



HAZARD MITIGATION PLAN 2010



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EXECUTIVE SUMMARY

The City of Santa Clarita Hazard Mitigation Plan (Plan) is a document containing resources and information to assist City residents, public and private sector organizations, and others who are interested in planning for the occurrence of natural and man-made hazards. The Plan provides a list of activities that may assist the City of Santa Clarita in reducing risk and preventing loss from future natural and man-made hazard events. The action items address multi-hazard issues, as well as activities for earthquakes, floods, hazardous materials, landslides and earth movement, severe weather, and wild fires.

The original 2004 Plan was prepared by the Hazard Mitigation Plan Steering Committee (HMPSC) composed of representatives from a range of City Departments. The 2010 update was completed using a similar process, with a Planning Committee that included representatives from several departments, and a Stakeholders group. Specifics of the process are discussed in the sections below.

Organization of the Plan

The Plan contains an updated five-year action plan matrix, background on the purpose and methodology used to develop the Plan, an updated profile of the City of Santa Clarita, sections on six natural and man-made hazards that occur within the City, and a number of appendices. All of the sections are described in detail in Section 1, the Plan introduction.

Development of the Plan

The City of Santa Clarita's Hazard Mitigation Plan is the result of a collaborative effort between City of Santa Clarita staff and citizens, public agencies, non-profit organizations, the private sector, and regional and state organizations. Public participation played a key role in development of goals and action items. Interviews were conducted with stakeholders across the City, and two public workshops were held to include City of Santa Clarita residents in plan development. A Hazard Mitigation Plan Development Committee comprised of City staff was tasked with leading the project to completion. This group identified a project Steering Committee, to assist with guiding the process of updating the plan.

The Steering Committee was comprised of representatives from the following organizations:

- The City of Santa Clarita, Department of Administrative Services
- The City of Santa Clarita, Office of the City Manager
- The City of Santa Clarita, Department of Public Works
- The City of Santa Clarita Department of Parks, Recreation and Community Services
- The City of Santa Clarita Department of Community Development
- The Los Angeles County Sheriff's Department
- The Los Angeles County Fire Department
- The Los Angeles County Department of Public Works
- The Sanitation Districts of Los Angeles County
- Saugus Union School District
- Newhall School District
- Sulphur Springs School District

William S. Hart School District
Castaic School District
The Gas Company
Southern California Edison
Henry Mayo Newhall Memorial Hospital
National Weather Service
Santa Clarita Senior Center
California Highway Patrol
California Department of Transportation (Cal-Trans)
Castaic Lake Water Agency
Santa Monica Mountains Conservancy
Building Industry Association of Southern California
Santa Clarita Valley Chamber of Commerce

In addition to directing the Plan's update on a broad level, a sub-committee of the Steering Committee was formed. The sub-committee, the Planning Committee, was comprised of a group of staff from the City of Santa Clarita representing each department within the City. This group participated in public meetings, and also provided assistance on specific areas of plan development.

Mission Statement

The mission statement of the City of Santa Clarita Hazard Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural and man-made hazards. This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the City towards building a safer, more sustainable community.

Goals of the Plan

The Plan goals describe the overall direction that the City of Santa Clarita agencies, organizations, and citizens can take to work toward mitigating risk from natural and man-made hazards. The goals are stepping-stones between the broad direction of the mission statement and the specific recommendations outlined in the action items.

Protect Life and Property

- Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural and man-made hazards.
- Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.
- Improve hazard assessment information to make recommendations for discouraging new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural and man-made hazards.

Public Awareness

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

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

Natural Systems

- Balance natural resource management, and land use planning with natural hazard mitigation to protect life, property, and the environment.
- Preserve, rehabilitate, and enhance natural systems to serve natural hazard mitigation functions.

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 Services

- Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.
- Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.
- Coordinate and integrate hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

Organization of the Action Items

The action items are a listing of activities in which City agencies and citizens can take to reduce risk.

The action items are organized within the following matrix, which lists all of the multi-hazard and hazard-specific action items included in the mitigation plan. Data collection and research and the public participation process resulted in the development of these actions. The matrix includes the following information for each action item:

Priority of Action Item - The Planning Committee prioritized the potential mitigation activities for each hazard of concern and ranked each as either “high,” “medium,” or “low” priority. The Plan goals including Protect Life and Property, Promote Public Awareness, Augment Emergency Services, Enhance Natural Systems, and Encourage Partnerships and Implementation were considered during each phase of the mitigation planning process. As the mitigation action items were developed, the Planning Committee identified which plan goals were addressed by each action item and then ranked the Plan goals to determine the priorities for the City of Santa Clarita. Each goal was given a score of one point to five points, with five points going to the highest priority. The prioritized plan goals are as follows:

- 5 Points: Protect Life and Property
- 4 Points: Enhance Natural Systems
- 3 Points: Augment Emergency Services

2 Points: Partnerships and Implementation

1 Point: Public Awareness

The points for the plan goals were then totaled for each action item. The following scores reflect the High, Moderate and Low rating:

0-5 Low/None

5-10 Moderate

10-15 High

Coordinating Organization. The coordinating organization is the public agency with regulatory responsibility to address natural and man-made hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of or responsible for implementing activities and programs.

Time Line. Action items include both short and long-term activities. Each action item includes an estimate of the time line for implementation. Short-term action items are activities which City agencies are capable of implementing with existing resources and authorities within one to two years. Long-term action items may require new or additional resources or authorities, and may take between one and five years (or more) to implement.

Plan Goals Addressed. The plan goals addressed by each action item are included as a way to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins. The plan goals are organized into the five areas detailed at length above. The five plan goals are:

- Protect Life and Property
- Public Awareness
- Natural Systems
- Partnerships and Implementation
- Emergency Services

Plan Implementation, Monitoring, and Evaluation

The Plan Maintenance Section of this document details the formal process which will ensure that the City of Santa Clarita's Hazard Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan revision every five years. This section describes how the City will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how City of Santa Clarita government intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms such as the City's General Plan, Capital Improvement Projects, and Building and Safety Codes.

Plan Adoption

Adoption of the Hazard Mitigation Plan by the local jurisdiction's governing body is one of the

prime requirements for approval of the plan. Once the plan is completed, the City Council will be responsible for adopting the City of Santa Clarita's Hazard Mitigation Plan. The local agency governing body has the responsibility and authority to promote sound public policy regarding natural and man-made hazards. The City Council will periodically need to re-adopt the plan as it is revised to meet changes in the natural and man-made hazard risks and exposures in the community. The approved Hazard Mitigation Plan will be significant in the future growth and development of the community.

Coordinating Body

A City of Santa Clarita Hazard Mitigation Steering Committee will be responsible for coordinating implementation of Plan action items and undertaking the formal review process. The City Council or their designee will assign representatives from City agencies, including, but not limited to, the current Hazard Mitigation Steering Committee members.

Convener

The City Council will adopt the City of Santa Clarita's Hazard Mitigation Plan, and the Hazard Mitigation Steering Committee will take responsibility for plan implementation. The designee of the City Council will serve as a convener to facilitate the Hazard Mitigation Steering Committee meetings, and will assign tasks such as updating and presenting the Plan to the members of the committee. Plan implementation and evaluation will be a shared responsibility among all of the Hazard Steering Committee Members.

Implementation through Existing Programs

The City of Santa Clarita addresses statewide planning goals and legislative requirements through its General Plan, Capital Improvement Projects, and City Building & Safety Codes. The Hazard Mitigation Plan provides recommendations that are closely related to the goals and objectives of these existing planning programs. The City will have the opportunity to implement recommended mitigation action items through existing programs and procedures.

Economic Analysis of Mitigation Projects

The Federal Emergency Management Agency's approach to identify costs and benefits associated with natural and man-made hazard mitigation strategies or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural and man-made hazards can provide decision makers with an understanding of the potential benefits and costs of an activity, and a means to compare alternative projects.

Formal Review Process

The Hazard Mitigation Plan is a living document that reflects ongoing hazard mitigation activities and requires monitoring, evaluating, and updating to ensure the mitigation actions are implemented. To facilitate the City of Santa Clarita's Hazard Mitigation Planning process and adhere to regulatory requirements, the plan will be reviewed annually and any revisions will be incorporated into the five-year update. In addition, public involvement will be requested when applicable.

Continued Public Involvement

The City of Santa Clarita 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 City Hall and on line at www.santa-clarita.com. The existence and location of these copies will be advertised to the public in a manner consistent with City policy. The plan also includes the address and the phone number of the department responsible for keeping track of public comments on the Plan. In addition, copies of the Plan and any proposed changes will be posted on the City website. This site will also contain an e-mail address and phone number to which people can direct their comments and concerns.

ACKNOWLEDGEMENTS

The City of Santa Clarita would like to acknowledge the following City staff members for their hard work on the Hazard Mitigation Plan Development Committee and the creation of Santa Clarita's Hazard Mitigation Plan. Without their tireless efforts, the preparation of this document would not have been possible.

Mike Ascione, Assistant Planner, Community Development
Ruben Barrera, City Building Official, Public Works
Patrick Bryant, Administrative Analyst, City Manager's Office
Eric Boldt, Warning Coordination Meteorologist, National Weather Service
Anthony Calderon, GIS Tech, Administrative Services
Christina Clark, Risk Administrator, Risk Administration
Stephanie English, Community Services Representative, Los Angeles County Fire Department
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Kris Markarian, Senior Engineer, Public Works
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Donna Nuzzi, Emergency Services Supervisor, Parks, Recreation, and Community Services
Debbie O'Leary, Project Development Coordinator, Public Works
Bill Read, Assistant Building Official, Public Works
Robert Sartain, Urban Forestry Supervisor, Public Works
Jason Smisko, Senior Planner, Community Development
Lisa Webber, Planning Manager, Community Development

Additionally, the Plan Development Committee would like to thank the many individuals from the City staff, the public, and other agencies who shared their thoughtful insights and expertise, that assisted with the creation of this Plan.

