franco, Consultant with MLC & Associates

LOCATION: City of Malibu City Hall

DATE: Monday, July 26, 2004

DESCRIPTION: Hidden Hills City Council and staff discussed the Hazard Mitigation Plan process

ATTENDEES: Mayor Steve Freedland, Mayor Pro Tem Ronald S. Berg, Council Member Jim Cohen Council Member Stuart E. Siegel, Staff: City Attorney Larry Wiener, City Engineer Dirk Lovett, City Manager Cherie L. Paglia

LOCATION: Hidden Hills City Hall

DATE: February 24, 2004

DESCRIPTION: City of Hidden Hills Public Safety Commission meeting discussed the Hazard Mitigation Plan

ATTENDEES: Public Safety Commission members

LOCATION: City of Hidden Hills City Hall

Fire Department

DATE: September 29th, 2004

DESCRIPTION: Meeting with Los Angeles County Fire Chief to discuss fire history, background and programs in the region

ATTENDEES: Asst. Fire Chief Reginald C. Lee Division VII Central Operations Bureau, Terry Dipple, Executive Director of the Las Virgenes-Malibu COG, Viviana Franco, Consultant with MLC & Associates

LOCATION: Fire Station 70, 3970 Carbon Canyon Rd., Malibu 90265-5005

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Sheriff's Department

DATE: September 30th, 2004

DESCRIPTION: Meeting with Sergeant to discuss history of terrorist activities in the region

ATTENDEES: Sgt. Phillip Brooks, County of Los Angeles Sheriff's Department, Viviana Franco, Consultant with MLC & Associates

LOCATION: Region I, Lost Hills/Malibu Headquarters, 27050 Agoura Road, Agoura, CA 91301-5336

Focus Group Meetings

DATE: October 26, 2004

DESCRIPTION: Focus Group # 1 meeting to discuss Hazard Mitigation Strategies within the Las Virgenes-Malibu region and also to take the Hazard Rating Survey

ATTENDEES: Terry Dipple, Executive Director of the Las Virgenes-Malibu COG, Viviana Franco, Consultant with MLC & Associates, Carol Tubelis, Assistant to the City Manager/City Clerk for City of Agoura Hills, Dirk Lovett, City Engineer for City of Hidden Hills, Gary J. Lysik, Chief Financial Officer for the City of Calabasas, Brad Davis, Emergency Preparedness Coordinator for the City of Malibu, Audrey Brown, Assistant City Manager for the City of Westlake Village.

LOCATION: City of Hidden Hills City Hall

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PUBLIC INVOLVEMENT MEETINGS AND EVNETS

AGOORA HILLS

Information will be added as it becomes available and shall be included in the plan.

CALABASAS

DATE: October 1, 8, 15 & 22, 2004

DESCRIPTION: CERT follow-up training

ATTENDEES: Various Community Members

LOCATION: City of Calabasas Auditorium

DATE: September 20, 2004

DESCRIPTION: The City of Calabasas Emergency Response Program (CERP) hosted representatives from the Las Virgenes Municipal Water District (LVMWD) to discuss the Districts revised emergency plan that now includes dealing with acts of terrorism. The meeting was open to the public and members of volunteer emergency response groups in the area.

ATTENDEES: Representatives for the City of Calabasas and the LVMWD

LOCATION: Calabasas City Hall

DATE: September 10, 17 & 24, 2004

DESCRIPTION: CERT follow-up training

ATTENDEES: Various community members

LOCATION: City of Calabasas Auditorium

DATE: February 28, 2004

DESCRIPTION: Overview of the CERT, program, Communications, Shelter Management, Human Services, Logistics and, Transportation, Medical Team, Animal Rescue, Finance and Administration, Post Disaster-Spontaneous volunteers, Team safety assessment, Public Information officer

ATTENDEES: LA County Fire Department representatives, various regional community members

LOCATION: Calabasas City Hall

DATE: February 14, 2004

DESCRIPTION: Overview of the CERT, program, Communications, Shelter Management, Human Services, Logistics and, Transportation, Medical Team, Animal Rescue, Finance and Administration, Post Disaster-Spontaneous volunteers, Team safety assessment, Public Information officer

ATTENDEES: LA County Fire Department representatives, various regional community members

LOCATION: Calabasas City Hall

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

DATE: January 24, 2004

DESCRIPTION: Overview of the CERT, program, Communications, Shelter Management, Human Services, Logistics and, Transportation, Medical Team, Animal Rescue, Finance and Administration, Post Disaster-Spontaneous volunteers, Team safety assessment, Public Information officer

ATTENDEES: LA County Fire Department representatives, various community members

LOCATION: Calabasas City Hall

DATE: January 10, 2004

DESCRIPTION: CERT training/classes held by the LA County Fire Department which include: Overview of the CERT, program, Communications, Shelter Management, Human Services, Logistics and, Transportation, Medical Team, Animal Rescue, Finance and Administration, Post Disaster-Spontaneous volunteers, Team safety assessment, Public Information officer

ATTENDEES: LA County Fire Department representatives, 16 community members

LOCATION: Calabasas City Hall

HIDDEN HILLS

Information will be added as it becomes available and shall be included in the plan.

DATE: June 5, 2004

DESCRIPTION: CERT Training

ATTENDEES: Unknown at this time

LOCATION: Unknown at this time

DATE: May 22, 2004

DESCRIPTION: CERT Training

ATTENDEES: Unknown at this time

LOCATION: Unknown at this time

DATE: February 25, 2004

DESCRIPTION: Search and Rescue Training

ATTENDEES: Los Angeles County Fire Department Community Services Representative Maria Grycan, various Las Virgenes-Malibu region community members

LOCATION: Round Meadow Elementary School

DATE: February 11, 2004

DESCRIPTION: LACoFD briefing about the October 2003 wildland fires.

ATTENDEES: City of Hidden Hills Public Safety Commission member and representatives from the Los Angeles County Fire Department.

LOCATION: TBD

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DATE: Year 2003-2004

DESCRIPTION: Training for Jim Doran, Emergency Services Director. Include, Area B-Disaster Management Area Coordinator meetings (10), Vulnerability Assessment/Homeland Security (9), Public Safety Commission/Emergency Management (44)

ATTENDEES: Various

LOCATION: Various Southern California locations

MALIBU

DATE: October 2, 9, 23, & 30 2004

DESCRIPTION: CERT training to include Disaster Preparedness, Fire Suppression, Medical part 1, Medical part 2, Light Search And Rescue, Terrorism, Team Organization / Disaster Psychology and a Disaster Simulation exercise.

ATTENDEES: Brad Davis, Emergency Preparedness Coordinator, Representatives form the Los Angeles County Fire Department and various community members

LOCATION: City of Malibu City Hall and various Homeowner Associations homes.

DATE: June 5th, 2003

DESCRIPTION: OES Workshop

ATTENDEES: Brad Davis (Emergency Preparedness Coordinator-Malibu)

LOCATION: Santa Paula Community Center, 530 W. Main St, Santa Paula, Ventura County

DATE: February 6th, 2004

DESCRIPTION: Form core team for creating Hazard Mitigation Plan

ATTENDEES: Brad Davis (Emergency Preparedness Coordinator-Malibu)

LOCATION: Malibu City Hall

DATE: January 27th, 2004

DESCRIPTION: Consultation meeting with the city of Santa Monica

ATTENDEES: Brad Davis (Emergency Preparedness Coordinator-Malibu)

LOCATION: City of Santa Monica, 333 Olympic Drive, Santa Monica

DATE: January 27th, 2004

DESCRIPTION: Planning Staff Meeting

ATTENDEES: Brad Davis (Emergency Preparedness Coordinator-Malibu)

LOCATION: Malibu City Hall

DATE: January 15th, 2004

DESCRIPTION: County Workshop

ATTENDEES: Brad Davis (Emergency Preparedness Coordinator-Malibu)

LOCATION: Carson Community Center, 801 East Carson St, Carson

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WESTLAKE VILLAGE

DATE: October 2003 and October 2004

DESCRIPTION: Search and Rescue trainings.

ATTENDEES: Unknown at this time

LOCATION: Unknown at this time

DATE: June 19, 2004

DESCRIPTION: Disaster drill

ATTENDEES: Unknown at this time

LOCATION: Unknown at this time

DATE: March 13, 2004

DESCRIPTION: Damage assessment

ATTENDEES: Unknown at this time

LOCATION: Unknown at this time

DATE: June 28, 2003

DESCRIPTION: City Disaster drill

ATTENDEES: Unknown at this time

LOCATION: Unknown at this time

DATE: March 29, April 26, May 21, 2003

DESCRIPTION: CERT trainings.

ATTENDEES: Unknown at this time

LOCATION: Unknown at this time

DATE: January 2003

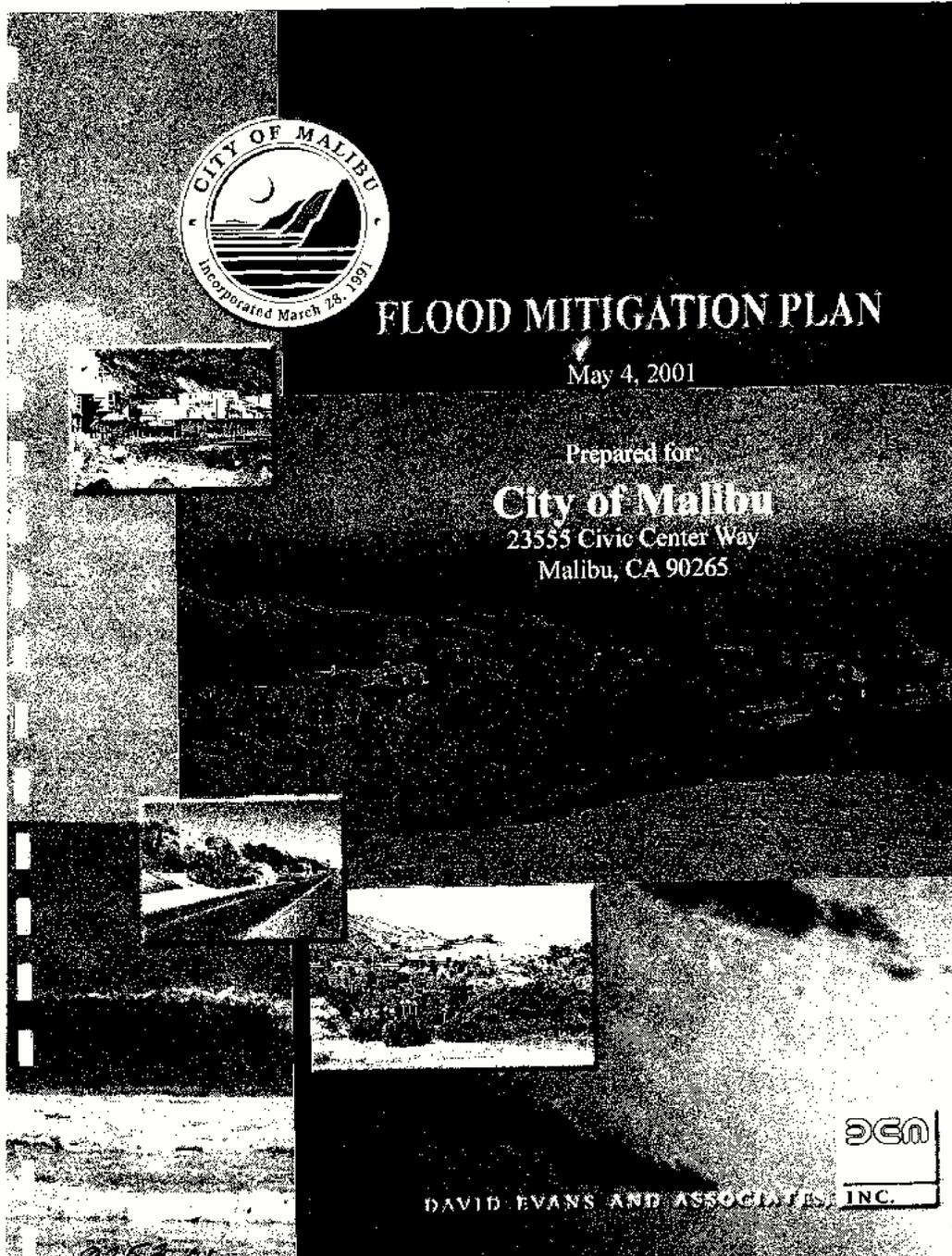
DESCRIPTION: Traffic control

ATTENDEES: Unknown at this time

LOCATION: Unknown at this time

APPENDIX E.