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

EARTHQUAKES									
E1:	Identify funding sources for structural and nonstructural retrofitting of structures that are identified as seismically vulnerable.	Low	Public Works, City Manager's Office	Ongoing		X		X	
	<i>1. Provide information for property owners, small businesses, and organizations on sources of funds (loans, grants, etc..)</i>	Low							
	<i>2. Explore options for including seismic retrofitting in existing programs such as low-income housing, insurance reimbursements, and pre and post disaster repairs.</i>	Low							
E2:	Seismically retrofit city-owned facilities to meet essential and critical building codes and standards, as needed.	High	Building and Safety Division	5 years	X	X		X	X
	<i>3. Seismically retrofit City Hall (primary EOC.)</i>	High							
	<i>4. Seismically retrofit Transportation Maintenance Facility to perform as an essential facility (alternate EOC).</i>	High							
	<i>5. Seismically retrofit Sports Complex Facility to perform as a critical facility (community shelter).</i>	High							
E3:	Educate citizens about seismic risks, the potential impacts of earthquakes and opportunities for mitigation actions.	Medium	Parks and Recreation and Community Services, Community Services Division, Building and Safety Division	Ongoing	X	X			
	<i>6. Print and distribute emergency preparedness booklet.</i>	Medium							
	<i>7. Organize and hold an annual Earthquake Forum.</i>	Medium							
	<i>8. Distribute emergency preparedness information through other social media outlets.</i>	Medium							
	<i>9. Encourage residents to prepare an earthquake kit, an evacuation plan and mitigate non-structural hazards.</i>	Medium							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

EARTHQUAKES (continued)										
E4:	Encourage seismic strength evaluations of critical facilities in the City of Santa Clarita to identify vulnerabilities for mitigation of schools and universities, public infrastructure, and critical facilities to meet current seismic standards.	Medium	Building and Safety Division, local water agencies, school districts, and LA County Public Works	5 years	X					X
	10. Develop an inventory of schools, universities, and critical facilities that do not meet current seismic standards.	Medium								
	11. Encourage owners of non-retrofitted structures to upgrade them to meet seismic standards.	Medium								
	12. Encourage water providers to replace old cast iron pipes with more ductile iron, and identify partnership opportunities with other agencies for pipe replacement.	Medium								
E5:	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.	Medium	Building and Safety Division, Parks and Recreation and Community Services, Community Services Division, school districts, Chamber of Commerce, Valley Industrial Association (VIA), Building and Industry Association (BIA), and residents.	On-going	X	X				
	13. Provide information to government building and school facility managers and teachers on securing bookcases, filing cabinets, light fixtures, and other objects that can cause injuries and block exits.	Medium								
	14. Encourage facility managers, business owners, and teachers to refer to FEMA's practical guidebook: "Reducing the Risks Nonstructural Earthquake Damage."	Medium								
	15. Encourage homeowners and renters to use "Is Your Home Protected from Earthquake Disaster? A Homeowner's Guide to Earthquake Retrofit" (IBHS) for economic and efficient mitigation techniques.	Medium								

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

EARTHQUAKES (continued)

E6:	<i>Identify and require analysis and modification of structures that are vulnerable to earthquake damage: pre-cast concrete, soft-story structures, and non-ductile frame buildings.</i>	High	Building and Safety Division of Public Works Dept., FEMA, CalEMA	5 years	X	X		X	X
	<i>17. Perform a seismic retrofit analysis of Santa Clarita City Hall - the primary emergency operations center (EOC) for the Santa Clarita Valley.</i>	High							
	<i>18. Implement a program to investigate critical connections within existing buildings for unrepaired damage caused by the 1994 Northridge Earthquake. Where damage is uncovered, mandate further investigation and repairs in accordance with City Council direction.</i>	High							

FLOODS

F1:	Continue participation in programs.	High	Public Works Dept., Developers, Homeowners, and FEMA	Ongoing	X		X		X
	<i>1. Continue the participation in the National Flood Insurance Program (NFIP).</i>	High							
	<i>2. Continue in the participation of the Community Rating System (CRS). This program consists of additional "activities" which are all defined by FEMA and have points associated with each activity.</i>	High							
F:2	Lower CRS rating.	High	Public Works Dept., FEMA, Cal EMA, Insurance Services Office	Ongoing	X	X	X	X	
	<i>3. Research CRS activities to apply for credit to lower CRS rating from 9 to 8 to further educate public on flood hazards, reduce flooding potential and reduce property owners flood insurance premiums an additional 5% lower than the class 9 discount.</i>	High		(Completed)	X	X	X	X	

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

FLOODS (Continued)									
	4. <i>Research CRS activities to apply for credit to lower CRS rating from 8 to 7 to further educate public on flood hazards, reduce flooding potential and reduce property owners flood insurance premiums an additional 5% lower than the class 8 discount.</i>	High		(3 years)	X	X	X	X	
F:3	Minimize damage and hazards to development in areas subject to risk resulting from flooding conditions.	High	Public Works Dept., FEMA, Cal EMA	Ongoing	X	X	X		
	5. <i>Promote open space and recreational uses in designated flood zones.</i>	High							
	6. <i>Continued clearance of the Santa Clara River of non-native plant species that may impede flood flow.</i>	High							
	7. <i>Continue to review all permits for development in designated flood hazard areas to meet the requirements of the NFIP and reduce damages and loss of life during flooding events.</i>	High							
F:4	Update existing 30-yr old Flood Insurance Rate Maps (FIRMs) to provide most current flood data to regulate development standards.	High	City of Santa Clarita, HDR Inc., FEMA	2 Years	X	X	X		
	8. <i>Coordinate review and implementation of new Flood Insurance Study</i>	High	City of Santa Clarita, HDR Inc., FEMA	(2 years)					
	9. <i>Submit Letter Of Map Revision for storm drain improvements in downtown Newhall to reduce floodplain in affected area.</i>	High	City of Santa Clarita, HDR Inc., FEMA	(1 year)					
HAZARDOUS MATERIALS									
HM1:	Conduct a public awareness and educational campaign to raise awareness about hazardous and toxic materials.	Low	LACoFD (contract city), and Community Services Division,	Ongoing		X		X	
	1. <i>Support LACoFD's efforts to disseminate and keep current emergency information on hazardous materials. Include phone numbers for contacting the proper agencies.</i>	Low							
	2. <i>Continue to promote and update information on hazardous materials that may be found in the home and the proper antidotes for them.</i>	Low							
	3. <i>Conduct information meetings on how to "shelter-in-place for residences as well as businesses.</i>	Low							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

HAZARDOUS MATERIALS (Continued)									
HM2:	<i>Create an inventory of the sites that are contaminated with chemicals and other hazardous materials, and promote clean-up efforts.</i>	High	Tech. Svcs. Div., LACoFD, and LA Co Industrial Waste Div.	2 years	X			X	X
	4. <i>Create a hazardous materials users GIS layer for the city's hazard map.</i>	High							
LANDSLIDES									
L1:	Increase knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	High	Pub. Wks. Dept., Development Svcs. Div., Developers, and Homeowners, and local water and utility agencies.	Ongoing	X	X		X	X
	1. <i>Develop public information to emphasize risks when building on potential or historical landslide areas.</i>	High							
	2. <i>Continue to map new earth movement hazards and make information available to staff, developers, and residents so that soil types, slope percentage, drainage, or other critical factors are used to identify landslide prone areas.</i>	High							
	3. <i>Encourage design and placement of utilities outside of landslide areas to decrease the risk of service disruption.</i>	High							
L2:	Continue public education information program that includes material for residents with information on how to protect their property from landslides and debris flows.	High	Bldg. & Sfty. Div., Community Svcs. Div., Development Svcs. Div., Communications Div., and LA County Public Works	Ongoing	X	X	X		
	4. <i>Provide information on plant ground cover for slopes and building of retaining walls.</i>	High							
	5. <i>Provide information for mudflow areas, including information on building channels or deflection walls to direct the flow around buildings (be conscientious of diverting debris flow and the flow lands on a neighbor's property).</i>	High							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

LANDSLIDES (Continued)										
	6. Provide information on installation of flexible pipe fittings to avoid gas or water leaks.	High								
L3:	Review, monitor and update codes, regulations, and local ordinances.	Medium	Bldg. & Sfty. Div., Dev. Svcs. Div., Community Preservation, LA County State of Ca., and Building and Industry Association (BIA)	Ongoing	X	X				
	7. Study ordinances including Zoning, Grading, Hillside, Subdivision, etc. and make recommendations to mitigate landslide prone areas.	Medium								
	8. Review and enforce building codes for construction standards, including minimum foundation requirements, in landslide prone areas.	Medium								
	9. Review drainage control regulations to control drainage, and reduce the risk of landslides resulting from saturated soils.	Medium								
L4:	Limit activities in identified potential and historical landslide areas through regulation and public outreach.	High	Bldg. & Sfty. Div., Development Svcs. Div., Planning Svcs. Div., Developers & residents	Ongoing	X	X		X	X	
	10. Analyze existing regulations regarding development in landslide prone areas.	High								
	11. Continue the open space designation efforts. Open space designations keep landslide prone areas undeveloped.	High								
L5:	Identify and potentially improve if feasible landslide prone areas.	High	Planning Div., Dev. Svcs. Div., City Manager's Office, Landscape Maintenance District	5 years	X	X	X	X	X	
	12. Consider acquiring landslide prone property as city open-space.	High								
	13. Consider vegetation management on landslide prone property.	High								
	14. Encourage public/private partnerships that encourage homeowners to mitigate landslide potential.	High								

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

SEVERE WEATHER									
SW1:	<i>Continue to enhance participation in Southern California Edison's Independent System Operator Notification Procedure Process for Rolling Blackouts.</i>	Medium	Pub. Wks. Dept., and Southern California Edison	Ongoing		X		X	X
	<i>1. Continue to participate with Southern California Edison's notification system to inform the community of impending rolling blackouts.</i>	Medium							
SW2:	<i>Create a Public Education program regarding proper precautions against exposure to heat and potential hazards of exposure to extreme heat.</i>	Medium	Community Services Div., Environmental Services and Los Angeles County Pub. Health,	Ongoing		X		X	X
	<i>2. Partner with the Los Angeles County Department of Health Services to create and or/adopt their existing information regarding heat, how to monitor and/or adjust behavior depending on the specific heat index, and information to seek should specific ailments from exposure to heat occur.</i>	Medium							
	<i>3. Maintain and update cooling center inventory on a bi-annual schedule.</i>	Medium							
SW3:	<i>Create a Public Education program regarding proper precautions against exposure to poor air quality.</i>	Medium	Environmental Services, South Coast Air Quality Management District (AQMD), LA County Pub. Hlth., and National Weather Service	Ongoing		X		X	X
	<i>4. Partner with the Los Angeles County Department of Health Services to create and/or adopt their existing information regarding poor air quality.</i>	Medium							
	<i>5. Partner with the South Coast Air Quality Management District to develop a mechanism to notify sensitive populations within the City on days when air quality standards exceed state and federal standards.</i>	Medium							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

SEVERE WEATHER (Continued)									
SW4:	Enhance programs to keep trees from threatening lives, property, and public infrastructure during windstorm events.	Medium	Urban Forestry , Landscape Maintenance District, LA County Fire, Utilities,	Ongoing	X		X		
	6. Partner with responsible agencies and organizations to design and disseminate education information to property owners to reduce risk from tree failure to life, property, and utility systems.	Medium							
	7. Develop partnerships between utility providers and City/County local public works agencies to document known hazard areas.	Medium							
	8. Identify and track potentially hazardous trees.	Medium							
SW5:	Enhance strategies for debris management for windstorm events.	Medium	Public Works Dept.	2 years	X				X
	9. Develop coordinated management strategies for clearing debris from roads of fallen trees, and clearing debris from public and private property.	Medium							
SW6:	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Medium	Pub. Wks. Dept., Planning Div., and Southern California Edison	2 years	X				X
	10. Open a dialogue with local utility companies to increase the use of underground utilities where possible.	Medium							
	11. Participate in the Underground Utilities Program	Medium							
SW7:	Create a localized map that charts seasonal dominant wind speeds and directions.	High	Tech Svcs. Div., National Weather Service, US Forest Service, and LACoFD	5 years	X			X	X
	12. Expand Weather Spotters program for high winds and extreme weather to pinpoint areas that are hardest hit in the City	High							
	13. Coordinate with public/private weather entities to obtain weather data and create various weather maps.	High							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