MALIBU FLOOD MITIGATION PLAN



**Las Virgenes-Malibu Council of Governments
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**CITY OF MALIBU
FLOOD MITIGATION PLAN**

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Table 1 - Summary of 50-Year Flows (cfs) in Canyon

FIGURES

Figure 1 - Study Area Map

APPENDICES

- Public Notices
- Meeting Agenda
- Report to the Council
- Meeting Minutes
- Single and Repetitive loss properties field review, photographs and maps
- Specific watershed area mitigation activities

Flood Mitigation Plan, City of Malibu

David Evans and Associates, Inc.

Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

- Consulting Engineering Firm

The FMP committee held two public meetings during the preparation of the draft FMP. In addition, five working sessions were conducted with the Committee focusing on hazard assessment, problem identification, mitigation goals, possible activities and review of the draft report.

As a part of the preparation of the FMP the consulting drainage engineers visited all of the 161 repetitive-loss properties and clusters of selected single-loss properties to:

- Assess the flood hazard
- Identify the flooding source
- Determine the proposed mitigation activities

The FMP preparation consisted of the following major steps:

- Identify areas of historic flooding and problem areas
- Determine existing hydrologic and hydraulic characteristics of the watersheds
- Develop goals for the FMP
- Consider possible mitigation activities to the flooding problems
- Evaluate and prioritize the potential mitigation activities
- Identify funding sources
- Prepare the Draft Flood Mitigation Plan
- Address and/or incorporate public comments
- Adopt and implement the policies and plans

One of the primary purposes of the FMP is to enable the City to apply for the NFIP's Community Rating System (CRS) program under Activity 500 "Flood Damage Reduction Activities" and Activity 510 "Floodplain Management Planning" at a later date. The CRS program allows reduction in flood insurance premiums for the preparation within the City based on the number of credit points.

2.0 DESCRIPTION OF STUDY AREA

The City of Malibu, with a population of approximately 15,000, encompasses an area of approximately 20 square miles, within relatively steep, rugged and unstable coastal slopes of the Santa Monica Mountains at the Pacific Ocean. The City stretches between the City of Santa Monica on the east and the Ventura County line on the west. Elevations within the City limits range from 2,650 feet above Mean Sea Level (MSL) to sea level through 21 major canyons and watershed areas along approximately 20 miles of shoreline. The watershed areas are shown on Figure 1.

The City averages less than a mile wide and is less than 2.5 miles at its widest point with the coastal length of 19 miles. Pacific Coast Highway (PCH), State Route 1, is the major four-

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

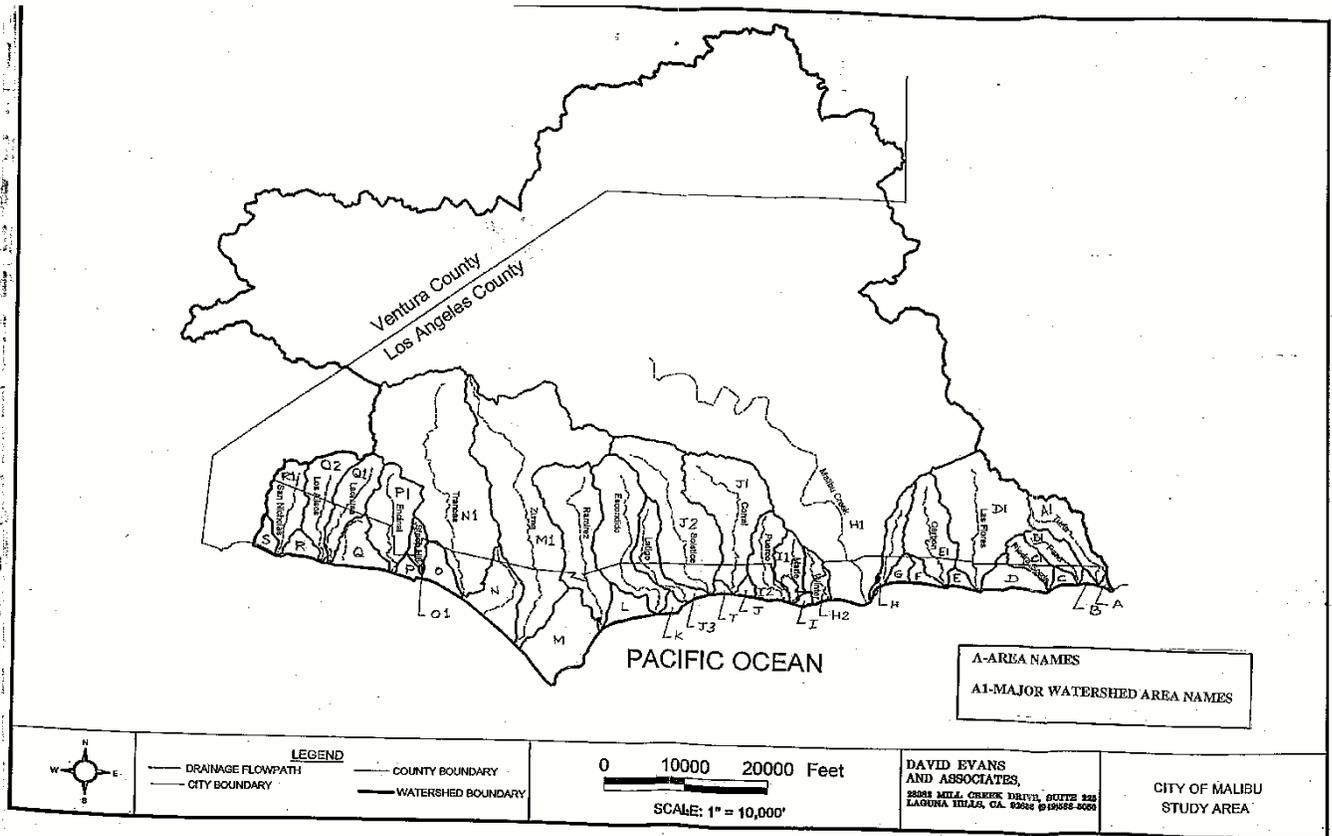


Figure 1

Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

lanic arterial roadway traversing the City, which provides access through the City for approximately 40,000 daily commuters. Beach traffic substantially increases the traffic congestion along PCH during the summer months. PCH and its facilities are owned and maintained by the Department of Transportation.

The City was incorporated in March 1991. Residential use comprises a majority of urbanized land use within the City. There are 6,753 parcels of land within the City, of which nearly 5,500 are developed. Generally, the developed portions of the City are situated in close proximity to the coast with direct access to the beach or a view of the ocean. About 20 percent of the parcels of land within the City falls in the undeveloped category. However, some of this acreage has already been planned for development and/or is currently under construction.

2.1 Watershed Characteristics

There are 21 major water courses that cross PCH within the City's boundaries. It is important to note that the contributing watershed areas extend far beyond the City's boundaries. The City's Master Plan of Drainage (MPD), prepared by Hawks & Associates, has identified a study area of approximately 172 square miles reflecting both watershed characteristics and City boundaries. This is depicted on hydrology maps that were prepared as a part of MPD. The watershed boundaries thus approximately encompass more than eight times the incorporated City area of 20 square miles. Most of the contributing watersheds are outside the direct control of the City. The design of drainage and flood control facilities is not only dependent upon the corporate boundaries but also the characteristics at the upstream watershed.

Malibu Creek has the largest watershed area of 110 square miles. Wildfires over the years in canyon areas destroyed most of native vegetation, increased runoff, erosion and sedimentation and caused heavy flooding in 1993, 1994, 1995 and 1998. Flood flows in all of the 21 canyon watersheds are conveyed by major drainage facilities at and through PCH. The major seven canyon areas, draining through the City are shown below:

<u>Canyon</u>	<u>Area (Acres)</u>
• Trancas Canyon:	5,440
• Zuma Canyon:	22,600
• Ramirez Canyon:	4,360
• Escondido Canyon:	5,360
• Solistica Canyon:	4,280
• Malibu Creek:	70,470
• Las Flores Canyon:	8,440

The runoff for various frequencies using County's methodology and Army Corps of Engineers methodology are presented on Table 1.

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TABLE 1

SUMMARY OF 50-YEAR FLOWS (CFS) IN CANYONS

NAME	LACFCD (B & B)	LAD		AREA (AC)
		Q ₅₀ Clear	B & B	
San Nicholas		987	1,668	845
Los Alisos	1580	1,153	2,252	948
Lachusa		1,126	2,187	922
Encinal		1,586	3,090	1,277
Steep Hill		410	709	241
Trancas	11,900	6,812	13,875	6,314
Zuma	11,600	7,715	14,117	5,687
Ramirez	4,360	2,813	4,835	2,150
Escondido	5,360	3,023	5,206	2,085
Latigo	1,600	962	1,593	786
Solstice	7,280	3,899	7,358	2,836
Corral		2,954	5,248	2,272
Puerco		1,163	1,902	918
Marie		820	1,464	595
Winter		535	832	352
Malibu	40,800			70,400
Carbon		1,931	3,695	1,288
Las Flores	8,440	4,051	8,351	2,646
Piedra Gorda		626	1,513	432
Pena		678	1,539	480
Tuna		1,347	2,665	932

B & B = burned and bulked watershed flows

Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

Serious flooding and associated damage has also occurred along PCH at Las Flores and the smaller Pena Canyon (515 acres), Tuna Canyon (107 acres), and Piedra Gorda Canyon at Big Rock (464 acres). As indicated earlier, the maximum elevation within the City limits is about 2,650 feet MSL at Simi Peak north of Highway 101 and in the Santa Monica Mountains. Generally, north-south ground slopes are adequate to permit stormwater runoff to flow to the canyons, from which it is conveyed to the ocean. The steep slopes are primarily responsible for excessive velocities and associated surface erosion, sediment deposition during storms which contributes to frequent problem areas along PCH. However, the coastal plain areas at the mouth of Malibu Creek in the vicinity of the City Civic Center, the Malibu Colony, and the Cross Creek Shopping Center have relatively milder slopes. These areas have been subjected to frequent flooding in the past.

Additional details of meteorologic, hydrologic and hydraulic characteristics, along with design of drainage facilities are presented in the City's MPD.

3.0 BENEFITS OF PLANNING

The objective of planning is to produce a program of activities that will best tackle the City's flood problems and meet other community needs. The basic steps of planning are:

- Set goals and facilitate development of solutions
- Formulate policies that all possible activities are reviewed and implemented so that the local flood problem is addressed by the most appropriate and efficient solutions
- Coordinate flood management policies to specific activities
- Coordinate the FMP goals with each other and with other City's goals and activities, preventing conflicts and reducing the costs of implementing each individual activity
- Educate residents on the flood hazard, flood loss reduction measures, and the natural and beneficial functions of their floodplains
- Build public and political support for projects that prevent new flood problems; reduce flood losses, and protect the natural and beneficial functions of floodplains
- Coordinate with the state and/or federal assistance programs
- Facilitate implementation of floodplain management activities through an action plan that has specific tasks, staff assignments, and deadlines
- Allow the City to apply for, and receive, certification for CRS credits

This plan will guide the City's flood, stormwater, and related activities so that they are implemented more economically and in ways more attuned to the needs and objectives of the City and its residents to reduce the impacts of flooding.



Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

4.0 PUBLIC INVOLVEMENT

At the beginning of this Plan, a Flood Mitigation Plan Committee was formed which included the public, City, OES and FEMA.