WILDFIRES									
WF1:	Work with Los Angeles County Fire Department Division III, North Regional Operations Bureau (LACoFD Division III) to enhance emergency services to increase the efficiency of wildfire response and recovery activities.	Low	LACoFD Division III (contract city), Tech Svcs. Div., Communications Div., City Manager's Office, and LA County Sheriff's Department	Ongoing					X
	1. Support LACoFD Division III's efforts to install more fire stations for better access and coverage.	Low							
	2. Coordinate with LACoFD Division III and Sheriff's Department to coordinate the Public Alert and Warning Notification System to quickly contact all at-risk urban/wildland interface residents in the Santa Clarita Valley regarding evacuations. Incorporate the use of e-texting, mass notification and social media, i.e. Twitter, Facebook, My Space.	Low							
WF2:	Collaborate with LACoFD Division III in educating City staff and fire personnel on federal cost-share and grant programs, Fire Protection Agreements and other related federal programs so the full array of assistance available to local agencies is understood.	Medium	LACoFD Division III (contract city), Parks and Recreation and Community Svcs. Dept.	Ongoing	X	X			
	3. Collaborate with LACoFD to secure potential funding opportunities for individual mitigation projects.	Medium							
	4. Work with LACoFD Division III's to develop, approve, and promote Fire Protection Agreements and partnerships to clarify roles and responsibilities and to provide for fire mitigation activities and suppression preparedness.	Medium							
WF3:	Continue collaborating with LACoFD Division III's to develop and disseminate maps relating to fire hazards to help educate and assist builders and homeowners in being engaged in wildfire mitigation activities and to help guide emergency services during response.	Medium	LACoFD Division III (contract city), Tech Svcs. Div., Bldg. & Sfty Div.	On-going	X				
	5. Work with LACoFD Division III to update wildland/urban interface maps.	Medium							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

WILDFIRES (Continued)									
	6. Encourage LACoFD Division III and USDA Forest Service to continue to conduct risk analysis incorporating data and creating hazard maps using GIS technology to identify risk sites and further assist in prioritizing mitigation activities.	Medium							
WF4:	Collaborate with LACoFD Division III's to enhance outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to natural and man-made hazards.	Medium	LACoFD Division III (contract city), Community Svcs. Div., Communications Div.	On-going	X	X			
	7. Support LACoFD Division III's efforts to hire and educate fire prevention staff to oversee education programs.	Medium							
	8. Work with LACoFD Division III and USDA Forest Service to visit urban interface neighborhoods and rural areas and conduct education and outreach activities.	Medium							
	9. Work with LACoFD Division III to conduct specific community-based demonstration projects of fire prevention and mitigation in the urban interface.	Medium							
	10. Continue to work with LACoFD Division III to establish neighborhood "drive-through" activities that pinpoint site-specific mitigation activities. Fire crews can give property owners personal suggestions and assistance.	Medium							
	11. Continue to work with LACoFD Division III to organize public outreach and information activities at fire stations, such as "Wildfire Awareness Week" activities. This allows the public to visit fire stations, see the equipment, and discuss wildfire mitigation with the station crews.	Medium							
WF5:	Work with LACoFD Division III to encourage and increase communication, coordination, and collaboration between wildland/urban interface property owners, County and officials to address risks, existing mitigation measures and federal assistance programs.	High	LACoFD Division III (contract city), Community Svcs. Div., Communications Div.	On-going	X	X		X	X

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

WILDFIRES (Continued)									
	12. Continue to encourage single-family residences to have fire plans and practice evacuation routes.	High							
	13. Work with LACoFD Division III to continue performing fire inspections in residential homes to increase awareness among homeowners and potential fire responders.	High							
	14. Work with LACoFD Division III to encourage a standard for the State Fire Marshall to evaluate fire plans and emergency plans for businesses.	High							
	15. City and LACoFD Division III work closely with landowners and/or developers who choose to build in the wildland/urban interface to identify and mitigate conditions that aggravate wildland/urban interface wildfire hazards.	High							
	16. City to encourage all new homes and major remodels involving roof additions that are located in the interface to have fire resistant roofs and residential sprinkler systems.	High							
	17. Work with LACoFD Division III to encourage the public to evaluate access routes to rural homes for fire-fighting vehicles and to develop passable routes if they do not exist.	High							
WF6:	Collaborate with LACoFD Division III to encourage implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.	Low	LACoFD Division III (contract city), Community Svcs. Div., Communications Div.	Ongoing			X		
	18. Support LACoFD Division III's effort to employ mechanical thinning and prescribed burning to abate the risk of catastrophic fire and restore the more natural regime of high frequency, low-intensity burns.	Low							
	19. Support LACoFD Division III's efforts to clear trimmings, trees, brush and other debris completely from sites when performing routine maintenance and landscaping to reduce fire risk.	Low							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

WILDFIRES (Continued)

WF7	Enhance City's Urban Forestry ability to mitigate, respond to, prepare for and recover from events that impact the more than 80,000 trees in the City.	High	LACoFD Division III (contract city), Urban Forestry, Natural Resources Conservation Service, CalFire,	Ongoing	X	X	X	X	X
	20. Maintain tree program in the City which includes routine inspections and review of the tree maintenance cycle	High							
	21. Mitigate tree hazards by addressing trees that pose a public safety hazard.	High							
	22. Purchase a full-size bucket truck for tree maintenance operations to enable city staff to safely perform emergency limb removal.	High							
	23. Design and develop informational and educational brochures that relate to the hazards of dead material on palm trees and problematic trees in fire areas. Brochures would educate the public on how to keep your homes fire safe and inform them of what trees are beneficial and troublesome in high fire areas.	High							

MULTI HAZARD

MH1:	Construct/enhance major transportation infrastructure to provide the necessary additional roads and mobility.	High	Pub. Wks., Capital Improvement Projects, Dev. Svcs. Div., Metropolitan Transit Authority, LA County, Federal Highway Administration, The Gas Co., So. Ca. Edison, Developer-Bridge & Thoroughfare, and CalTrans.	2-4 years	X			X	X
	1. Complete the restriping of the Cross Valley Connector – Golden Valley segment between Centre Pointe Parkway and Sierra Highway to provide additional travel lanes	High							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

MULTI HAZARD (Continued)									
	2. Bridge Widening - Hwy 14 – Golden Valley Off/On ramp.	High							
	3. Bridge Widening – McBean Bridge	High							
	4. Consider retrofitting Cross Valley Connector.	High							
	5. Bridge Widening – Newhall Ranch Road, San Francisquito Bridge.	High							
MH2:	Implement technologies to enhance public notification and support in the event of an emergency.	High	Tech. Svcs. Div., Communications Svcs. Div., Traffic Div., Metropolitan Transportation Authority (MTA), and LA County,	Ongoing	X	X		X	X
	6. Continue replacing backup batteries for traffic lights on a rotational basis.	High							
	7. Continue replacing old traffic/light signals with LED signals.	High							
	8. Consider new technology for emergency messages.	High							
	9. Install Intelligence Transportation System Infrastructure.	High							
MH3:	Enhance School Emergency Communications Plan	Medium	Community Svcs. Div., Communications Team (Volunteers), LA County Fire Department, LA County Sheriff Department, private and public schools	On-going		X		X	X
	10. Enhance Communications Plan by incorporating private schools and child-care facilities.	Medium							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

MULTI HAZARD (Continued)									
	11. Work with First Start program to incorporate them into the Communications Plan.	Medium							
	12. Work with special needs community and groups to identify alternate modes of communications.	Medium							
	13. Participate annually in communications exercise with school districts.	Medium							
	14. Encourage schools to send annual letters to parents regarding emergency procedures.	Medium							
MH4:	Prepare the City to be self-sufficient in the event of a major emergency.	High	Community Svcs. Div., LA County Sheriff's Office, LA County Fire	Ongoing	X	X	X	X	X
	15. Promote City's C.E.R.T-Community Emergency Response Training Program and increase number of CERT trained residents and business by 20%.	High							
	16. Promote City's Emergency Expo, encouraging residents to attend and learn how to prepare for all types of emergencies.	High							
	17. Implement the emergency operations plan that includes, but is not limited to, the establishment of a volunteer pool and community partners to assist in responding to, and the provision of food and shelter to those in the valley (residents and non-residents) during the emergency.	High							
	18. Consider acquiring additional generators to back-up critical operations.	High							
	19. Consider acquiring mobile communications trailer to augment communication capabilities.	High							
MH5:	Consider establishing a permanent Department Operations Center at the Transportation Maintenance Facility for Public Works. Facility would serve as an alternate Emergency Operations Center.	High	Pub. Wks., Tech. Svcs. Div., Community Svcs. Div., Traffic Div.	2-4 years	X			X	X
	20. Assess the facility's basic physical capabilities and identify the physical requirements for a DOC., i.e. space, layout, technology, etc.	High							

Mitigation Goals and Action Items	Priority	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services

MULTI-HAZARD (continued)									
	21. Consider new design and construction to accommodate emergency functions and people.	High							
MH6:	Identify safe evacuation routes in high-risk natural disaster areas.	High	LA County Sheriff (contract city), Tech Svcs. Div., Traffic Div., California Highway Patrol, and Caltrans	Ongoing	X	X		X	X
	22. Identify potential debris removal resources.	High							
	23. Increase participation in regional committee planning for emergency transportation routes.	High							
	24. Identify and publicize information regarding emergency transportation routes.	High							
MH7:	Create a Recovery and Reconstruction Ordinance.	Medium	City Manager's Office, City Council, Public Works Dept., Building and Safety, Community Dev. Dept.	4 years	X				X
	25. Consider developing and adopting a pre-disaster ordinance for post-disaster recovery and reconstruction that includes provisions for debris clearance, damage assessment, demolitions, re-occupancy and building moratorium criteria, fee waivers and deferrals, and expedited permitting procedures for repair and reconstruction.	Medium							
MH8:	Use HAZUS to develop loss estimates from earthquakes and floods. Loss estimates include: physical damage, economic loss and social impacts	Medium	Tech Svcs. Division	2 years	X	X			X
	26. Provide HAZUS training for GIS group.	Medium							

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SECTION ONE - INTRODUCTION

Background

In its short history, the City of Santa Clarita has dealt with several natural and man-made hazards that dramatically impacted the area. These hazards have included earthquakes, floods, hazardous materials, severe weather, earth movement, and wild fires. These natural and man-made hazards adversely affected the lives of those who lived and worked in Santa Clarita, and also impacted the lives of those who lived and worked in surrounding communities. The City of Santa Clarita continues to grow, as does the area bordering Santa Clarita. As the population of the City continues to increase, the exposure to natural and man-made hazards creates an even higher risk than previously experienced.

The City of Santa Clarita is the fourth most populous City in the County of Los Angeles, 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 and man-made hazards associated with the terrain make the environment and population vulnerable to natural and man-made disaster situations.

The City is subject to earthquakes, floods, hazardous materials, landslides and earth movement, severe weather, and wild fires. It is extremely difficult to predict when these events will occur, or the extent to which they will affect the City. However, with careful planning and collaboration among public agencies, private sector organizations, not for profits, and citizens within the community, it is possible to minimize the losses that can follow these natural and man-made disasters.

The City of Santa Clarita most recently experienced large-scale destruction during the Northridge earthquake in 1994. Since 1998, the City of Santa Clarita has received approximately \$30 million in total reimbursements for disaster related expenses. Of that total, approximately \$27 million was related to damage caused by the Northridge event.

Why Develop a Hazard Mitigation Plan?

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

The Santa Clarita's Hazard Mitigation Plan provides a set of action items to reduce risk from natural and man-made hazards through education and outreach programs and to foster the development of partnerships, and implementation of preventative activities such as land use programs that restrict and control development in areas subject to damage from natural and man-made hazards.

The resources and information within the Plan:

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

This Plan works in conjunction with other City documents, including, but not limited to, the City General Plan, the Uniform Development Code, the Emergency Operations Plan, Fair Housing Element, and the Joint General Plan.

Whom Does the Plan Affect?

The City of Santa Clarita's Hazard Mitigation Plan affects entire city. This plan provides a framework for planning for natural and man-made hazards. The resources and background information in the Plan is applicable City-wide, and the goals and recommendations can lay groundwork for local mitigation plans and partnerships.

Hazard Land Use Policy in California

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

The continuing challenge faced by local officials and state government is to keep the network of local mitigation plans effective in responding to the changing conditions and needs of California's diverse communities, particularly in light of the very active seismic region in which we live. This is particularly true in the case of planning for natural hazards where communities must balance development pressures with detailed information on the nature and extent of hazards.

Planning for hazards includes the documentation of inventories, policies, and ordinances to guide development in hazard areas. These inventories should include the summary of hazards facing the community, the built environment at risk, the personal property that may be damaged by hazard events, and the people who live within the effective range of these hazards.

Support for Hazard Mitigation

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

- The California Emergency Management Agency (CalEMA) is responsible for disaster mitigation, preparedness, response, recovery, and the administration of federal funds after a major disaster declaration.

- The Southern California Earthquake Center (SCEC) gathers information about earthquakes, integrates this information on earthquake phenomena, and communicates this to end-users and the general public to increase earthquake awareness, reduce economic losses, and save lives.
- The California Division of Forestry (CDF) is responsible for all aspects of wildland fire protection on private, state, and administers forest practices regulations, including landslide mitigation, on non-federal lands.
- The California Division of Mines and Geology (DMG) is responsible for geologic hazard characterization, public education, the development of partnerships aimed at reducing risk, and exceptions (based on science-based refinement of tsunami inundation zone delineation) to state mandated tsunami zone restrictions.
- The California Division of Water Resources (DWR) plans, designs, constructs, operates, and maintains the State Water Project; regulates dams; provides flood protection and assists in emergency management. It also educates the public, serves local water needs by providing technical assistance.

Plan Methodology

Information in the Hazard Mitigation Plan is based on research from a variety of sources. Staff from the City of Santa Clarita conducted data research and analysis, facilitated steering committee meetings and public workshops, and developed the final mitigation plan. The research methods and various contributions to the plan include:

Input from the Steering Committee

The Hazard Mitigation Plan Steering Committee formally convened twice to guide development of the Mitigation Plan. The Committee played an integral role in developing the mission, goals, and action items for the mitigation plan. The Committee consisted of representatives of public and private agencies and organizations in City of Santa Clarita, and is listed in the Executive Summary.

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.
- The public must be afforded opportunities for involvement in: identifying and assessing risk, drafting a plan, and public involvement in approval stages of the plan.
- Community cooperation, with 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 Plan, the Zoning Ordinance, the Building Codes, and other pertinent documents.

The following components must be part of the planning process:

- Complete documentation of the planning process
- A detailed risk assessment on hazard exposures in the 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 City Council.
- Plan Review by both Cal EMA and FEMA

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

City of Santa Clarita staff examined existing mitigation plans from around the country, current FEMA hazard mitigation planning standards (386 series) and the State of California Natural Hazards Mitigation Plan Guidance.

Other reference materials consisted of county and city mitigation plans from other jurisdictions throughout the country, including:

Los Angeles County (California) Hazard Mitigation Plan
 State of California Multihazard Mitigation Plan, 2007
 Local Multi Hazard Mitigation Planning Guidance, FEMA, 2008

Hazard Specific Research

City of Santa Clarita staff collected data and compiled research on six hazards: earthquakes, floods, hazardous materials, severe weather, earth movement, and wild fires. Research materials came from a wide variety of federal, state and local agencies.

The City of Santa Clarita staff identified current mitigation activities, resources and programs, and potential action items from research materials and stakeholder interviews.

Public Workshops

The City of Santa Clarita staff facilitated two public workshops to gather comments and ideas from City of Santa Clarita citizens about mitigation planning and priorities for mitigation plan goals. These workshops were held on April 15, 2010 and April 29, 2010.

The resources and information cited in the mitigation plan provide a strong local perspective and help identify strategies and activities to make City of Santa Clarita more disaster resilient.

How Is the Plan Organized?

Each section of the mitigation plan provides information and resources to assist people in

understanding the City 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 natural and man-made hazard events.

The structure of the plan enables people to use a section of interest to them. It also allows City government 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 City. Decision-makers 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 hazards mitigation plan that remains current and relevant to City of Santa Clarita.

Section 1-A: Executive Summary: Five-Year Action Plan

The Five-Year Action Plan provides an overview of the mitigation plan mission, goals, and action items. The plan action items 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 natural hazard events.

Section 1: Introduction

The Introduction describes the background and purpose of developing the mitigation plan for City of Santa Clarita.

Section 2: Community Profile

This section presents the history, geography, demographics, and socioeconomics of City of Santa Clarita. It serves as a tool to provide an historical perspective of natural and man-made hazards in the City.

Section 3: Risk Assessment

This section provides information on hazard identification, vulnerability and risk associated with natural and man-made hazards in City of Santa Clarita.

Section 4: Multi-Hazard Goals and Action Items

This section provides information on the process used to develop goals and action items that cut across the six natural and man-made hazards addressed in the mitigation plan.

Sections Hazard Specific Information

Hazard-Specific information on the six chronic hazards is addressed in this 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, goals and action items, and local, state, and national resources.

The chronic hazards addressed in the Plan include:

- Section 5:** Earthquake
- Section 6:** Floods
- Section 7:** Hazardous Materials
- Section 8:** Earth Movement/Landslides
- Section 9:** Severe Weather
- Section 10:** Wild Fires

Section 11: Public Process

The section provides a chronological format on the public process development of the plan and the methodology use in the development.

Section 12: Plan Maintenance

In the plan maintenance section information on plan implementation, monitoring and evaluation are provided.

Appendix A: List of Acronyms

This appendix provides a list of acronyms for City, regional, state, and federal agencies and organizations that may be referred to within the City of Santa Clarita Hazards Mitigation Plan.

Appendix B: Glossary

This appendix provides a glossary of terms used throughout the Plan.

Appendix C: Maps

This appendix includes all maps germane to this document.

Appendix D: Public Process Documentation

This appendix provides documentation of agendas, letters, newspaper articles, press releases, public service announcements, agenda reports, the council resolution, and the data from the web-based survey.

Why Plan for Natural Hazards in City of Santa Clarita?

Natural hazards impact citizens, property, the environment, and the economy of the City of Santa Clarita. Earthquakes, floods, hazardous materials, severe weather, earth movement, and wild fires, have exposed Santa Clarita residents and businesses to the financial and emotional costs of recovering after natural disasters. The risk associated with natural hazards increases as more people move to areas affected by natural hazards.

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

Santa Clarita Geography and Environment

Located in a picturesque valley just north of Los Angeles, Santa Clarita is bold and confident in its role as a premier community for raising families and building businesses. The balance of quality living and quality growth is carefully maintained through long-term planning, fiscal responsibility, community involvement, respect for the environment and strong support for business development. Santa Clarita's successes are evident in its residential neighborhoods, recreational attractions, businesses, cultural activities, and commercial, educational and health care centers.

City of Santa Clarita has an area of 52.68¹ square miles and is located in northern Los Angeles County. At 1,200 to 1,400 feet above sea level, Santa Clarita enjoys a mild Southern California Mediterranean climate, making it ideal for business, residential, and recreational opportunities. The terrain of the city is comprised mainly of the Santa Clara River valley and surrounded by the Santa Susana and San Gabriel Mountain ranges.

History of Santa Clarita

The City of Santa Clarita is rich in history. The area comprising the City of Santa Clarita was first settled in 1769 by the Spanish. They named the wide river valley they found for Saint Clare. The river running through the valley was later named the "Little St. Clara" or "Santa Clarita". By 1804, the Spanish had established an agricultural outpost or *estancia* in the Santa Clara Valley. The first recorded discovery of gold in California occurred in Santa Clarita, six years prior to its discovery at Sutter's Mill in Sacramento. As the story goes, in 1842 Juan Francisco de Gracia Lopez was napping under a massive oak tree in Placerita Canyon, and he dreamt that he was surrounded by gold and became very rich. Upon awakening, he picked a bunch of wild onions growing nearby, and attached to the onion roots were several small pieces of gold. This

¹ City of Santa Clarita, *General Plan*, DRAFT, October 2008.

discovery greatly impacted further development, namely the Newhall pass, which was constructed for the transportation of mining supplies.

Black Gold, a substance which oozed from the ground, rarely served a purpose for the Indians. However, in 1875 the rivers of oil were diverted into the first commercially producing oil well in Pico Canyon. CSO 4, as it was called, was operated by the forerunners of the Standard Oil Company, and had the distinction of being the oldest operating oil well in the world until capped in 1990. The 1900's brought new prosperity and businesses to the Valley, some of which remain today. For example, Sterling Borax began production, and the Saugus Station Eatery was renamed the Saugus Cafe. Many businesses opened shop during this era, including general stores, post offices, and churches.

This growing community with its rich surroundings of mountains, trees, and deserts attracted Gene Autry and his western style television show. By the early 1900's, Hollywood studios were using the area's rugged canyons as locations for westerns. The new home for Melody Ranch was "Western" town, renamed and used as the set for Gene Autry's television show. A prominent Hollywood film star of the 1920's, William S. Hart left his mark on the community by building his home here and upon his death, leaving it to the County. Today it provides tourists and residents a chance to recapture the feelings of the old west and the beginnings of the western film business. Today, the movie business has become one of the leading industries in the area and an important reason for its economic growth.

By the early 20th Century Santa Clarita had become a vital outpost for traders and travelers alike. However on March 12, 1928 the Valley was flooded and nearly destroyed by the failure of the Saint Francis Dam, built by the renowned Henry Mulholland. The disaster sent a wall of water from the Santa Clarita Valley to Ventura taking the lives of 470 people as it went. The failure is the second worst disaster in California maritime history, second only to the 1906 earthquake in San Francisco.

By the year 1940, Santa Clarita's population reached 4,000. Six years later, the first high school in the William S. Hart District was dedicated. With the development of schools came the construction of tract homes, the first being Rancho Santa Clarita. In 1963, Canyon Country was founded, and the first celebration of Frontier Days took place. In answering the demands of all the new developments and residents, the Santa Clarita National Bank opened its doors in 1965. The new additions of schools, stores, and churches brought more people and more communities. The community of Valencia was dedicated in 1967, and at that time houses were selling for a mere \$25,000. Higher education opened its doors to the Valley in the late sixties and early seventies. College of the Canyons and California Institute of the Arts, which was incorporated by Walt Disney, were established and serviced the needs of this growing community. Magic Mountain opened in 1971, bringing thousands of tourists to the area, and giving the Valley a significant landmark. Today, it remains one of the largest amusement parks in the country. In 1975, Henry Mayo Newhall Memorial Hospital was founded, as well as the Santa Clarita Valley Historical Foundation, which maintains and protects the rich history of the Valley.

In the 1980's "Santa Clarita" became a common term. The eighties also brought a staggering increase in population to 81,816. In 1985 the Chamber of Commerce instituted a study on the economic feasibility of becoming an incorporated city; two years later it was approved by the voters of what is now the City of Santa Clarita. Ultimately, on December 1987, the City of Santa Clarita was formed as the second largest and the sixth most populated city within Los Angeles County. Today, it boasts the fourth largest population of cities in Los Angeles County.