The first of two public meetings regarding the FMP was held at 7:00 PM, Thursday, June 29, 2000, at Hughes Research Labs. Prior to the first public meeting, notices were prepared for publication and advertisement along with the plan agenda. Notices and questionnaires were mailed to the County of Los Angeles, Caltrans, City of Calabasas, City of Agoura Hills, Sierra Club, Heal the Bay, repetitive loss property owners and single-loss property owners. Specifically, notices were mailed to the multiple-losses property owners as well as single-loss property owners, and homeowners associations. Questionnaires were also distributed to the repetitive-loss property owners requesting them to identify the flooding situations and issues and suggestions for solutions. It was emphasized at the meeting that public input is an extremely important ingredient of the planning process. This meeting was organized to provide orientation to the formulation of the FMP and review existing flood data.

The City presented an overview of the FMP, the need for the study, the formation of the FMP Committee, and the need for volunteer(s) to serve on the Committee. FEMA presented the background of the NFIP, benefits to the communities, ranking of Malibu as second in the State in terms of the amount of disaster-related claims, the overall process an FMP study, and the purpose of the public meeting(s).

The City's consultant, David Evans and Associates, Inc., presented a City-wide map with the location of multiple and single-loss properties in different colors for each number of claims.

The focus of the meeting was for the public to:

- Provide input on existing conditions
- Identify problem areas regarding flooding
- Discuss the cause(s) of the flooding problems
- Review possible activities
- Discuss the steps involved in the preparation of the Draft FMP

The second meeting was held on August 24th, 2000, which was devoted to an overall discussion of the general goal, specific goals and mitigation activities within the frame work of the six categories as suggested by the FEMA guidelines. Copies of Draft of Public Notice, Notes of two Meetings and Report to the City Council are included in Appendix A.

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5.0 COORDINATION WITH OTHER AGENCIES

The City is cognizant of the importance of involving numerous other government agencies as well as private organizations in its planning efforts. Should these entities be implementing or planning to implement activities that may potentially impact flood damage and related concerns within the City, then the City would coordinate the activities to make sure that its efforts are not going to be in conflict with another government program or duplicate the efforts of another organization. Although such planning initiatives by other state, regional, and federal agencies may not address all local issues, this kind of collaboration between the agencies will facilitate a thorough evaluation of flood mitigation alternatives with mutual benefits to residents of these communities.

Involving other agencies and organizations would facilitate acquisition of available flood hazard data, technical information regarding mitigation measures, and their implementation, guidance pertaining to regulatory requirements, advice and assistance in the planning effort, and/or financial assistance in the implementation of a recommended mitigation measure.

Currently, the City's planning effort includes collaboration with the Los Angeles County Department of Public Works (LACDPW), Caltrans, FEMA, Los Angeles District U.S. Army Corps of Engineers (COE), California Department of Water Resources (DWR), Governor's OES, City of Calabasas, City of Agoura Hills, and other regulatory agencies. These agencies have been contacted to attend the FMP Committee Meetings and public meetings. Notices have been mailed out to not only request their participation in these meetings, but also for providing a written response and any pertinent data for the City's planning process. The City believes that collaboration of this kind will continue on an on-going basis throughout the duration of the FMP process and its implementation.

6.0 PLAN ORGANIZATION

The FMP was organized to concentrate on the planning process rather than focusing on the specific detail of the mitigation measures. Hence the planning functions and the public involvement and consensus building with the public was important for the successful formulation of this Plan. This draft mitigation plan was prepared using the guidelines stated in the "Flood Management Plan", a CRS planning process by FEMA.

The following representatives were involved in the mitigation planning process:

- Planning and Community Development – planning direction, coordination with other plans or programs to help resident and businesses
- Engineer, Hydrologist or Flood Control Specialist – flood data, analysis, and evaluation, design of mitigation measures
- Public Safety/Police/Fire – emergency services including evacuation plans
- Public Works/Streets/Highways – channel maintenance and structural measures
- Building/Zoning/Code Enforcement – regulations, building and property protection

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- Public Information/Community Relations – public involvement and property protection measures
- Parks, Recreation, Forest Preservation – acquisition and protection of natural areas
- Governing Board/City Council – political and institutional acceptance and adoption

7.0 FLOOD HAZARD ASSESSMENT

This section identifies the flood hazard for the single-loss and the repetitive-loss properties and flooding problem areas where properties had no claims.

In accordance with the FEMA's NFIP requirements, floodplain management and mitigation programs deal with the "base flood" which is defined as a 100-year frequency flood. The magnitude of the base flood thus will be equaled or exceeded, on the average, once every hundred years. This statistical concept considers both the severity of a flood and the likelihood of its occurrence. Most of the nation's base floodplains have been mapped by FEMA on Flood Insurance Rate Maps (FIRMs).

The City's FIRMs were used to delineate the base flood plain(s) for major watersheds, including Malibu Creek, Trancas Creek, Ramirez Canyon, Las Flores Canyon, Escondido Canyon, and Zuma Canyon. The FEMA flood insurance study identifies floodways for some major watercourses. A floodway is defined by FEMA as the minimum area, with encroachment, needed to convey the 100-year flood without raising the flood levels by more than one foot. FEMA did not define floodways, but Los Angeles County has delineated floodways for the 50-year burned and bulked floods in Malibu Canyon, Zuma Canyon, Trancas Canyon and Las Flores Canyon. They have not been adopted by the City to regulate the development of the flood hazard areas. Even though the County's 50-year burned and bulked discharge would be considerably higher than FEMA's 100-year clear discharge, it would be beneficial to the City to adopt flood plain and flood ways until the City develops its own floodplain and floodways. Also it should be noted that the discharges rates with respect to the frequencies and burned and bulked conditions will be inconsistent (FEMA and County of Los Angeles) if two sets of criteria are used within the City. FIRM generally does not include floodplains for smaller watersheds that drain less than one square mile area. The latter watersheds are under local jurisdiction. It should be noted that most of the existing drainage facilities were constructed by Caltrans and LACDPW prior to incorporation of the City in March 1991.

The FIRM designated two types of floodplains for most of the areas in the City as A Zone and V Zone. The A Zone is the regular floodplain due to the inland watersheds. The V Zone is the "Coastal high hazard area" which is subjected to flooding due to the inland watersheds and coastal high hazards. In this combination of A and V Zones, V Zone will be shown on the map.

In addition to the major 21 watersheds discussed earlier, there are numerous "triangle-shaped" areas that are located between the major watersheds. These "triangle-shaped" watershed areas did not have any hydrologic data. As a part of the FMP preparation,

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hydrology calculations were performed for a few of these triangle areas to determine representative hydrologic data for all other areas. These “triangle” areas were designated alphabetically starting from “A” through “R” and were located in the City-wide watershed map (Plate 1) and in Figure 1 of this report. In addition, the major watersheds have been assigned with new alphanumeric names such as “A1” for consistency and easier reference which are shown in the City-wide watershed map (Plate 1) and in Figure 1.

For this assessment, all available flood data was obtained from MPD and other agencies such as LACDPW, COE and FEMA. No detailed modeling and hydrologic/hydraulic analyses were performed for major watersheds.

The City-wide watershed map/Geographic Information System (GIS) map was divided into watershed boundaries and each repetitive-loss property and single-loss property was located within the watershed boundaries on the map. This facilitated organization of loss areas in accordance with the runoff corresponding to base flood hazard for the particular watershed. A color-coding scheme was used to clearly identify the number of losses for the single-loss and repetitive-loss properties on the City-wide map (Plate 1).

As a technical back-up to the preparation of this FMP, a spreadsheet was created with data for each single-loss and repetitive-loss properties within the watershed. The spreadsheets were modified to show the following data in a tabular format:

- Date of Inspection
- Photograph
- Watershed Name
- Street Address
- Flood Zone
- Number of Losses
- Description of Existing Conditions
- Potential Flooding Source(s)
- Recommendations and Comments

8.0 ASSESSMENT OF THE FLOODING PROBLEM

Each multiple-loss property was observed to integrate the field condition and potential cause of the flooding that was documented. Photographs for these properties were added in to the property data sheets which are presented in the Appendix.

This assessment included comparison of the building pad elevation versus the water surface elevation, type of structure, existing drainage structure, condition of the structure, size of the drainage facility and observation of maintenance of the drainage structure, potential damage area within the lot, etc. After identifying the appropriate discharges and capacities of the existing facilities and street capacities, flood risk areas were determined based on available data.

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Assessment included the nearby infrastructure facilities such as bridges, roads, conditions of roads, off-site and on-site drainage, type of damage and nature of damage during the past floods with year, potential velocities, low points within the lot, secondary outlets, sewer back ups, roof drainage and type of upstream conditions, flood control facilities and developments, and proposed development in the upstream watershed. Future flooding due to the change in the runoff coefficient in the upstream watershed was considered. Any construction or proposed new flood protection measure was noted during the field reconnaissance.

Our experience indicates that the properties located adjacent to the repetitive loss properties needed to be reviewed for potential flooding.

Also, some new property owners who acquired the property next to a repetitive loss property may not know the extent and the magnitude of flooding. This needed to be documented during the field visit.

New buildings must be elevated above the base flood elevation in A and V Zones of the FIRM. In A Zone, commercial buildings can be flood proofed. In the V Zone, the new buildings must be elevated on pilings or piers so that the waves do not batter the building walls.

Critical facilities and business facilities such as the Civic Center area have been closely observed. The backflow conditions from Malibu Creek into Cross Creek Road via the existing culvert were noted. The impacts due to the potential development in the Civic Center area and the required mitigation activities including a future on-site detention basin were reviewed. Enlargement of the existing drainage facilities across PCH by Caltrans were reviewed.

9.0 SETTING GOALS

This task depends upon the extent of consensus within the community. It is imperative that an agreement regarding overall goals as well as specific goals for each watershed area be achieved. Prior to setting the goals, mutual agreement among the affected parties with the result of the flood assessment needs to be achieved. Consensus among the participants needs to be achieved. During the public meetings, the public was asked to identify their goals, which were shared with all participants. Excluding fatal flaws, the goals were scrutinized to reach a common goal, which would be agreed upon by everyone on common ground.

Presented below are proposed FMP main and general goals as well as specific goals for each of the watershed area.

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FMP Goals

MAIN GOAL: Reduce repetitive flood losses to NFIP insured and insurable structures and reduce exposure to flood damages and future flooding throughout the City.

GENERAL GOAL: The general goal of this FMP is to implement state-of-the-art technology and engineering practices using structural and non-structural solutions as a long range planning mechanism to reduce the impacts of flooding, harm and hazard to life and properties in the City.

SPECIFIC GOALS: In general, there are common goals for these areas such as: 1) reduce coastal flooding which is a combination of A and V Zones for the areas located along the shoreline; 2) improve and maintain existing drainage facilities' and 3) reduce runoff and debris flow. The other specific goals are listed below:

- AREA A:**
1. Reduce flood damage to Topanga Beach Drive and reduce the overflow from PCH.
 2. Contain and reduce spill over from Tuna Canyon at PCH.
 3. Reduce runoff and debris from Tuna Canyon watershed.
 4. Improve and maintain existing drainage facilities.
- AREA B:**
1. Contain and reduce spill over from Tuna Canyon at PCH.
 2. Reduce runoff and debris from Tuna Canyon watershed.
 3. Establish new standards for new buildings and substantial improvements.
 4. Improve and maintain culverts crossing at PCH.
 5. Improve existing low point drainage facilities.
- AREA C:**
1. Contain and improve Big Rock Road "Piedra Gorda" crossing PCH and reduce spill over.
 2. Reduce runoff and debris for Piedra Gorda.
 3. Reduce runoff and provide erosion control within local Area C.
 4. Improve existing low point drainage facilities.
- AREA D:**
1. Reduce runoff and debris within Area D.
 2. Reduce spill over from Piedra Gorda.
 3. Improve local drainage facilities.
- AREA E:**
1. Reduce Las Flores Creek spill over PCH and Rambla Pacifica.
 2. Reduce runoff and debris from Las Flores watershed.
 3. Improve and maintain local drainage facilities.
- AREA F:**
1. Reduce runoff and debris within Area F.
 2. Improve and maintain debris basin and storm drain at Fanning.
 3. Reduce spill over across Fanning and PCH.