Major Rivers

This section describes the drainage features, storm water quality, flooding hazards, and flood protection improvements within the city of Santa Clarita. Regulatory agencies governing storm water quality and flooding hazards are also discussed.

The Santa Clarita Valley contains many natural streams and creeks that function as storm drain channels. These streams and creeks empty into the Santa Clara River, which flows westerly into the Pacific Ocean. The Santa Clara River is the major drainage feature within the City of Santa Clarita. The river from its headwaters in the San Gabriel Mountains, to its mouth at the Pacific Ocean, drains a total area of approximately 1,634 square miles. The watershed is approximately 80 miles in length and averages about 25 miles in width. The headwaters of the Santa Clara River are typical of mountain streams in that discharge increases rapidly with rainfall events. Ninety percent of the watershed consists of mountainous terrain; the remaining portion is a mix of valley floor/floodplain and coastal plains. High intensity rainfalls, in combination with alluvial soils, sparse vegetation, erosion, and steep gradients can result in significant debris-laden flash floods. The river and its tributary streams play a major role in moving the large volume of runoff that is generated from the valley and surrounding foothills and mountains. The drainage system (both natural and County/City storm drain infrastructure) is normally adequate to handle the normal precipitation in the region. However, abnormal rainfall amounts, as in the case of the 100-year flood event, can strain the system.

Climate

Temperatures in the City of Santa Clarita average between 40 and 60 degrees Fahrenheit in the winter months to between 70 and 100 degrees Fahrenheit in the summer months. However the temperatures can vary over a wide range, particularly when the Santa Ana winds blow, bringing higher temperatures and very low humidity. Temperatures can, but rarely, exceed 110 degrees in the summer months (June - September), and rarely drop below 30 degrees in the winter months (November-March).

Average rainfall is about 17.6 inches per year in the flat areas and about 27 inches in the mountains². However, annual rainfall fluctuates from year to year as well as from site to site. For example, average rainfall for a 3-year period was 19.5 inches (1995–1998), but average long-term seasonal precipitation at Acton is 10.20 inches compared to 18.45 inches for Saugus.

Average annual unimpaired runoff within the western portion of the Planning Area is 25,000 acre-feet per year. Within the Planning Area, historical land uses have been predominantly

² City of Santa Clarita, *General Plan*, DRAFT, October 2008.

agricultural. However, since 1960 there has been a substantial increase in the urbanization of the area. Changes in land use types, particularly the conversion of agricultural land to urbanized areas, have altered historical drainage patterns. Increases in impervious areas, (e.g., paved areas, parking lots, building roofs) contribute to increased runoff and potential drainage problems. Recognition of the potential runoff and flooding implications of this urbanization has led to the incorporation of runoff controls and regulations, as well as improvements in the storm water drainage systems. Flood control channels, debris basins, and channel cleaning and runoff control systems have all been implemented to control the increasing amount of storm water runoff, and maintain safe drainage patterns.

Minerals and Soils

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

The City of Santa Clarita consists mainly of two different soil series: Cienba and Pico.

Cienba is characterized by very shallow to shallow soils that are somewhat excessively drained. Formed in material weathered from granitic rock, these soils are located at elevations between 500 and 4,000 feet. Generally this soil series exhibits low to medium runoff characteristics along with moderately rapid permeability.

The Pico series consists of deep, well drained soils that formed in alluvium from primarily sedimentary rocks. Pico soils are found on floodplains and alluvial fans at an elevation of between 10 and 1,500 feet. Most of the soils directly surrounding the Santa Clara River are of the Pico series. These soils tend to exhibit slow to medium runoff, and moderately rapid permeability.

Other Significant Geologic Features

The City of Santa Clarita, like most of the Los Angeles Basin, lies over the area of one or more known earthquake faults, and potentially many more unknown faults, particularly so-called lateral or blind thrust faults. In addition to fault activity, the City of Santa Clarita is subject to liquefaction and landslides.

The major faults that have the potential to affect the greater Los Angeles Basin, and therefore the City of Santa Clarita are the San Andreas, San Fernando, San Gabriel, Holser, Santa Susana, Oak Ridge, Clearwater, Soledad, Northridge Hills, San Francisquito, Pelona and the Sierra Madre³.

The Los Angeles Basin has a history of powerful and relatively frequent earthquakes, dating back to the powerful 8.0+ San Andreas earthquake of 1857 which did substantial damage to the relatively few buildings that existed at the time. Pale seismological research indicates that large

³ City of Santa Clarita, *Safety Element*, DRAFT, October 2008.

(8.0+) earthquakes occur on the San Andreas fault at intervals between 45 and 332 years with an average interval of 140 years⁴. Other lesser faults have also caused very damaging earthquakes since 1857. Notable earthquakes include the Long Beach earthquake of 1933, the San Fernando Earthquake of 1971, the 1987 Whittier Earthquake and the 1994 Northridge earthquake.

Since 1855, eighteen separate seismic events have affected the Santa Clarita Valley, the most dramatic of the recent events being the Northridge event in 1994. This event was rated at a magnitude 6.7 with an epicenter located approximately thirteen miles south of the Santa Clarita Valley.

An Alquist-Priolo Special Study Zone exists within the City of Santa Clarita covering the area of the San Gabriel Fault.

Liquefaction refers to a phenomenon where the surface soils, generally alluvial in nature, become saturated with water. Ground shaking packs the sand grains closer together so that there is less space available for the water. These soils become very wet and mobile causing foundations of structures to move leading to a variety of potential structural damage.

Generally, liquefaction occurs only below the water table. However, after it has become established, liquefaction can migrate upward toward the surface level.

The San Andreas and San Gabriel Faults are both causative sources for strong ground movement and liquefaction. The most susceptible areas within the City to liquefaction are within the river channels and flood deposits, such as the Santa Clara River channel.

Landslides are often associated with earthquakes, although there are other factors that may influence landslides. The factors that can lead to landslides include the slope, moisture content of the soil, and the composition of the soils and subsurface geology. Heavy rain and improper grading as well as earthquakes can all trigger landslides given the proper conditions. Much of the City of Santa Clarita includes hills and mountainous terrain. As a result there are a number of areas where landslides may occur.

Specifically, the hills and mountains within the City consist of steep slopes and eroded hillsides of clays and shales. Shales are extremely susceptible to pervasive fracturing which weakens slopes. Grading, ground movement, and rainfall can cause these slopes to fail. Moreover, clays are considered to be expansive soils. When expansive soils are saturated, they can lose their cohesiveness and fail.

There is some potential for subsidence within the City. Subsidence can occur as a result of excessive ground water or petroleum withdrawal which results in a sinking of the ground

⁴ Peacock, Simon M.,
<http://aamc.geo.lsa.umich.edu/eduQuakes/EQpredLab/EQprediction.peacock.html>

surface. This can be particularly common in areas of high alluvial soils. However, no large-scale local subsidence has occurred within the City.

Population and Demographics

According to the California Department of Finance (DOF), the population of Santa Clarita in January of 2007 was 177,158, an increase of 17.9% over the population in 2000. The City of Santa Clarita currently contains an area of 52.68 square miles. The population of City of Santa Clarita has steadily increased from the mid 1800's through 2000, and increased approximately 35% from 1990 to 2000 according to the 2000 Census. Notably this is the third fastest growth rate of the over eighty cities in Los Angeles County.

Population growth is expected to continue in Santa Clarita. Southern California Association of Governments (SCAG) estimates the population of Santa Clarita to reach 211,367 persons by 2020. This represents a population growth of approximately 19.3 percent between 2007 and 2020 under SCAG projections, and represents approximately a 1.5 percent annual growth rate, which is less than the 2004 SCAG projections.⁵

The Figure 2.1 ranks the City of Santa Clarita in various areas of size and growth versus the eighty-eight other Cities in Los Angeles County.

Figure 2.1: Population Size and Growth Rankings City of Santa Clarita Compared to 88 Cities in Los Angeles County		
Population	177,158	4 th in L.A. County
Population Growth (number) From 2000 to 2007	26,070	3 rd in L.A. County
Population Growth (percentage) From 2000 to 2007	2.5%	4 th in L.A. County

The increase of people living in City of Santa Clarita creates more community exposure, and changes how agencies prepare for and respond to natural hazards. For example, more people living on the urban fringe can increase risk of fire. Wildfire has an increased chance of starting due to human activities in the urban/rural interface, and has the potential to injure more people and cause more property damage. But an Urban/wildland fire is not the only exposure to the city of Santa Clarita. In the 1987 publication, Fire Following Earthquake issued by the All Industry Research Advisory Council, Charles Scawthorn explains how a post-earthquake urban conflagration would develop. The conflagration would be started by fires resulting from earthquake damage, but made much worse by the loss of pressure in the fire mains, caused by

⁵ Southern California Association of Governments, *2004 Regional Transportation Plan* growth forecasts, City Projections, adopted April 2004. Available at <http://www.scag.ca.gov/forecast/downloads/2004GF.xls> (Accessed August 21, 2008).

either lack of electricity to power water pumps, and /or loss of water pressure resulting from broken fire mains.

Furthermore, increased density can affect risk. For example, narrower streets are more difficult for emergency service vehicles to navigate, the higher ratio of residents to emergency responders affects response times, and homes located closer together increase the chances of fires spreading.

Natural hazards do not discriminate, but the impacts in terms of vulnerability and the ability to recover vary greatly among the population. According to Peggy Stahl of the Federal Emergency Management Agency (FEMA) Preparedness, Training, and Exercise Directorate, 80% of the disaster burden falls on the public.

According to the American Community Survey (ACS) 2006-2008 3 Year Estimates, Only about 4.5% of the City's families are living in poverty compared to nearly 12.2% of families in Los Angeles County. Median household income in 2008 in Santa Clarita was \$84,442 per year compared to \$55,192 per year median income for Los Angeles County.

Vulnerable populations, including seniors, disabled citizens, women, and children, as well as those people living in poverty, may be disproportionately impacted by natural hazards. ACS estimates for 2008 indicate that approximately 8.6% of the population in Santa Clarita is 65 years of age or older, while nearly 32.2% of the population is 19 years of age or less. Fifty-one percent of the population is women, while 49% are men.

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

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

Land and Development

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

County was virtually built out. This pushed new development further and further away from the urban center.

The City of Santa Clarita General Plan addresses the use and development of private land, including residential and commercial areas. (The General Plan Land Use Map can be found in Appendix C of this Plan). 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.

It is the General Plan and the General Plan policies and objectives that ensure that any future development will follow city processes to mitigate any hazards by employing the following steps:

- **Avoid** – Avoid development in areas that are identified as hazardous. This is primarily accomplished by designating areas as open space and thus prohibiting residential units and nearly preventing all habitable structures. Also, zoning with lesser or reduced densities can be assigned resulting in fewer development areas within a hazard area.
- **Engineer** – Engineering a solution is often an option to reduce potential hazard impacts. This is common in flood zone areas as engineering measures are used for erosion control, bank stabilization and water retention. Further, buildings themselves can be engineered to the highest standard to withstand earthquakes.
- **Mitigate** – Implement mitigation measures to lessen the threat from the hazard. Examples from "Avoid" and "Engineer" above represent possible mitigation measures. Any action that is taken to reduce the potential impact of a hazard would be a mitigation measure. This could be accomplished through land use controls, building development standards, building placement and flood control devices.