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4. Improve and maintain storm drain crossing PCH.
5. Improve local low point drainage facilities.

- AREA G:**
1. Improve and maintain debris basin.
 2. Improve and maintain storm drain crossing at PCH.

- AREA H:**
1. Improve and maintain debris basin near Sweetwater Canyon.
 2. Maintain catch basin and storm drain north of PCH.

Malibu Canyon (H1):

1. Keep the flow in Malibu Road to avoid spilling into Malibu Colony Road.
2. Improve and maintain existing storm drain facilities.

Winter Canyon (H2):

1. Reduce runoff and debris within watershed area of Winter Canyon.
2. Improve and maintain Winter Canyon drain.

- AREA I:**
1. Reduce spill over from Marie Canyon Creek at Malibu Road.

Marie Canyon (I 1):

1. Reduce spill over from Marie Canyon Creek across Malibu Road.
2. Reduce runoff and debris.

Puerto Canyon (I 2):

1. Improve and maintain storm drain across Malibu Road.
2. Improve local low point drainage facilities.

- AREA J:**
1. Reduce spill over along the north of PCH.
 2. Reduce runoff and debris from Area J.

Latigo Canyon (J3):

1. Reduce spill over along Corral Canyon Road from Solstice Creek.

- AREA K:**
1. Reduce spill over from Escondido Creek at PCH.
 2. Reduce runoff and debris from Escondido Creek.
 3. Improve local drainage facilities.

Escondido Canyon (K1):

1. Reduce spill over at Escondido Canyon and PCH.
2. Reduce runoff and debris from Escondido watershed.

- AREA L:**
1. Reduce spill over from Meadows Drive at PCH.
 2. Reduce spill over from Winding Way and PCH.
 3. Reduce runoff and debris within Area L.
 4. Improve and maintain storm drain across PCH.

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Ramirez Canyon (L1):

1. Reduce outlet spill over of 10' x 10' Reinforced Concrete Barrier (RCB).

AREA M: 1. Improve property entrance and drainage.

Zuma Canyon (M1):

1. Improve entrance and street for Heathercliff Road and Bonsall Drive.
2. Improve drainage system.
3. Improve and maintain catch basin in Bonsall Drive.

AREA N: 1. Improve property entrance and street drainage.

Trancas Canyon (N1):

1. Improve entrance and street for Sea View Drive and El Sueno Drive.

AREA O: 1. Remove the bottleneck storm drain at Broad Beach Road.
2. Reduce spill over from Steep Hill Creek.
3. Improve and maintain storm drain system at low points in Broad Beach Road.

AREA P: 1. Reduce spill over at Broad Beach Road.
2. Reduce runoff and debris in Area P north of PCH.
2. Improve property entrance and local street.

AREA Q: 1. Improve local drainage.

Lachusa Canyon (Q1):

1. Improve outlet across PCH.
2. Reduce runoff and debris in Lachusa Canyon.

AREA R: 1. Improve entrance.
2. Reduce spill over at PCH and Los Alisos Canyon Creek.

10.0 REVIEW POSSIBLE ACTIVITIES

All possible flood mitigation activities need to be evaluated. The mitigation measures are:

1. Preventive activities
2. Property protection
3. Natural resources protection
4. Emergency services
5. Structural projects

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6. Public Information activities

The mitigation activities have been identified within the frame work of the above shown six categories. Budget, cost and funding resources will constitute the selection criteria. No measures were discarded without further investigation. These alternative mitigation activities were compared with the goals. The alternative mitigation activities were identified based on innovative ideas, cost-benefits, disadvantages, public opinions, and ease or difficulty of implementation, environmental impacts, environmental compliance, compliance to City and County codes, ordinances and regulations, and potential source of money for implementation and maintenance.

Presented below are the proposed mitigation activities for all of the watersheds based on the six categories for public review.

1. Preventive Activities

- Enforce floodplain regulations and zoning ordinances for new structures, new developments or substantial improvements to the existing structure/property.
- Incorporate landscape and pavement improvements that generate lower runoff and improve percolation for all new developments.
- Prepare a specific Storm Water Management Plan for Malibu Creek, Zuma Creek, Trancas Canyon and Los Flores Creek.
- Establish drainage fee based on the additional runoff generated due to improvements/developments.
- Modify the zoning ordinances of A Zone areas to locate building elevation a minimum of one foot above base flood elevation.
- Modify the zoning ordinances to require a minimum of one foot free board above base flood elevation for depth/height requirements for all flood hazard areas.
- Enforce permit requirements for all new developments in the floodplain and prohibit developments within floodway
- Modify the zoning ordinances of special flood hazard areas such as V Zones to require a minimum of one foot-free board above base flood elevation for lowest horizontal member of structures
- Review development policies for public buildings, utilities and private properties for open space preservation. Acquire easements in floodplain areas. Review City's policies to dedicate open space, park areas for large development projects.
- Review subdivision regulations, building codes and floodplain ordinances to regulate any developments within floodplain.
- Develop storm water management policies to maintain or reduce the runoff from existing conditions for all new developments using detention basins, retention basins and other natural barriers to reduce runoff.
- Review and update Storm Facility Maintenance System (including PCH/State/County and Federal facilities) and establish reports for annual maintenance and each major storm event.

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- Implement storm drain master plan.
2. **Property Protection Activities**
- Request to elevate existing structures as a part of any proposed development to the existing properties in special flood hazard areas.
 - Recommend flood proofing of existing non-residential buildings that have repetitive losses.
 - Prioritize properties to: A) Acquire B) elevate and C) relocate with FMA grant, Disaster Relief Grant Program (DRGP) for those that have had numerous NFIP losses claims. Use these properties for parks and recreation.
 - Assist to acquire/elevate/relocate properties and buildings with aid from FEMA's Hazard Mitigation Grant Program (HMGP) for those properties that suffered losses or future flood loss.
 - Assist in retrofitting non-residential properties with flood proofing.
3. **Natural Resource Protection Activities**
- All structural projects shall start with a project study report. This project study report shall include a comprehensive approach that will include:
 - ✓ Upstream and downstream watershed impacts
 - ✓ Water quality impact in relation to the proposed improvement
 - ✓ Reduction in peak flow
 - ✓ Addition of detention and filtration basins
 - ✓ Impact to endangered plant and animal
 - ✓ Impact of erosion and scour
 - ✓ Incorporation of soft engineering such as reduction of use of concrete and riprap and increase in use of channel grass lining and channel vegetation at various stages with different species in accordance with the depth of water and frequency of flood
 - ✓ Bioengineering solutions
 - ✓ Integration of treatment BMPs
 - ✓ Sediment reduction and mitigation measures
 - ✓ Watershed management
 - ✓ Concept level design of the proposed improvements
 - ✓ Integrate watershed improvement ideas without fatal flaws from local interest groups
 - The project study report shall be submitted to the Environmental Review Board (ERB) for review and comments prior to the start of any preliminary design of any facilities.
 - Enforce Best Management Practices (BMPs) within the watershed.
 - Provide technical assistance to select appropriate BMPs.
 - Review the Environmentally Sensitive Habitat Area(ESHA)) in relation to the repetitive loss map for integration of the design solutions and enhancement of the environment. All ESHA are to be identified in the repetitive loss map.

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4. **Emergency Services Activities**
 - Provide flood forecasting, warning systems and emergency plans for potential flooding.
 - Prepare an emergency evacuation plan, and health and safety plan during flood event.
 - Develop flood emergency measures, disaster preparedness, flood recovery plans.

5. **Structural Project Activities**
 - Recommend future and existing roof drainage systems for the properties located along the shoreline to be designed to drain towards the ocean side rather than to the front of buildings.
 - Encourage runoff entrapment within the site with filtration system for reusing the storm water for irrigating landscape areas without creating public health hazards and degradation of geologic conditions.
 - Prepare structural mitigation plans for site-specific areas with priorities based on the extent of damage to life and property.

6. **Public Information Activities**
 - Participate in FEMA's CRS program to reduce flood insurance premium rates.
 - Create a computerized tracking system to follow up on multiple loss properties and improvements and other pertinent information with a database.
 - Advise and assist property owners on retrofitting buildings with multiple losses.
 - Request and maintain FEMA's elevation certification for all new buildings and for existing buildings with proposed substantial improvements.
 - Provide information and education about flooding and protection measures in a public forum.
 - Create a GIS map and maintain the repetitive loss areas and floodplain zones.
 - Continue to provide map information and formulate a regular outreach program.
 - Provide technical assistance for locating properties within the floodplain.
 - Maintain flood data, FIRM and relevant information in the library.

11.0 ACTION PLAN

Based on the review of the six categories, it is recommended that the City implement the following floodplain management activities.

- **Floodplain regulations:** For the properties along the coastal areas, enforce the zoning ordinances of special flood hazard areas such as V Zones to require a minimum of one-foot free board above base flood elevation for lowest horizontal member of structures for new structures or substantial improvement to the existing structure. Enforce permit

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requirements for all new developments in the floodplain. Prohibit developments within floodway and prepare a specific Storm Water Management Plan for Malibu Creek, Zuma Creek, Trancas Canyon and Los Flores Creek. Implement storm drain master plan.

- **Flood Mapping:** For major watersheds that do not have floodway delineation's, the City shall prepare comprehensive floodway delineations using NFIP standards recognizing the fact that the County standards that include the burn and bulked condition would yield conservative results. Since the flood insurance program is based on the FIRM maps, NFIP standard should be followed. Until the comprehensive floodway mapping and preparation is completed for a specific watershed, any encroachment or construction activities within the floodplain area shall have its own hydrology/ hydraulics studies to prove that the proposed improvement within the flood plain does not increase the flood elevation by more than one foot which would follow the definition of the floodway. The City shall monitor and review the proposed improvements within the floodplain on a case by case basis until the preparation of a comprehensive floodway mapping for a specific watershed. The City shall adopt the new floodway delineations for the major watersheds after the review and approval of the new comprehensive floodway studies by FEMA.
- **Flood Protection Assistance:** City should obtain grants from OES and FEMA through programs such as DRGP and HMGP to assist to acquire/elevate/relocate properties and buildings that have had numerous NFIP loss claims. Also City should assist in retrofitting non-residential properties with flood proofing through low interest loans in coordination with the County, State and Federal government.
- **Flood Protection Materials:** City should mail FEMA's book, " Repairing Your Flooded Home" to all of the single- and multiple-loss property owners and other property owners that have potential of flooding. Copies of these books and other FEMA's publications should be available for distribution at the City Hall as well as the local library. City should provide technical assistance in understanding of the books and BMPs.
- **Flood Protection Activities:** For new buildings and proposed substantial improvements of the existing buildings, City should pass an ordinance that roof drainage systems for the properties located along the shoreline to be designed to drain towards the ocean side rather than to the front of buildings. City should encourage or provide incentives to entrap runoff within the property/site with filtration system for reusing the storm water for irrigating landscape areas without creating public health hazards and degradation of geologic conditions. City should prepare a long term and short term budgets with priorities to implement projects as stated in the Master Plan of Drainage.



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- **Emergency Manager Training:** City should set up a task force comprising of the Building and Safety, Fire Department, Sheriff's Department and Public Works Department and provide training for coordinated effort for flood warning, evacuation and response to emergencies. City should assign a lead person such as Emergency Manager for this task force to coordinate these training and planning. The Emergency Manager should attend appropriate training on flood warning and flood response planning.
- **Flood Warning and Preparedness:** After the training, the Emergency Manager and the City Engineer in coordination with other departments should prepare a flood warning system and emergency flood preparedness systems for Trancas Canyon, Zuma Canyon, Ramirez Canyon, Escondido Canyon, Solistica Canyon, Malibu Creek and Las Flores Canyon. City should explore the possibility of installing level control system with telemetry devices with audio and video signals that could be connected to the City Hall, Emergency Manager's office and other Task Force members.