In the future, the City plans to build the Newhall Library, a Canyon County Community Center, Sports Complex, and Discovery Park. Any hazards identified with these projects will be reduced by mitigation activities. Successful mitigation projects in the City have enabled private development projects to be built in fire, flood and earthquake hazard areas.

Gate King Development

The 2004 Gate King Development, a 4.2 million square foot industrial development site, is located in a high fire hazard area. This development is 584 acres with only 170 of these acres being built upon. To mitigate the fire threat to this development 414 acres of this development will remain as Open Space. A trail system has been developed throughout the development and Open Space areas. In addition to providing a buffer between the development and the hazard area, other mitigation measures include: manufactured slopes, fuel modification landscape and two egress and ingress routes. An additional Fire Station has been planned for the area and a helipad site has been identified.

Riverpark, River Village Development

The 2007 Riverpark, River Village Development located north of the Santa Clara River along the Cross Valley Connector, includes 695.4 acres of land for 1,123 single- and multi-family

units, a maximum of 16,000 square feet of commercial uses and recreational/park uses, along with associated infrastructure, and open space. This project is located in the geographic center of the City and is in a designated flood hazard zone. To mitigate the flood threat to his project the following mitigation activities were employed: buried bank stabilization, setbacks and a trail system.

Crossroads Shopping Area

The 2006 Crossroads Shopping Area includes 100,000 square feet of commercial development. The project is bisected by the Alquist-Priolo Special Study Zone – Earthquake Fault Zone. To mitigate the earthquake threat to this development, the following mitigation measures were completed: Setbacks of buildings to avoid the Alquist-Priolo Special Study Zone and higher risk areas were designated as low risk parking areas and trails.

Housing and Community Development

In the City of Santa Clarita the demand for housing outstrips the available supply, and the recent low interest rates have further fueled a pent up demand. Between 2000 and 2008, Santa Clarita's housing stock increased by 6,258, of which 2,643 units were annexed into the City in 2006. The remaining 3,615 units were constructed.⁶ According to the California Department of Finance (DOF), there were 58,714 households in Santa Clarita in 2008. The median value for single family homes in the City of Santa Clarita is estimated at \$410,000⁷.

To address development issues, the Community Development Agency has engaged in activities that promote the quality of life for the citizens of City of Santa Clarita. The large-scale effort is termed the City of Santa Clarita Community Program, and includes neighborhood and other public facility improvements, rehabilitation of existing housing, and new housing development.

HUD provides funding to benefit low and moderate income residents in the area of housing rehabilitation and neighborhoods.

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. City of Santa Clarita's CDBG Entitlement Allocation for the 2010-2011 is \$1.2 million.

Employment and Industry

Management/Administrative occupations, services, sales, construction and transportation are Santa Clarita's principal employment and industrial activities. The City business climate has been strong and growing for several years due to a diversified base of employment options.

⁶ City of Santa Clarita, *General Plan – Housing Element*, DRAFT, January 2009

⁷ City of Santa Clarita, *General Plan – Economic Development*, DRAFT, October 2008.

Recently, the City of Santa Clarita has targeted four main industry clusters for expansion in Santa Clarita including – Entertainment, Aerospace, Biomedical, and Technology. These industry sectors were identified in the Alfred Gobar Associates 2005 Labor Market Study.⁸

Nearly 38 percent of the workforce in the City of Santa Clarita is employed in the services sector. An additional 25 percent of the City’s workforce is employed in retail trade followed by nine percent in manufacturing, eight percent in construction, seven percent in finance/insurance, and real estate industries, and six percent in wholesale trade.⁹

Santa Clarita’s local economy is primarily a service-based economy with 41 percent of the businesses in the service sector. An additional 21 percent of businesses are in retail trade and 10 percent each are in the finance, insurance, and real estate sector as well as construction.

Table 2.2 below details the major employers in the Santa Clarita Valley, including the type of business and the number of employees¹⁰.

Table 2.2 - Major Employers in Santa Clarita Valley

Company	Type of Business	Employees
Six Flags Magic Mountain	Theme Park	3,680
Wm. Hart Union School District	Public High & Junior High School District	2,455
Princess Cruises	Vacation Cruise Line Services	2,100
Saugus Union School District	Public Elementary School District	2,010
U.S. Postal Service	U.S. Postal Service	1,790
College of the Canyons	Community College	1,678

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

Capabilities Assessment

This section identifies current capabilities (administrative, technical, legal and fiscal) available for implementing hazard mitigation activities within the City. A summary is included to outline the City departments and their responsibilities associated with hazard mitigation planning as well as codes, ordinances, and plans already in place associated with hazard mitigation planning.

⁸ City of Santa Clarita, *General Plan – Economic Development*, DRAFT, October 2008.

⁹ Ibid.

¹⁰ Ibid.

Existing Institutions, Plans, Policies and Ordinances

The following is a summary of existing departments in the City and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the City. The administrative and technical capabilities of Santa Clarita, as shown in Table 2.3, provides an identification of the staff, personnel, and department resources available to implement the mitigation actions identified in the Multi-Hazard Mitigation Goals and Actions and each of the hazard sections. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the City.

Table 2.3 – City of Santa Clarita Administrative and Technical Capability

Staff/Personnel Resources	Y/N	Dept./Agency and Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Y	Community Development-Housing, Redevelopment Manager Planning Division Manager
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Public Works Department – City Engineer, Public Works Director, Building Official and Public Works Building and Safety Inspectors
Planners or Engineer(s) with an understanding of natural and/or manmade hazards	Y	Public Works – Development Services Division, City Engineer, Building & Safety Division, Building Official
Floodplain manager	Y	Public Works-Director of Public Works
Surveyors	Y	Public Works – Development Services Division, Sr. Engineer
Staff with education or expertise to assess the community's vulnerability to hazards	Y	Community Development-Housing, Redevelopment Manager Planning Division Manager, Public Works Department – City Engineer, Public Works Director, Building Official and Public Works Building and Safety Inspectors
Personnel skilled in GIS and/or HAZUS	Y	Administrative Services Department, Information Technology Services Division, GIS Group, GIS Coordinator, and GIS Technician
Scientists familiar with the hazards of the community	Y	Private/Public Consultants
Emergency manager	Y	Emergency Services Manager, Emergency Services Supervisor
Grant writers	Y	All Departments – Management analyst, administrative analyst

The legal and regulatory capabilities of City are shown in Table 2.4, which presents the existing ordinances and codes that affect the physical or built environment of the City. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

Table 2.4 -Legal and Regulatory Capability

Regulatory Tools (ordinances, codes, plans)	Local Authority (Y/N)	Does State Prohibit? (Y/N)
Building code	Y	N
Zoning ordinance	Y	N
Subdivision ordinance or regulations	Y	N
Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Y	N
Growth management ordinances (also called "smart growth" or anti-sprawl programs)	Y	N
Site plan review requirements	Y	N
General or comprehensive plan	Y	N
A capital improvements plan	Y	N
An economic development plan	Y	N
An emergency response plan	Y	N
A post-disaster recovery plan	Y	N
Real estate disclosure requirements	Y	N

Fiscal Resources

Table 2.5 shows specific financial and budgetary tools available to the City such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

Table 2.5 - Fiscal Capability

Financial Resources	Accessible or Eligible to Use (Yes/No)
Community Development Block Grants (CDBG)	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water	No
Fees for sewer/Industrial Waste	Yes
Impact fees for homebuyers or developers for new developments/homes	Yes
Incur debt through general obligation bonds	Yes
Incur debt through special tax and revenue bonds	Yes
Incur debt through private activity bonds	Yes
Withhold spending in hazard-prone areas	Yes
Other – Other Grants	Yes

SECTION THREE – RISK ASSESSMENT

What is a Risk Assessment?

Conducting a risk assessment can provide information on the location of hazards, the value of existing land and property in hazard locations, and an analysis of risk to life, property, and the environment that may result from natural hazard events. The risk assessment process proved to be quite beneficial as the City prepared its plan. The five levels of a risk assessment used are as follows:

1. Hazard Identification

Hazard Identification is the process of answering the question: “What hazards can occur in my community or jurisdiction?” Hazards can be identified into two general categories, Natural and Man-made. Table 3.1 is a comprehensive listing of specific hazard types sorted by category that are identified in both the City’s Emergency Operations Plan, and the General Plan, Safety Element.

**Table 3.1
Summary of Natural and Man-made Hazard Threats to the City of Santa Clarita**

Natural Hazards	Human-Caused Hazards
Earthquake/Liquefaction	Arson
Flooding	Biological Hazards
Landslides/Mudslides	Civil Unrest/Disobedience/Disturbance
Subsidence	Dam Failure
Wildfires	Hazardous Materials Incident
Winter Storms	Terrorism
Severe Weather	Transportation Incident: Truck, Airplane, Rail

The Plan Development Committee narrowed the list of hazards down to six hazards of concern to the City of Santa Clarita: earthquake, landslide, wildfires, floods, severe weather and hazardous materials. The Committee decided to include Hazardous Materials in the list of natural hazards due to this hazard’s potential impact on the city and the resident’s concern for this hazard.

2. Profiling Hazard Events

Profiling Hazard Events describes the causes and characteristics of each hazard, how it has affected the City of Santa Clarita in the past, and what part of City’s 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 hazard specific events, please see the appropriate hazard section.

The development of optimal mitigation strategies is critical in helping the City focus the mitigation plan on hazards most likely to affect, and result in loss to, the City and its resources. The Plan Development Committee utilized a tool that was developed by the State of Arizona's Department of Emergency Management: the Calculated Priority Risk Index (CPRI). The CPRI was used to evaluate individual hazards and rank them according to an indexing system. The CPRI value is obtained by assigning varying degrees of risk to four (4) categories for each hazard, and then calculating an index value based on a weighting scheme. The four categories and associated levels of risk are summarized in Table 3.2. It is duly noted that there is a high degree of subjectivity in the assigning of various levels of severity to each CPRI category for a given hazard. In addition to the CPRI tool, the planning group looked at historical data from newspapers and other reports from FEMA and National Oceanic Atmospheric Administration (NOAA) databases.

TABLE 3.2
Summary of CPRI Categories and Risk Levels

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	<ul style="list-style-type: none"> Extremely rare with no documented history of occurrences or events. Annual probability of less than 0.001. 	1	45%
	Possibly	<ul style="list-style-type: none"> Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 0.01 and 0.001 	2	
	Likely	<ul style="list-style-type: none"> Occasional occurrences with at least two or more documented historic events. Annual probability that is between 0.1 and 0.01. 	3	
	Highly Likely	<ul style="list-style-type: none"> Frequent events with a well documented history of occurrence. Annual probability that is greater than 0.1. 	4	
Magnitude/ Severity	Negligible	<ul style="list-style-type: none"> Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths. Negligible quality of life lost. Shut down of critical facilities for less than 24 hours. 	1	30%
	Limited	<ul style="list-style-type: none"> Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). Injuries or illnesses do not result in permanent disability and there are no deaths. Moderate quality of life lost. Shut down of critical facilities for more than 1 day and less than 1 week. 	2	
	Critical	<ul style="list-style-type: none"> Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and at least one death. Shut down of critical facilities for more than 1 week and less than 1 month. 	3	
	Catastrophic	<ul style="list-style-type: none"> Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). Injuries and illnesses result in permanent disability and multiple deaths. Shut down of critical facilities for more than 1 month. 	4	
Warning Time	Less than 6 hours	Self explanatory	4	15%
	6 to 12 hours	Self explanatory	3	
	12 to 24 hours	Self explanatory	2	
	More than 24 hours	Self explanatory	1	
Duration	Less than 6 hours	Self explanatory	1	10%
	Less than 24 hours	Self explanatory	2	
	Less than 1 week	Self explanatory	3	
	More than 1 week	Self explanatory	4	

Table 3.3 summarizes how the hazards were evaluated using the CPRI tool.

**Table 3.3
Summary of Hazard Evaluations**

Hazard	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Rating
Earthquake	Likely	Critical	Less than 6 hrs	Less than 6 hrs	3.55/High
Wildfires	Highly Likely	Limited	6 to 12 hrs	Less than 1 week	3/High
Hazardous Materials	Highly Likely	Negligible	Less than 6 hrs	Less than 6 hrs	2.8/Moderate
Flooding	Highly Likely	Negligible	More than 24 hrs	Less than 1 week	2.55/Moderate
Severe Weather	Likely	Limited	More than 24 hrs	Less than 1 week	2.4/Moderate
Landslide Mudslide	Possibly	Negligible	Less than 6 hrs	Less than 6 hrs	1.9/Low/No

CPRI Rating Hazard Risk Ranking

Severe	4
High	3-3.9
Moderate	2-2.9
Low/No	1-1.9

3. Vulnerability Assessment/Inventorying Assets

Vulnerability Assessment/Inventorying Assets combines hazard identification with an inventory of the existing (or planned) property and population exposed to a hazard. Critical facilities are of particular concern because they provide essential products and services to the general public that are necessary to preserve the welfare and quality of life in the county and fulfill important public safety, emergency response, and/or disaster recovery functions. The critical facilities and infrastructures identified for the City of Santa Clarita are listed in Tables 3.5, 3.6 of this section, and Appendix E. The critical facilities are documented on the earthquake and flood maps in Appendix C. The critical facilities identified include all owned and operated City facilities and critical infrastructure for the City.

4. Risk Analysis and Estimating Potential Losses

Risk Analysis and Estimating Potential Losses involves estimating the damage, injuries, and financial losses 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 City common format in which to measure the effects of hazards on assets. Using the best available data, from FEMA flood hazard data, County of Los Angeles Fire Department, City of Santa Clarita Building and Safety Division, and Santa Clarita Board of

Realtors, the City was able to estimate potential losses. For each hazard where data was available, quantitative estimates for potential losses are included in the hazard assessment.

5. Assessing Vulnerability and Analyzing Development

Assessing Vulnerability and Analyzing Development Trends provides a general description of land uses and development trends within the community so that mitigation options can be considered in land use planning and future land use decisions. The community Profile (Section 2) of this plan provides comprehensive depiction of the City of Santa Clarita. The description includes the geography and environment, population and demographics, land and development, housing and community development, and employment and industry. These components addressed in this plan for the City of Santa Clarita can help in identifying potential problem areas and can serve as a guide for incorporating the goals and ideas contained in this mitigation plan into other community development plans.

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

The City of Santa Clarita conducted a vulnerability assessment for each hazard using Geographic Information Systems (GIS) to identify the geographic extent of the hazard and assess the land use and value at risk. Insufficient data exists to conduct vulnerability assessments and risk analyses for severe weather, and hazardous materials. Although this data is not available for some of the hazard assessments, there are various strategies the city can take to reduce risk. These strategies are described in the action items detailed in each hazard section of this Plan. Mitigation strategies further reduce disruption to critical services, reduce the risk to human life, and lessen damage to personal and public property and infrastructure.

Federal Requirements for Risk Assessment

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 six hazards profiled in the mitigation plan, including earthquakes, floods, hazardous materials, landslides, severe weather, and wildfires. The Federal criteria for risk assessment and information on how the City of Santa Clarita's Natural Hazard Mitigation Plan meets those criteria are outlined in Table 3.4 below.

Table 3.4 - Federal Criteria for Risk Assessment

Section 322 Requirement	How is this addressed?
Identifying Hazards	Each hazard section includes an inventory of the best available data sources that identify hazard areas. To the extent GIS data are available, the city developed maps identifying the location of the hazard in the city. Appendix C includes the hazard maps.
Profiling Hazard Events	Each hazard section includes documentation of the history, and causes and characteristics of the hazard in the city and county.
Assessing Vulnerability: Identifying Assets	Where data is available, the vulnerability assessment for each hazard addressed in the mitigation plan includes an inventory of all publicly owned facilities and infrastructure within the hazard areas. Each hazard section provides information on vulnerable areas in the city. Each hazard section also identifies potential mitigation strategies.
Assessing Vulnerability: Estimating Potential Losses	The Risk Assessment Section of this mitigation plan identifies key critical facilities and critical infrastructure in the city.. 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 City of Santa Clarita Community Profile Section (2) of this plan provides a description of the development trends in the county, including the geography and environment, population and demographics, land use and development, housing and community development, and, employment and industry patterns.

Critical Facilities and Infrastructure

Facilities critical to government response and sustainability (i.e., life safety and property and environmental protection) include: 911 centers, emergency operations centers, Sheriff’ stations and fire stations, public works facilities, sewer and water facilities, hospitals, bridges and roads, and shelters. Facilities that, if damaged, could cause serious secondary impacts may also be considered “critical.” 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.

Since the City of Santa Clarita is a contract city with County of Los Angeles Fire Department and the Los Angeles County Sheriff, those station facilities are under the County of Los Angeles’ purview. Sanitation districts critical facilities also belong to the County of Los Angeles. The water provided in the City of Santa Clarita is owned by a separate public agency, the Castaic Lake Water Agency. This agency is a wholesaler of water, and its critical facilities are not under

the City of Santa Clarita’s jurisdiction. The water in the City of Santa Clarita and the Santa Clarita Valley is provided by three independent water retailers-Santa Clarita Water Company, Newhall County Water, and Valencia Water Company. All of the critical facilities attached to the three water retailers are not under the City of Santa Clarita’s jurisdiction. Similarly, the four schools districts within the City are not under the its jurisdiction-Newhall School District, Saugus Union School District, Sulphur Springs School District, and the William S. Hart School District.

The following tables 3.5 and 3.6 are the comprehensive listing of all City-owned and operated critical facilities and infrastructure. The facilities and infrastructure have been identified as “critical” by City staff and stakeholders.

Table 3.5 – Critical Facilities

	Impacting Hazards	Earthquake Liquefaction	Fire	Landslide	Flood	Severe Weather	Hazardous Materials	Total Exposure (\$) Real Property + Personal Property
Critical Facilities								
City Hall		X			*	X	X	\$21,095,021
Corporate Yard		X				X	X	\$10,667,920
Sports Complex/Gym		X	X	X		X	X	\$2,917,478
Sports Complex/Activities Ctr.		X	X	X		X	X	\$3,754,846
Aquatic Ctr./Maint. Bldg.		X	X	X		X	X	\$594,122
Aquatic Center/Restrooms/Concession		X	X	X		X	X	
Central Park/Maintenance Bldg.		X	X	X		X	X	\$1,029,800
Transit Maintenance Facility		X	X			X	X	
Community Center		X	X		X	X	X	\$4,782,634
Metrolink Station/Via Princessa		X			X	X	X	\$736,300
Metrolink Station/Soledad		X	X	X	X	X	X	\$1,969,900
Metrolink Station/Newhall		X	X		X	X	X	\$342,811

*City Hall is not in a designated Flood Zone, but in the unlikely event of dam failure, City Hall is in the dam inundation pathway

Information for the above table was obtained from the City of Santa Clarita 2009 Difference in Conditions Statement of Value.

Table 3.6 - Critical Infrastructure

Bridge_ No	Description	Impacting Hazards							Deck Area	Valuation
		Earthquake Liquefaction	Fire	Landslide	Flood	Severe Weather	Hazardous Materials			
791	Southern Pacific RR over Sand Cyn. Rd	X	X		X			689	\$ 243,486	
1134	Placerita Cyn. Rd. over Sand Cyn. Wash	X	X		X			1,948	\$ 688,404	
1318	Lost Cyn. Rd. over Sand Cyn. Wash	X	X		X		X	1,432	\$ 506,054	
1577	Lyons Ave. over Santa Clara River	X			X			5,425	\$ 1,917,141	
1578	Valencia Blvd N. over So. Fork Santa Clara	X			X	X	X	8,224	\$ 2,906,279	
1594	Urbandale Ave. over Bouquet Channel	X	X					4,973	\$ 1,757,408	
1597	Clearlake Dr. over Unnamed Wash	X	X					1,281	\$ 452,693	
1653	Bouquet Cyn. Rd. over Plum Cyn. Channel	X	X					2,540	\$ 897,611	
1672	Soledad Cyn. Rd. over Santa Clara River	X			X		X	48,631	\$ 17,185,709	
1784	Sierra Hwy. N. over Santa Clara River	X			X		X	17,416	\$ 6,154,640	
1844	Valencia Blvd. over Golden State Freeway	X						11,600	\$ 4,099,324	
1845	Lyons Ave. over Golden State Freeway	X						41,328	\$ 14,604,902	
1851	Wiley Cyn. Rd. over Pico Cyn. Channel	X	X					8,913	\$ 3,149,765	
1905	Sierra Hwy. over Whitney Wash	X	X		X			5,700	\$ 2,014,323	
1928	Sierra Hwy. S. over Santa Clara River	X			X		X	18,191	\$ 6,428,517	
1929	Sierra Hwy. over Solemint SPTCO	X	X		X			9,849	\$ 3,480,538	
1932	Orchard Village Rd. over Santa Clara River	X			X			26,221	\$ 9,266,239	
1938	Bouquet Cyn. Rd. over Santa Clara River	X			X		X	44,024	\$ 15,557,641	
1963	Bouquet Cyn. Rd. over Bouquet Cyn. Channel	X			X			14,833	\$ 5,241,834	
1976	Bouquet Cyn. Rd. over Bouquet Cyn. Creek	X			X			1,582	\$ 559,063	
2034	Garzota Dr. over Dry Cyn. Channel	X						2,390	\$ 844,602	
2035	Decoro Dr. over Dry Cyn. Channel	X			X			3,326	\$ 1,175,375	
2062	Whites Cyn. & Nadel St. over PD 704	X	X					40,500	\$ 14,312,295	
2063	Foxlane Dr. over PD 704	X	X					1,827	\$ 645,644	
2064	Grandifloras Rd. over PD 771	X	X					1,227	\$ 433,610	
2065	Begonias Ln. over PD 771	X	X					1,345	\$ 475,310	
2084	Festividad Dr. over Dry Cyn. Channel	X						2,390	\$ 844,602	
2119	Bouquet Cyn. Rd. over Bouquet Cyn. Channel	X			X	X	X	19,623	\$ 6,934,572	
2126	Wiley Cyn. Rd. over Santa Clara River	X			X		X	9,042	\$ 3,195,352	
2151	15th St. over Newhall Creek	X			X		X	1,991	\$ 703,600	
2186	McBean Pkwy. over Golden State Freeway	X				X		33,756	\$ 11,929,033	
2210	Powell/Everett Dr. over So. Fork Santa Cla	X						10,904	\$ 3,853,365	
2216	Ridgegrove Dr. over Haskell Cyn. Channel	X						3,035	\$ 1,072,539	
2219	Sand Cyn. Rd. over Iron Cyn Creek	X	X		X			1,249	\$ 441,384	
2242	Ave. Navarre over Paseo Valencia PUC	X						630	\$ 222,636	
2244	Centurion Wy. Over Bouquet Cyn. Channel	X						7,395	\$ 2,613,319	
2284	Golden Valley Rd. & 14 Freeway	X	X					12,900	\$ 4,558,731	
2319	Soledad Cyn. Rd. over Mint Cyn. Wash	X			X			6,792	\$ 2,400,225	
2345	Pamplico Dr. over Dry Cyn. Channel	X						2,390	\$ 844,602	
2375	Sierra Hwy. over Solemint SPTCO	X	X		X			10,161	\$ 3,590,796	
2376	Tournament Rd. over Pico Cyn. Channel	X						4,058	\$ 1,434,057	
2611	Atwood Boulevard over Santa Clara River	X						1,173	\$ 410,550	