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Mitigation Activities for Specific Areas

Area	Description	Priority	Medium Priority	Low Priority	Comments
Area A	Triangular area at southeast end of the City Limits in between Topanga Canyon Blvd and Tuna Canyon Road.	<ol style="list-style-type: none"> Increase height of the AC berm at Topanga Beach Drive with a vertical curve along PCH to keep the PCH runoff within PCH Re-profile Topanga Beach Drive to drain the street low along the gutter adjacent to the retaining wall along the north side of the street 		<ol style="list-style-type: none"> Improve existing 1-48" and 1-24" storm drain(SD) and inlets that are inadequate to discharge runoff from 24 acres. 	
Area B	Triangular area between Tuna Canyon (Area A1) and Pena Canyon (Area B1).	<ol style="list-style-type: none"> Construct levee along Tuna Canyon Road Re-profile and elevate Tuna Canyon Road for approximately 500' from PCH Elevate the Tuna Canyon culvert 	<ol style="list-style-type: none"> Add additional inlet at north side of PCH east of Tuna Canyon Road 	<ol style="list-style-type: none"> Replace existing three Storm Drains (1-18" Dia and 2-24" Dia) that are inadequate to discharge runoff from 49 acres (139 cfs for 10-year, 128 cfs for 25-year) with larger sizes. Construct relief drain for the spill over of Tuna Canyon Creek Improve drainage system at the low point between 19036 and 19040 PCH including upsizing the inlet and storm drain pipe 	
Area C	Triangular area between Pena Canyon (Area B1) and Piedra Santa Canyon (Area C1).	<ol style="list-style-type: none"> Construct levees and increase the headwall of the 84" pipe inlet at the "hairpin" bend location. Re-profile and elevate Big Rock Drive at this location Elevate the 6'X4' existing RCB which is under capacity to discharge the runoff across PCH. 	<ol style="list-style-type: none"> Add additional inlets at southwesterly curb return of Big Rock / Tuna Canyon Road and increase the size of the existing 24" drain 	<ol style="list-style-type: none"> Consider rolled curb to keep the PCH runoff away from the garage level - reroute the roof drain to the back of the building 	<ol style="list-style-type: none"> Contractor to enlarge the 6' X 4' Reinforced Concrete Box(RCB) under curb order.
Area D	Triangular area between Florida Garcia Canyon (Area C1) and Las Flores (Area D1).	<ol style="list-style-type: none"> Elevate the 6'X4' existing RCB which is under capacity to discharge the runoff across PCH. 	<ol style="list-style-type: none"> Remove "bolt neck" storm drain and replace or add a solid drain at 20330 to 20340 PCH areas. Replace the 18" storm drain with larger size storm drain at the area in front of garage to eliminate local ponding and possible discharge for 19019 PCH 		
Area Las Flores (Area D1)	Area bounded by E1, E, D, C1, B1, and A1 (minimal coastal frontage)	<ol style="list-style-type: none"> Elevate the Las Flores Canyon Road and adjoin Las Flores Mesa storm drain 	<ol style="list-style-type: none"> Prepare a specific emergency plan for Las Flores Canyon at PCH crossing until completion of construction of the proposed enlargement of the flow area by Caltrans. Include evacuation of the nursery and the premises in the plan. 		
Area E	Triangular area between Las Flores (Area D1) and Carbon Canyon (Area E1)	<ol style="list-style-type: none"> Provide a SD system to pick up the flows across PCH at 21400 PCH to 21422 Construct a new SD system at the low point in front of 21643 PCH to pick up the flows across PCH from the 24" outlet 	<ol style="list-style-type: none"> Provide storm drain system with inlets at the intersection of Ramble Vista and PCH to drain across PCH. Improve the existing 18" SD system at 21330 PCH. 		
Area F	Triangular area between Carbon Canyon (Area E1) and Carbon Canyon (Area F1)	<ol style="list-style-type: none"> Provide inlets at the intersection of PCH 1 and direct the runoff to Carbon Canyon creek head of PCH to prevent runoff crossing over PCH to the east low point 		<ol style="list-style-type: none"> Replace the deficient existing inlet and 14" SD at 21362 PCH Construct inlet at the "T" intersection of Flaming and PCH and connect to the existing 30" SD 	
Area G	Triangular area bounded by H, F and E1			<ol style="list-style-type: none"> Consider a new inlet at the low point of 22522 PCH and a storm drain system connecting to existing 48" storm drain 	



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Mitigation Activities for Specific Areas

Watershed (Rel. to Escondido River Region)	Location	Priority	Medium Priority	Low Priority
Area Malibu Canyon (Area H1)	Large area that includes Malibu Creek drainage area (H1)	<ol style="list-style-type: none"> 1) Construct a structural levee west of the Malibu Colony Drive adjacent to the tennis courts along the Creek. Disturbance to the environment must be considered also. 2) Construct a new storm drain in Malibu Colony Drive to drain towards the south end of the street in to the creek (assessment along the sidewalk will not be needed) 3) Construct a 18" pipe for the 12.5" Vx 5.5H PCB outlet in to Malibu Creek to prevent "backing" of Malibu Creek in to the Civic Center area. 4) Perform a detailed design study for detention basin and year around wetland creek improvement near the Civic Center. Expand the master plan concept study. 5) Add a new storm drain system with inlets in Malibu Road to eliminate ponding and flow diversion in to Malibu Colony Road. 6) Re-profile Malibu Road to eliminate the flat areas, low clarity and to keep Malibu Road runoff away from the garage level along with new rolled curb and gutter. 7) Upgrade the existing storm drain in Wasbi Way. 	<ol style="list-style-type: none"> 1) Upgrade the sump pump and storm drain within the gated community area of Malibu Colony. 2) Create a "Y" gutter and change the street cross slope for Malibu Colony Drive to keep the runoff flowing in the garages. 	<ol style="list-style-type: none"> 1) Reach the sand dune/bar during a major storm event with early warning system such as telemetry attached to the upstream stream gauge to prevent backup of Malibu Creek.
Area Winter Canyon (Area H2)	Winter Creek (H2)		<ol style="list-style-type: none"> 1) Extend the 90" storm drain system across Malibu Road and east inlet north of 23995 Malibu Road. 	<ol style="list-style-type: none"> 1) Construct rolled curb and gutter along the south side of Malibu Road to keep runoff within the street.
Area I	Triangular area bounded by H2 and Marie Cyn (H1)	<ol style="list-style-type: none"> 1) Remove and replace the existing corrugated 12" CMP at 24460 Malibu Road. 		<ol style="list-style-type: none"> 1) Construct rolled curb and gutter along the south side of Malibu Road to keep runoff within the street.
Area Marie Canyon (Area H1)	Area bounded by H1, H2, I and J	<ol style="list-style-type: none"> 1) Add a relief drain to the existing 6" H X 10" V PCB to provide additional capacity. 		<ol style="list-style-type: none"> 1) Construct rolled curb and gutter along the south side of Malibu Road to keep runoff within the street.
Area Puerto Canyon (Area I2)	Area bounded by H1, I, J and J1	<ol style="list-style-type: none"> 1) Re-profile Malibu Road to create cross fall and prevent spillover across the road. 2) Construct a natural swale along the westerly side of Malibu Road (without creating any public driving hazard) to increase the depth of flow at inlets and increase the capacity of inlets. 		<ol style="list-style-type: none"> 1) Construct rolled curb and gutter along the south side of Malibu Road to keep runoff within the street.
Area J	Triangular area bounded by I2 and J1	<ol style="list-style-type: none"> 1) Re-profile Malibu Road to create cross fall and prevent spillover across the road. 2) Construct a natural swale along the westerly side of Malibu Road (without creating any public driving hazard) to increase the depth of flow at inlets and increase the capacity of inlets. 		<ol style="list-style-type: none"> 1) Construct rolled curb and gutter along the south side of Malibu Road to keep runoff within the street.
Area K	Irregular area bounded by J3 and Escondido Cyn		<ol style="list-style-type: none"> 1) Construct a storm drain system across Malibu Cove Colony Drive to pick up the flows from the 12" X 10" culvert outlet located west of Malibu Cove Colony Drive at 26642 Lallago Shore Drive. 	<ol style="list-style-type: none"> 1) Re-profile Malibu Road to create cross fall and prevent spillover across the Road also construct rolled curb and gutter along the east side of Malibu Road to keep runoff within the street. 2) Construct additional inlets and storm drain system to capture the flows from the westerly side of Malibu Cove Colony Drive.
Area L	Triangular area bounded by Escondido Cyn and Ramirez Cyn		<ol style="list-style-type: none"> 1) Raise the profile of Sea Lane at PCH to prevent PCH runoff spillover in to Sea Lane, (Private and Public) 	



Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

Mitigation Activities for Specific Areas

Watershed Name	Location (Section)	Storm Priority	Low Priority	Continued
Area Ramirez Canyon	Area bounded by Escondido Cyn, L, M, and M1	1) Replace the two CMPs with one large arch culvert or RC3 at ocean outlet	1) Schedule regular maintenance at the outlet to remove sand buildup.	
Area M	Triangular area (on coast) bounded by Ramirez Cyn and M1		1) Consider a storm drain system at the end of the cul-de-sac	
Area 7uma Canyon (Area M1)	Area bounded by M, Ramirez Cyn, H1, N, and N1		1) Remove and replace the existing onsite inlets and storm drain line with larger sizes at the property 29221 Heathercliff Road (private project) 2) Construct an opening in the perimeter screen wall for secondary flows at the property 29221 Heathercliff Road (private project)	
Area O	Triangular area bounded by N1 and O1	1) Perform a project study for the Broad Beach Road diversion drain project, Project No. 7 as stated in the Master Plan of Drainage. Evaluate all impacts such as environmental, structural and physical to the Transas Canyon creek and watershed 2) Prepare plans, specifications and estimate and construct the project	1) Remove the "bottleneck" (8" connector pipes) and replace with large connector pipes. Consult a 30" SD westerly of PCH to westerly of Broad Beach Drive. Connect the inlet connecting pipe in to the proposed 30" SD at 31034 Broad Beach Drive. 2) Remove the existing "bottleneck" (24" dia and 30" ups end) at this low point at 31310 Broad Beach Road. Replace with larger storm drain system at the downstream end easterly of Broad Beach Road. Replace the existing 10" catch basin connector pipes with larger pipes. Connect inlet to Broad Beach Road between 31302 and 31310 Broad Beach Road.	
Area P	Triangular area bounded by O1 and P1		1) Remove the existing "bottleneck" Steep Hills Canyon 15" SD and replace it with larger size at 31431 Broad Beach Road. Remove the existing connector pipes and replace with larger size.	
Area Q	Triangular area bounded by P1 and Q1		1) Re-profile the access road at 31974 PCH to the gate to higher elevation at gate to keep off the PCH runoff (gr valve)	
Area R	Triangular area bounded by Q2 and R1		1) Re-profile the access road in to the property at 33306 PCH to higher elevation at the entrance to keep off the PCH runoff	
			1) Replaces existing 6' X 6' culvert across PCH which is under capacity to drain 3,000 cfs for 50 year storm. This will avoid spill over along the westerly side of PCH at Encinal Canyon.	



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12.0 PLAN ADOPTION

Following assessment of flooding problem, setting goals, and reviewing all possible solutions, the draft FMP is being presented in a public forum so that the most appropriate actions can be selected for final implementation. The draft plan will also be made available to the FMP Committee, LACDPW, FEMA, OES, and various departments and organizations. Following discussion, debate, and common agreement, a written, final plan will emerge in the form of a series of recommendations. The Final FMP will be submitted to the City Council for adoption.

13.0 IMPLEMENTATION, EVALUATION AND REVISIONS

This is a relatively long process. The City's planning staff will be involved in this effort on a day to day basis. Inexpensive projects could be implemented quickly. Policy changes and Ordinances are inexpensive and take a longer time due to the procedural requirements.

Some of the structural and non-structural mitigation measures require close monitoring and periodic revisions based on the performance. The City's project manager will be responsible for overall implementation of the plan and presentation of the annual update to the City Council. This update will provide an overview of the plan and the progress made over the previous 12 months towards implementing the mitigation activities.

The City will use the CRS work sheets to claim credits for the FMP. Close coordination with FEMA and their involvement from the beginning will help the City get the maximum credit. The City will also provide a model annual evaluation report on progress that will be used for CRS re-certification.

**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**

APPENDIX



Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

DRAFT OF PUBLIC NOTICE

The City of Malibu will hold a public meeting to discuss the preparation of a Comprehensive Flood Mitigation Plan.

Date: Thursday, June 29, 2000
Time: 7-9 p.m.
Location: HRL Laboratory Auditorium
3011 Malibu Canyon Road

There are 21 major canyon water courses that cross the Pacific Coast Highway (PCH) within the City's boundary. The watershed areas extend far beyond the City's boundaries. The City of Malibu has a history of repetitive flooding caused by a variety of conditions. The City is preparing a Flood Mitigation Plan to take measures to reduce and eliminate repetitive losses of property due to flooding. Possible mitigation could include non-structural and structural improvements.

The focus of the June 29th meeting is for the public to:

- Provide input on existing conditions
- Identify problem areas
- Discuss the cause(s) of the problem

Project Background

The project, which is partially funded by the Federal Emergency Management Agency (FEMA), consists of the following steps:

- Identify areas of historic flooding and problem areas
- Determine existing hydrologic conditions in the watersheds
- Develop goals and objectives for the Flood Mitigation Plan
- Consider possible solutions to the problems
- Evaluate and prioritize the potential solutions
- Identify funding sources
- Prepare the Draft Flood Mitigation Plan
- Adopt the Flood Mitigation Plan

Public input is extremely important! Please attend to provide your input. If you are unable to attend the meeting but would like to provide input, please contact Claudio Sanchez at (310) 456-2489 Ext. 237.

**Las Virgenes-Malibu Council of Governments
Hazard Mitigation Plan – DRAFT 1**



Harry Barovsly
Honorary Mayor 2000-2001
In Memoriam

City of Malibu

23555 Civic Center Way - Malibu, CA 90265
(310) 456-2489 FAX (310) 456-3356

FLOOD MITIGATION PLAN

PUBLIC MEETING

THURSDAY, JUNE 29, 2000 7-9PM

1. Introductions
2. Existing Conditions and Explanation of Problem
 - Problem and Risk Areas
 - Repetitive Loss
 - Watershed Areas
 - Floodplain and Floodway
 - National Flood Insurance Program
3. Flood Mitigation Plan
 - Reasons for a flood mitigation plan
 - Steps
4. Public Comment
 - Reports of Flood Problems
 - Suggested Solutions
 - Questions and Answers
5. Summary
 - Schedule and Public Meetings
 - Flood Mitigation Plan Committee

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Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

Area R

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Increase the “n” value with additional landscaping and planting within the San Nicholas Canyon Watershed and Area Q.
- Prevent spillover from the PCH

2. Property protection activities

- Provide flood proofing with secondary outlets through the garage at 33306 PCH

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation along the westerly side of PCH.

4. Emergency services activities

5. Structural projects activities

The existing inadequate 8” catch basin connector pipes in PCH located north of 33306 PCH are under capacity to drain the PCH runoff. There is a 3” AC berm along PCH in the frontage of this property. The height of adjacent AC berm along PCH is 6”. The property slopes downwards from PCH. The depth of flow could exceed 3” in PCH and runoff could spill over in the property.

- Replace the existing catch basin and 18” connector pipe with large storm drain system north of 33306 PCH to reduce the depth of flow in PCH.
- Replace the existing berm with 6” berm to match the existing AC berm along PCH.
- Re-profile the access road in to the property at 33306 PCH to higher elevation at the entrance to keep off the PCH runoff.

6. Public information activities

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

AGENCY LETTER

June *, 2000

The City of Malibu has a history of repetitive flooding caused by a variety of conditions. There are 21 major canyon water courses that cross the Pacific Coast Highway (PCH) within the City's boundary. The watershed areas extend far beyond the City boundaries. The City of Malibu is beginning to prepare a Flood Mitigation Plan to identify mitigation measures to protect the community from flooding.

The objective of the FMP is to identify and implement measures to reduce and eliminate repetitive losses of property due to flooding. We would like to request assistance and input from your agency regarding our efforts. Specifically:

- Does your agency have any information on past flood studies and any possible solutions to flooding in the City of Malibu or the surrounding area?
- Is your agency planning or implementing any flood mitigation projects of which we should be aware?
- Does your agency have any financial or technical assistance programs that could help the City of Malibu?
- Do you have any suggestions on types of activities we should review that would reduce flood damage in Malibu?

City will hold a public meeting to discuss the preparation of Flood Mitigation Plan:

Date: Thursday, June 29, 2000
Time: 7-9 p.m.
Location: HRL Laboratory Auditorium
3011 Malibu Canyon Road

You are invited to attend this meeting. If your agency is unable to attend the meeting please send your response to the above questions to the City Manager, City of Malibu.

We appreciate your response to this letter. If you have any questions or need additional information concerning the City's efforts in this regard, please contact Claudio Sanchez at (310) 456-2489 Ext. 237.

Las Virgenes-Malibu Council of Governments Hazard Mitigation Plan – DRAFT 1

COVER LETTER TO REPETITIVE LOSS PROPERTIES

August *, 2000

As you know, the City of Malibu is preparing a Flood Mitigation Plan to identify ways to mitigate the flooding in the City because of the repetitive flooding losses that have historically occurred. The objective of the Flood Mitigation Plan is to identify and implement measures to reduce and eliminate repetitive losses of property due to flooding. Enclosed is a public notice for the second public meeting to be held on August 24, 2000.

Based on the FEMA's records, we believe that your property is located in an area that has experienced losses due to flooding. Therefore, the City would again like to invite you to participate in the public meeting so that you may provide your input on goals, objectives and mitigation regarding this issue. If you are unable to attend the meeting, but have information that may be helpful, please contact Claudio Sanchez at (310) 456-2489 Ext. 237 or send your comments in writing to the address above.



Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

Area A

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Improve maintenance frequencies of the existing inlets and the 18" and 24" storm drain at this low point.
- Improve existing 1-18" and 1-24" storm drain(SD) and inlets that are inadequate to discharge runoff from 24 acres.
- Increase the "n" value with additional landscaping and planting within the watershed
- Prevent Tuna Canyon spill over across PCH.

2. Property protection activities

- Consider an offer for relocation or request to elevate the building at 18814 Topanga Beach Dr.
- Elevate the buildings at 18856 PCH, 18862 PCH

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.
- Enforce the temporary and permanent Best Management Practices (BMPs) and to improve and to maintain the water quality within the watershed for substantial improvements to the property.

4. Emergency services activities

5. Structural projects activities

- Increase height of the AC berm at Topanga Beach Drive with a vertical curve along PCH to keep the PCH runoff within PCH.
- Re-profile the Topanga Beach Drive to drain the street flow along the gutter adjacent to the retaining wall along the north side of the street.
- Construct local SD and catch basin to collect and discharge the runoff
- Consider rolled curb to keep the PCH runoff away from the garage level
- Reroute the roof drain to the back of the buildings

Las Virgenes-Malibu Council of Governments

Hazard Mitigation Plan – DRAFT 1

- From 18922 PCH to north end of area A, regarding the Tuna Canyon spill over consider the following:
 - a) clean the creek area and maintain low "n".
 - b) construct levee along Tuna Canyon Road
 - c) re-profile and elevate Tuna Canyon Road for approximately 500' from PCH
 - d) enlarge the Tuna Canyon cuivert
 - e) add additional inlet at north side of PCH south of Tuna Canyon Rd
 - f) construct relief drain for the spill over of the Tuna Canyon Creek
 - g) enlarge the 4" dia pipe outlets and increase the size of the grate inlet.
 - h) encourage flood proofing the garage and provide a secondary drain from the garage to the ocean with flap gate for emergencies.

6. Public information activities

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Area B

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Provide regular maintenance of the existing inlets and the three storm drains at the low point. Existing three Storm Drains (1-18" Dia and 2-24" Dia) are inadequate to discharge runoff from 49 acres (109 cfs for 10-year, 128 cfs for 25-year).
- Increase the "n" value with additional landscaping and planting within the watershed.
- Prevent Tuna Canyon Spillover flows across PCH

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Consider offer for relocation of the building at 19028 PCH
- Elevate the buildings at 19028 PCH, 19034 PCH, 19126 PCH

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.
- Enforce the temporary and permanent Best Management Practices (BMPs) and to improve and to maintain the water quality within the watershed for substantial improvements to the property.

4. Emergency services activities

5. Structural projects activities

- From 19130 PCH to north end of Area B regarding the Tuna Canyon Spill over consider the following:
 - a) clean the creek area and maintain low "n".
 - b) construct levee along Tuna Canyon Road
 - c) re-profile and elevate Tuna Canyon Road for approximately 500' from PCH
 - d) enlarge the Tuna Canyon culvert
 - e) add additional inlet at north side of PCH south of Tuna Canyon Rd

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- f) construct relief drain for the spill over of the Tuna Canyon Creek
- g) enlarge the 4" dia pipe outlets and increase the size of the grate inlet.
- h) encourage flood proofing the garage and provide a secondary drain from the garage to the ocean with flap gate for emergencies
- Repave the area in front of garage to eliminate local ponding and positive drainage at 19016 PCH
- Improve the drainage system at the low point between 19036 and 19040 PCH including the upsizing the inlet and storm drain pipe
- Improve the existing 4" dia storm drain and inlet at 19324 PCH
- Consider rolled curb to keep the PCH runoff away from the garage level

6. Public information activities

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Area C

SPECIFIC AREA
MITIGATION ACTIVITIES

1. Preventive activities

- Perform regular maintenance of the existing inlet and storm drain at southwesterly curb return of Big Rock Drive and the storm drain; perform regular maintenance of the three storm drains and inlets starting from 19700 PCH.
- Increase the "n" value with additional landscaping and planting within the watershed.
- Prevent Peidra Gorda Spillover at Big Rock Drive crossing "hairpin" bend. Existing 84" pipe and the culvert 6' X 4' is under capacity to discharge the runoff.

2. Property protection activities

- Provide floodproofing with secondary outlets through the garages
- Elevate the buildings for 19728 PCH and 19848 PCH

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

4. Emergency services activities

5. Structural projects activities

- Prevent the spill over of Peidra Gorda Creek at Big Rock Dr crossing and spill over at 6' X 4' RCB at PCH
 - a) clean the creek area and maintain low "n".
 - b) construct levees and increase the headwall of the 84" pipe inlet at the "hairpin" bend location
 - c) re-profile and elevate Big Rock Drive at this location
 - d) Add additional relief drain per the master plan
 - e) add additional inlets at southwesterly curb return of Big Rock Tuna Canyon Rd and increase the size of the existing 24" drain

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g) enlarge the 6'X4' existing RCB which is under capacity to discharge the runoff across PCH.

- Encourage flood proofing the garage and provide a secondary drain from the garage to the ocean with flap gate for emergencies.
- Repave the area in front of garage to eliminate local ponding and positive drainage for 19848 PCH. Improve the drainage system at this low point with larger grate inlet
- Consider rolled curb to keep the PCH runoff away from the garage level
- Reroute the roof drain to the back of the building

6. Public information activities

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Area D

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Regular maintenance of the existing inlets and the storm drains are required at the low point.
- Increase the "n" value with additional landscaping and planting within the watershed.
- Prevent Peidra Gorda Spillover flows across PCH at 19932 PCH

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Consider offer for relocation or elevating the building for 19028 PCH
- Elevate the repetitive loss buildings in V zone especially 20848 PCH

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

4. Emergency services activities

5. Structural projects activities

- Prevent the spill over at 1) Peidra Gorda Creek at Big Rock Dr crossing and at 2) spill over at 6' X 4' RCB at PCH (see Area C)
- Remove "bottleneck" storm drain and replace or add a relief drain at 20330 to 20340 PCH areas. Replace the 18" SD with larger size storm drain (36" SD) at the area in front of garage to eliminate local ponding and positive drainage for 19016 PCH
- Replaco the existing grate inlet with larger size at 20832 and 20848 PCH
- Repave and replace the undersized grate inlet and storm drain at 20806 PCH
- Add additional inlets at eastside of PCH and storm drain at 20648 to 20654 PCH
- Elevate 20866 PCH and replace existing 24" SD with a larger SD

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Area Los Flores

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Increase the “n” value with additional landscaping and planting within the watershed.

2. Property protection activities

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

4. Emergency services activities

- Close the nursery during the heavy rainfall and evacuate the premises. Prepare a specific emergency plan for 21201 PCH and 3945 Las Flores Canyon until the completion of the construction of the new project by Caltrans.

5. Structural projects activities

- Add an additional culvert or a new bridge to convey 50 year frequency flow. This will be designed by Caltrans.
- Consider elevating the Las Flores Canyon Road and add Las Flores Mesa storm drain

5. Public Information activities

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Area E

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Regular maintenance of the existing inlets and the storm drains are required at the low point.
- Prevent spill over from Rambla Vista Dr across PCH

2. Property protection activities

- Elevate the repetitive loss buildings in V zone especially 21422 PCH, 21506 PCH and 21596 PCH

2. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

3. Emergency services activities

4. Structural projects activities

There are two existing 18" SD discharge at east of PCH . But there is no other SD system to pick up this runoff to transport across PCH in to the ocean. The runoff crosses the crown of PCH and floods 21400 to 21422 PCH

- Provide a SD system to pick up the flows across PCH at 21400 PCH to 21422
- Provide storm drain system with inlets at the intersection of Rambla Vista and PCH to drain across PCH. Improve the existing the 18" SD system at 21330 PCH.
- Upgrade the existing inlet size of 18" SD at 21506 PCH
An existing 24" SD located across 21640 PCH terminates east of PCH. There is no SD system to pick up the said flow and transport across PCH. There is low point at 21640 PCH in the street profile. Existing inlet located east of PCH at 21658 PCH is undersized to pick up spill over from Rambla Vista .
Consider the following:
- Upsize the inlet and SD system at 21658 PCH

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- Add a new SD system at the low point in front of 21640 PCH to pick up the flows across PCH from the 24" outlet
- Reroute the roof drain to the back of the building.

5. Public information activities



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Area F

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Require regular maintenance of the inlets and the storm drains after major storm events and regular scheduled maintenance.
- Prevent Carbon Canyon Creek Spillover flows across PCH

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Consider offer for relocation and elevating the building for 19028 PCH
- Elevate the repetitive loss buildings in V zone especially 20848 PCH

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

4. Emergency services activities

5. Structural projects activities

There are no inlets at the "T" intersection of Carbon Canyon Road and PCH. The street flow crosses the PCH and traverses towards the low point in the street at 21848 PCH. Consider the following:

- Provide inlets at the intersection and direct the runoff in to the Carbon Canyon creek east of PCH to prevent the runoff crossing over the PCH to the said low point.
- Construct new inlet and SD at the low point
- Perform flood proofing 21848 PCH

Replace the deficient existing inlet and 14" SD at 21962PCH
Local low point due to the flat profile of PCH contributed to the flooding of 22126 PCH, 22144 PCH, 22040 PCH and 22062 to 22104 PCH

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- Replace the existing inlet and 15" SD at 22202 PCH with larger size
- Construct inlet at the "T" intersection of Fanning and PCH and connect to the existing 30" SD
- At 22306 PCH and 22338 PCH replace the inlets with larger sizes
- Reroute the roof drain to the back of the building.

6. Public information activities



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Area G

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Provide maintenance of the existing inlets, debris basin and the 48" dia storm drain at 22522 PCH after major storm event and regularly scheduled maintenance.

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Elevate the repetitive loss buildings in V zone especially 22522 PCH

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

4. Emergency services activities

5. Structural projects activities

The surface flooding at 22522 PCH appears to be due to the low point and under capacity inlet connected to 48" dia SD

- Enlarge the size of the inlet at 22528 PCH
- Consider a new inlet at the low point of 22522 PCH and a storm drain system connecting to existing 48" storm drain
- Consider adding or upsizing inlets west side of PCH at the existing storm drain locations

6. Public information activities

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Area Malibu Canyon

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Incorporate the mitigation activities in the Watershed Management Area Plan (WMAP) for the Malibu creek with the participation of Cities of Agoura Hills and Calabasas and County of Los Angeles.
- Participate the discussions for the upstream watershed development with the County of Ventura and County of Los Angeles.
- Prepare an City ordinance restricting any increase in runoff and setting the minimum water quality standards such as TMDLs at the upstream end of the City boundary
- Formulate a Malibu Creek Watershed committee and facilitate regularly scheduled meeting. (once a month or once in two months). Encourage participation from the Malibu Colony Home owners group and local businesses that are located within the floodplain.
- Discourage any construction activities within the floodplain area including any interim activities
- Prepare specific ordinance for the properties within the floodplain area to use Best Management Practices to improve the water quality
- Maintain and upgrade the sump pumps within the Colony area
- Maintain the local storm drain system
- Add the maintenance fee for the storm drain system in the Association fee within the Malibu Colony area
- Create a section under City's web page about the Malibu Creek watershed management
- Adopt set of requirements for detention basin along with the water quality control for developments within the Malibu Watershed especially near the Civic Center areas.

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2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Consider offer for relocation and elevating the buildings in V zones

3. Natural resource protection activities

- Prevent scour, debris and sediment loading from the upstream end of Malibu Creek

4. Emergency services activities

- Consider a telemetry system at the stream gauge station in relation to the depth of flow at the upstream end to provide flood warning and the quantity of runoff. Connect the telemetry system to the City hall and the maintenance personnel for evacuation. Post the related quantity of runoff in the Internet under City's web page.

5. Structural projects activities

- Consider construction of a structural levee south of the Malibu Colony Drive along the Creek. Disturbance to the environment need to be considered also.
- Remove the sand dune in the lagoon during a major storm event with early warning system to prevent backup of Malibu Creek
- Consider schedule periodic removal of sand dune.
- Construct a flap gate for the 13.5' W X 5.5'H RCB outlet in to Malibu Creek to prevent "bubbling" of Malibu Creek in to the Civic Center area.
- Perform a detailed design study for detention basin and year around wetland creek improvement near the Civic center. Expand the master plan concept study.
- Add a new storm drain system with inlets in Malibu Road to eliminate ponding and flow diversion in to Malibu Colony Road.
- Secure easement along the side yard of 23736 Malibu Colony Road for the new storm drain
- Re-profile Malibu Road to eliminate the flat slope and low points along with new rolled curb and gutter
- Upgrade the sump pump and storm drain within the gated community area of Malibu Colony

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- Request the property owners to reroute the roof drains to the back of the buildings
- Consider new storm drain in Malibu Colony Drive to drain towards the south end of the street in to the ocean.(easement along the sidyard will not be needed)
- Create a "V" gutter and change the street cross slope for Malibu Colony Drive to keep the runoff flowing in the garages
- Consider upgrading of the existing storm drain in Web Way
- Replace the existing grate inlet and storm drain with larger sizes within Colony
- Consider rolled curb to keep the Malibu Road runoff away from the garage level

6. Public Information activities

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Hazard Mitigation Plan – DRAFT 1

Area Winter Canyon

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Provide maintenance of the existing inlets, 18" and 24" storm drains north of 23936 Malibu Road.
- Increase the "n" value with additional landscaping and planting within the watershed.

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

4. Emergency services activities

5. Structural projects activities

- Extend the 60" storm drain system across Malibu Road and add inlets north of 23936 Malibu Road
- Construct rolled curb and gutter along the east of Malibu Road to keep the runoff within street
- Request the property owners to reroute the roof drains to the back of the buildings

6. Public information activities

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- Provide storm drain system at 21056 to 21070 PCH
- Consider rolled curb to keep the PCH runoff away from the garage level
- Reroute the roof drain to the back of the building.

6. Public information activities



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Hazard Mitigation Plan – DRAFT 1

Area I

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Provide maintenance of the inlets, 18" storm drain at 24246 Malibu Road and 48" storm drain at 24320 Malibu Road.
- Increase the "n" value with additional landscaping and planting within the watershed.

2. Property protection activities

- Provide flood proofing and secondary outlets through the garages

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

4. Emergency services activities

5. Structural projects activities

In general the street level is higher than the garage level and there is no gutter to contain the street runoff. Most of the local inlets are owned by the property owners. Storm drain systems with inlets, 18" storm drain and 48" storm drain pick up flows.

- Add additional inlets to the storm drain system and replace the existing inlets with larger inlets.
- Encourage local property owners to enlarge the grate inlets and replace the existing 4" and 8" storm drains with larger size pipes.
- Construct rolled curb and gutter along the east of Malibu Road to keep the runoff within street
- Existing system is inadequate to carry the bulked flows. Remove and replace all the existing 12" storm drains and inlets with larger sizes.
- Remove and replace the existing corroded 12" CMP at 24460 Malibu Road.

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Area MARIE CYN

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Prevent Marie Canyon Creek Spillover flows from 6' H X 10'W RCB across Malibu Road
- Increase the "n" value with additional landscaping and planting within the area west of Malibu Road.
- Clean and maintain the 6'H X 10'W RCB outlet at the ocean

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages

3. Natural resource protection activities

- Prevent erosion control and slope protection at the downstream of the Arch Culvert at PCH

4. Emergency services activities

5. Structural projects activities

The flooding at 24608 Malibu road is due to the spill over from 6' H X 10'W RCB and inlet located at 24604 Malibu Road. The RCB outlet has plugged conditions at the ocean.

- Add a relief drain to the existing 6' H X 10'W RCB to provide additional capacity.
- Encourage local property owners to enlarge the inlet at 24604 Malibu Road.
- Construct rolled curb and gutter along the east of Malibu Road to keep the runoff within street
- Request the property owners to reroute the roof drains to the back of the buildings

6. Public information activities

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Area PUERCO CYN

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Increase the "n" value with additional landscaping and planting within the area east of PCH and west of Malibu Road. Runoff from the large lots could be reduced considerably to prevent local flooding in Malibu Road.
- Clean and maintain the numerous private drains west of Malibu road.
- Clean and maintain numerous drains that drain across Malibu Road in to the ocean.

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Elevate or relocate the repetitive loss buildings in V zone at 25154 Malibu Road

3. Natural resource protection activities

- Prevent erosion control and slope protection along the westerly side of Malibu Road.

4. Emergency services activities

5. Structural projects activities

There are numerous small 18" drains at the westerly side of Malibu Road from the large private lots. These drains discharge in to the street. There are only few storm drains that pick up these flow and drain across Malibu Road in to the ocean. Hence, there is surface overflow across the street. Malibu Road has very minimum to zero cross fall at these locations. Along the easterly side of the street, the runoff spills over the inlets and floods the adjacent property.

- Construct additional inlets and storm drain system along easterly side of Malibu Road to capture the flows from the private drains.
- Encourage local property owners to enlarge the local inlets and 4" drains especially at 24712 Malibu Road.

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- Remove and replace the existing inlets and 18" storm drain with larger size at 25154 Malibu Road
- Construct rolled curb and gutter along the east of Malibu Road to keep the runoff within street
- Re-profile Malibu Road to create cross fall and prevent spillover across the Road
- Construct a natural swale along the westerly side of the Malibu Road without creating any public driving hazard. This will increase the depth of low at inlets and will increase the capacity of inlets.
- Request the property owners to reroute the roof drains to the back of the buildings

6. Public information activities

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Area J

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Increase the “n” value with additional landscaping and planting within the area east of PCH and west of Malibu Road. Runoff from the large lots could be reduced considerably to prevent local flooding in Malibu Road.
- Clean and remove the silt in order to maintain the private drain at 25438 Malibu road that drains in to the ocean.

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Elevate or relocate the repetitive loss buildings in V zone at 25342 Malibu Road

3. Natural resource protection activities

- Prevent erosion control and slope protection along the westerly side of Malibu Road.

4. Emergency services activities

5. Structural projects activities

There are numerous small 18” drains at the westerly side of Malibu Road from the large private lots. These drains discharge in to the street. There are only few storm drains that pick up these flow and drain across Malibu Road in to the ocean. Hence, there is a potential for surface overflow across the street. Malibu Road has very minimum to zero cross fall at these locations. Along the easterly side of the street, the runoff spills over at the inlets and floods the adjacent property.

- Construct additional inlets and storm drain system along easterly side of Malibu Road to capture the flows from the private drains.
- Encourage local property owners to enlarge the local inlets and 6” drains especially at 25438 Malibu Road.
- Remove and replace the existing inlets and 18” storm drain with larger sizes

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- Construct rolled curb and gutter along the east of Malibu Road to keep the runoff within street
- Re-profile Malibu Road to create cross fall and prevent spillover across the Road
- Construct a natural swale along the westerly side of the Malibu Road without creating any public driving hazard. This will increase the depth of low at inlets and will increase the capacity of inlets.
- Request the property owners to reroute the roof drains to the back of the buildings

6. Public information activities

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Area K

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Increase the "n" value with additional landscaping and planting within the area east of PCH and west of Malibu Cove Colony Drive. Runoff from the large lots could be reduced considerably to prevent local flooding in Malibu Cove Colony Drive.
- Clean and remove the silt in order to maintain the storm drains that drain in to the ocean.

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Elevate or relocate the building in V zone at 27012 Malibu Cove Colony Drive

3. Natural resource protection activities

- Prevent erosion control and slope protection along the westerly side of Malibu Cove Colony Drive

4. Emergency services activities

5. Structural projects activities

Malibu Cove Colony Drive is relatively very flat. There are limited number of existing small drains lines 1 through 6 that drains from the westerly side of Malibu Cove Colony Drive in the ocean. There are no inlets along the easterly side of Malibu Cove Colony Drive.

- Construct a storm drain system across Malibu Cove Colony Drive to pick up the flows from the 10' X 10' culvert outlet located west of the Malibu Cove Colony Drive at 26642 Latigo Shore Drive.
- Construct additional inlets and storm drain system to capture the flows from the westerly side of Malibu Cove Colony Drive.
- Replace the existing 12" grate inlets at low points and storm drain at 27002 Malibu Cove Colony Drive.
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- Remove and replace the inlets and storm drain lines 4, 5 and 6 with larger sizes
- Re-profile Malibu Road to create cross fall and prevent spillover across the Road
- Construct rolled curb and gutter along the east of Malibu Road to keep the runoff within street
- Request the property owners to reroute the roof drains to the back of the buildings

6. Public information activities

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Area L

SPECIFIC AREA **MITIGATION ACTIVITIES**

1. Preventive activities

- Increase the "n" value with additional landscaping and planting within the gated community area
- Clean and remove the silt in order to maintain the storm drain at the ocean outlet

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages

3. Natural resource protection activities

- Prevent erosion control and slope protection along the side slopes of the access road

4. Emergency services activities

5. Structural projects activities

Runoff from the V gutter exceeds the V gutter capacity and cascades along the side before reaching the curb opening catch basin. In addition, at the catch basin, there is no local depression to build up depth. Runoff cascades to the driveway along the side and floods the property. The original design was not done correctly for the quantity of discharge.

- Raise the profile of the Sea Lane at PCH to prevent PCH runoff spillover in to Sea Lane.
- Redesign the storm drain system at the inlet. Revise the grade at inlet and add grate inlets before the the curb opening catch basin.
- Reduce the velocity of the flow across the street
- Remove and replace the inlets and storm drain line with larger sizes

6. Public Information activities

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Area Remirez Cyn

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Clean and remove the silt in order to maintain the two existing CMP storm drain at the ocean outlet. One large 72" CMP outlet is fully plugged at the outlet. The other outlet is partially open.

2. Property protection activities

3. Natural resource protection activities

4. Emergency services activities

5. Structural projects activities

The two pipe capacities at the outlet in to the ocean are inadequate.

- Replace the two CMPs with one large arch culvert or RCB at ocean outlet
- Schedule a regular maintenance at the outlet to remove sand buildup.

6. Public information activities

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Area M

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

2. Property protection activities

- Review the local drainage system within the large lot

3. Natural resource protection activities

4. Emergency services activities

5. Structural projects activities

There is an existing asphalt berm 6" high along the frontage of the property. Property has two unpaved entrances. Street has very mild cross slope. There is no drainage system at the end of the cul-de-sac of Greenwater Road. Street flow could top the berm for larger storms.

- Re-profile the property entrance to keep off the street runoff.
- Add local drainage within the lot if needed (private)
- Consider a storm drain system at the end of the Cul-de-sac

6. Public information activities

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Area ZUMA CYN

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Clean and remove the silt in order to maintain the on site local storm drain
- Remove the flap gate and attach a down drain system at the outlet in the alley for the property at 29221 Heathercliff Road.

2. Property protection activities

- Provide flood proofing and secondary outlets

3. Natural resource protection activities

4. Emergency services activities

5. Structural projects activities

Runoff in the street is generated by small local area. Heathercliff Road has steep longitudinal slope and standard cross slope. The property at 29221 Heathercliff Road is a condominium complex. Driveway highpoint is along the property line at the street and the driveway drops to 4-5' feet at the entrance gate from the street level. Pedestrian access is the same way. The street highpoint is located at the "T" intersection of Wandermere. Street has considerable capacity due to the steep slope. The complex is landlocked and no secondary outlet due to the perimeter wall.

- Remove and replace the existing onsite inlets and storm drain line with larger sizes at the property 29221 Heathercliff Road. (private)
- Construct a drainage system with long grate inlets in front of the gate at the property 29221 Heathercliff Road. (private)
- Construct an opening in the perimeter screen wall for secondary flows at the property 29221 Heathercliff Road. (private)

6. Public information activities

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Area O

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Increase the "n" value with additional landscaping and planting within the Steep Hills Canyon Watershed , Trancas Canyon Watershed and Area O.
- Prevent spillover from the Trancas Canyon Creek at PCH
- Prevent spillover from Trancas Canyon Creek at Principal Drive
- Prevent spillover from Steep Hills Canyon at PCH

2. Property protection activities

- Provide flood proofing with secondary outlets through the garages
- Elevate the repetitive loss buildings in V zone at 30962 Broad Beach Road.

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation.

4. Emergency services activities

5. Structural projects activities

Within Broad Beach Drive, there are three low points. There is only one inlet along the easterly side of Broad Beach at one low point. The existing inlet and 8" connector pipes are under capacity to drain the street runoff. The runoff from Trancas Canyon Road could cross PCH and traverse in to Broad Beach Road. At 31400 Broad Beach Road, there is an existing 18" storm drain that is designated to carry 709 cfs for 50 year frequency storm. The existing storm drain capacity is inadequate to drain the quantity of flow. At the outlet, the pipe is enlarged into 4.75' X 4.75' RCB. This "bottleneck" across PCH and Broad Beach Drive need to be removed. Due to this "bottleneck" runoff spills over at Broad Beach Drive and traverses south to the low point.

- Replace existing grate inlets and storm drains with larger system at 30804 Broad Beach Drive.
- Replace existing grate inlets and 3" storm drain with larger system at 31220 Broad Beach Drive. (Garage level lower than the top of inlet)

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Area P

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Prevent spillover from the Steep Hills Canyon storm drain “bottleneck”
- Prevent spillover from Encinal Canyon at PCH

2. Property protection activities

- Provide flood proofing with secondary outlets through the garage at 31450 Broad Beach Road

3. Natural resource protection activities

4. Emergency services activities

5. Structural projects activities

At 31430 Broad Beach Road, there is an existing 18” storm drain that is designated to carry 709 cfs for 50 year frequency storm. The existing storm drain capacity is inadequate to drain the quantity of flow. At the outlet, the pipe is enlarged into 4.75’ X 4.75’ RCB. This “bottle neck across PCH and Broad Beach Drive need to be removed. Due to this “bottleneck” runoff spills over at Broad Beach Drive and traverses south to the low point in area O.

- Replace the existing catch basin and 8” connector pipe with large storm drain system north of 31611 PCH to reduce the depth of flow in PCH.
- Construct a storm drain system at 31450 Broad Beach Drive.
- Replace existing 6’ X 6’ culvert across PCH which is under capacity to drain 3,090 cfs for 50 year storm. This will avoid the spill over along the westerly side of PCH at Encinal Canyon.
- Remove the existing “bottleneck” Steep Hills Canyon 18” SD and replace it with larger size at 31430 Broad Beach Road. Remove the existing connector pipes and replace with larger size.

6. Public information activities

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- Replace the existing catch basins and 8" connector pipes with large storm drain system along PCH
- Remove the "bottleneck" (8" connector pipes) and replace with large connector pipes. Construct a storm drain 30" SD westerly of PCH to easterly of Broad Beach Drive. Connect the inlet connector pipe in to the proposed 30" SD at 31034 Broad Beach Drive.
- Replace existing grate inlets and 3" storm drain with larger system at 30962 Broad Beach Drive. (Garage level lower than the top of inlet)
- Remove the existing "bottleneck" (24" d/s end 30" up/s end)at this low point 31310 Broad Beach Road. Replace with larger storm drain system at the downstream end easterly of Broad Beach Road. Replace the existing 10" catch basin connector pipes with larger pipes. Construct inlets east of Broad Beach Road between 31302 and 31310 Broad Beach Road.
- Remove the existing "bottleneck" Steep Hills Canyon 18" SD and replace it with larger size at 31400 Broad Beach Road. Remove the existing connector pipes and replace with larger size.
- Construct a storm drain system at 31372 Broad Beach Road with the at the low points

6. Public Information activities

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Area Q

SPECIFIC AREA MITIGATION ACTIVITIES

1. Preventive activities

- Increase the "n" value with additional landscaping and planting within the Encinal Canyon Watershed and Area Q.
- Prevent spillover from the PCH

2. Property protection activities

- Provide flood proofing and with outlets through the garage at 31974 PCH

3. Natural resource protection activities

- Prevent Bluff erosion by slope stabilizing with vegetation along the westerly side of PCH.

4. Emergency services activities

5. Structural projects activities

The existing inadequate 8" connector pipes in PCH located north of 31974 PCH are under capacity to drain the PCH runoff. There is a 6" AC berm along PCH in the frontage of this property. The driveway slopes up to 6" at the gate location and slopes down from the gate towards the house. The depth of flow could exceed 6" in PCH and runoff could spill over in the property.

- Replace the existing catch basin and 8" connector pipe with large storm drain system north of 31974 PCH to reduce the depth of flow in PCH.
- Re-profile the access road at 31974 PCH to the gate to higher elevation at gate to keep off the PCH runoff. (private)

6. Public information activities

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APPENDIX F.

STEERING COMMITTEE/FOCUS GROUP HAZARD RATING SURVEY

Hazard Rating Survey Please circle the answer you feel is best suited based on your knowledge and experience with the city

1. EARTHQUAKE

Probability

unlikely
possible
likely
highly likely

Magnitude/ Severity

negligible
limited
critical
catastrophic

Warning Time

24 + hours
12-24 hours
6-12 hours
Less than hours

Duration

Less than 6 hours
Less than one day
Less than one week
More than one week

2. WILDFIRE

Probability

unlikely
possible
likely
highly likely

Magnitude/ Severity

negligible
limited
critical
catastrophic

Warning Time

24 + hours
12-24 hours
6-12 hours
Less than hours

Duration

Less than 6 hours
Less than one day
Less than one week
More than one week

3. TERRORISM

Probability

unlikely
possible
likely
highly likely

Magnitude/ Severity

negligible
limited
critical
catastrophic

Warning Time

24 + hours
12-24 hours
6-12 hours
Less than hours

Duration

Less than 6 hours
Less than one day
Less than one week
More than one week