Bridge No	Description	Impacting Hazards						Deck Area	Valuation
		Earthquake Liquefaction	Fire	Landslide	Flood	Severe Weather	Hazardous Materials		
2878	Tupelo Ridge Dr. over Dry Cyn. Channel	X					2,293	\$ 810,323	
3105	Esterbrook Ave. over PD 266	X					1,908	\$ 674,268	
3107	De Wolfe Road over Santa Clara River South	X					1,088	\$ 380,800	
3250	Benz Rd. over Bouquet Cyn. Channel	X	X				6,706	\$ 2,369,833	
3263	Haskell Cyn. Rd. over Bouquet Cyn. Channel	X					6,168	\$ 2,179,710	
3277	14th St. over Newhall Creek	X				X	1,991	\$ 703,600	
3441	Rodgers Dr. over Plum Cyn. Channel	X	X				1,615	\$ 570,725	
3452	Adon Ave. over Mint Cyn. Wash	X	X		X		1,604	\$ 566,838	
3515	McBean Pkwy. Over Santa Clara River	X			X		60,784	\$ 21,480,458	
3516	Newhall Ranch Rd. over Bouquet Cyn.	X			X	X	12,325	\$ 4,355,532	
3524	Scherzinger Ln. over Mint Cyn. Wash	X	X		X		1,981	\$ 700,066	
3537	Sand Cyn. Rd. over Santa Clara River	X			X	X	24,789	\$ 8,760,185	
3538	Sierra Hwy. over Mint Cyn. Wash	X			X		5,974	\$ 2,111,152	
3548	Tourney Rd. over Valencia Golf Course PUC	X					4,895	\$ 1,729,844	
3589	Valle Del Oro over Newhall Creek	X	X		X		4,865	\$ 1,719,242	
3617	White's Cyn. Rd. over Santa Clara River	X			X	X	18,180	\$ 6,424,630	
3653	White's Cyn. Rd. over SPRR	X			X	X	40,332	\$ 14,252,925	
3679	Valencia Blvd S. over So. Fork Santa Clara	X			X	X	8,224	\$ 2,906,279	
3695	Newhall Ranch Road over San Francisquito	X			X		43,099	\$ 15,084,650	
3875	Camp Plenty Rd over PD 453	X			X	X	3,850	\$ 1,347,500	
3877	Ave. Scott over San Fransiquito Ctn. Chann	X			X		38,416	\$ 13,575,830	
3881	Ave. Crocker over Private Drain #1066	X					1,960	\$ 686,000	
3883	Ave. Stanford over Unnamed Wash	X					1,281	\$ 452,693	
3961	Banyan Place over Private Drain 1954	X	X				3,000	1,050,000	
3962	Boxwood Lane over PD 1954	X	X				2,940	\$ 1,029,000	
3963	Avenue Crocker over Unnamed Wash	X					3,360	1,176,000	
3964	Tamarack Lane over PD 1954	X	X				3,136	\$ 1,097,600	
4002	Golden Valley Rd over Soledad Cyn Rd	X				X	38,772	\$ 13,570,200	
532890	Wiley Cyn/Via Princessa over SC River Fork	X			X	X	62,560	21,896,000	
530014	Railroad Ave over Placerita Creek	X	X		X	X	13,325	4,663,750	
530015	Magic Mtn over SC River South Fork	X	X			X	44,290	15,501,500	
4009	Golden Valley over SC River - NB	X			X	X	62,111	\$11,255,248	
4022	Golden Valley over SC River - SB	X			X	X	55,431	\$10,044,753	

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SECTION FOUR – MULTI-HAZARD GOALS AND ACTION ITEMS

This section provides information on goals and action items that pertain to the six natural hazards addressed in the mitigation plan. It also describes the framework that focuses the plan on developing successful mitigation strategies.

Multi-hazard action items are those activities that pertain to all six hazards in the mitigation plan: earthquakes, flood, hazardous materials, landslide, severe weather, and wildfire.

MH1: Construct/enhance major transportation infrastructure to provide the necessary additional roads and mobility.

Actions:

1. Complete the restriping of the Cross Valley Connector-Golden Valley segment between Centre Pointe Parkway and Sierra Highway to provide additional travel lanes.
2. Bridge Widening - Hwy 14 – Golden Valley Off/On ramp.
3. Bridge Widening – McBean Bridge
4. Consider retrofitting Cross Valley Connector.
5. Bridge Widening – Newhall Ranch Road, San Francisquito Bridge

Coordinating Organization: Public Works Department, Capital Improvement Projects, Development Services Division, Metropolitan Transportation Authority (MTA), Los Angeles County, Federal Highway Administration, The Gas Company, Southern California Edison, Developer-Bridge & Thoroughfare, and Caltrans.

Timeline: 2-4 years

Plan Goals Addressed: Partnerships and Implementation
Protect Life and Property
Emergency Services

Priority: High

Funding Source: Capital Improvement Projects

MH 2: Implement technologies to enhance public notification and support in the event of an emergency.

Actions:

6. Continue replacing backup batteries for traffic lights on a rotational basis.
7. Continue replacing old traffic/light signals with LED signals.
8. Consider new technology for emergency messages.

9. Install Intelligence Transportation System Infrastructure.

Coordinating Organization: Technology Services Division, Communications Services Division, Metropolitan Authority (MTA), Los Angeles County.

Timeline: Ongoing

Plan Goals Addressed: Partnerships and Implementation
Protect life and Property
Public Awareness
Emergency Services

Priority: High

Funding Source: General Fund

MH3: Enhance School Emergency Communications Plan

Actions:

10. Enhance Communications Plan by incorporating private schools and child-care facilities.
11. Work with First Start program to incorporate them into the Communications Plan.
12. Work with special needs community and groups to identify alternate modes of communications.
13. Participate annually in communications exercise with school districts.
14. Encourage schools to send annual letter to parents regarding emergency procedures.

Coordinating Organization: Community Services Division, Santa Emergency Communications Team (Volunteers) County of Los Angeles Fire Department, Los Angeles County Sheriff's Department, public and private schools.

Timeline: Ongoing

Plan Goals Addressed: Partnerships and Implementation
Public Awareness
Emergency Services

Priority: Medium

Funding Source: General Fund

MH4: Prepare the City of Santa Clarita to be self-sufficient in the event of a major emergency.

Actions:

15. Promote the City's CERT-Community Emergency Response Training Program, and increase number of CERT trained residents and businesses by 20%.
16. Promote the City's Emergency Expo; encouraging residents to attend and learn how to prepare, mitigate, and respond for all types of emergencies.
17. Implement the emergency operations plan that includes, but is not limited to the establishment of a volunteer pool, and community partners to assist in responding to the provision of care and shelter to those in the valley (residents and non-residents) during an emergency.
18. Consider acquiring additional generators to back-up critical operations.
19. Consider acquiring mobile communications trailer to augment communication capabilities.

Coordinating Organization: Community Services Division, County of Los Angeles Fire Department, Los Angeles County Sheriff's Department,

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property,
Public Awareness
Natural Systems
Partnerships and Implementation
Emergency Services

Priority: High

Funding Source: General Fund

MH5: Consider establishing a permanent Department Operations Center at the Transportation Maintenance Facility for Public Works. Facility would serve as an alternate Emergency Operations Center.

Actions:

20. Assess the facility's basic physical capabilities and identify the physical requirements for a DOC, i.e. space layout, technology, etc.
21. Consider new design and construction to accommodate emergency functions and people.

Coordinating Organization: City Public Works, Technology Services Division, Community Services Division, Traffic Division.

Timeline: 2-4 years

Plan Goals Addressed: Partnerships and Implementation
Emergency Services
Protect life and Property

Priority: High

Funding Source: General Fund

MH6: Identify safe evacuation routes in high-risk natural disaster areas.

Actions:

- 22. Identify potential debris removal resources.
- 23. Increase participation in regional committee planning for emergency transportation routes.
- 24. Identify and publicize information regarding emergency transportation routes.

Coordinating Organization: Los Angeles County Sheriff (contract city), Technology Services Division, Traffic Division, California Highway Patrol, and CalTrans.

Timeline: Ongoing

Plan Goals Addressed: Partnerships and Implementation
Public Awareness
Emergency Services
Protect life and Property

Priority: High

Funding Source: General Fund

MH7: Create a Recovery and Reconstruction Ordinance.

Actions:

- 25. Consider developing and adopting a pre-disaster ordinance for post-disaster recovery and reconstruction that includes provisions for debris clearance, damage assessment, demolitions, re-occupancy and building moratorium criteria, fee waivers and deferrals, and expedited permitting procedures for repair and reconstruction.

Coordinating Organization: City Manager's Office, City Council, Public Works Department, Building and Safety, Community Development Department.

Timeline: 4 years

Plan Goals Addressed: Protect life and Property
Emergency Services

Priority: Medium

Funding Source: General Fund

MH8: Use HAZUS to develop loss estimates from earthquakes and floods. Loss estimates include: physical damage, economic loss and social impacts.

Actions:

26. Use HAZUS to develop loss estimates from earthquakes and floods. Loss estimates include: physical damage, economic loss and social impacts

Coordinating Organization: Administrative Services, Tech Services, GIS Group

Timeline: 2 years

Plan Goals Addressed: Protect life and Property
Public Awareness
Emergency Services

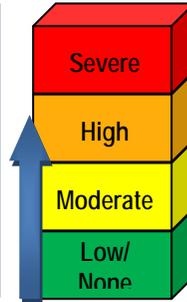
Priority: Medium

Funding Source: General Fund

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SECTION FIVE – EARTHQUAKE HAZARD PROFILE

CATEGORY OF RISK	LEVEL OF RISK
Probability/Frequency:	Likely
Magnitude/Severity:	Critical
Warning Time:	Less than 6 hours
Duration:	Less than 6 hours



Earthquake Hazard Information and Background

Plate tectonics is a starting point for understanding the forces within the Earth that cause earthquakes. Plates are thick slabs of rock that make up the outermost 100 kilometers of the Earth. The term "tectonics" describes the deformation of the Earth's crust, the forces producing such deformation, and the geologic and structural features that result. The constant motion of the plates causes stress in the brittle upper crust of the earth. These tectonic stresses build as the rocks are gradually deformed. The rock deformation, or strain, is stored in the rocks as elastic strain energy. When the strength of the rock is exceeded, rupture occurs along a fault. The rocks on opposite sides of the fault slide past each other as they spring back into a relaxed position. The strain energy is released partly as heat and partly as elastic waves called seismic waves. The passage of these seismic waves produces the ground shaking in earthquakes.

Faults are more likely to produce future earthquakes if they have rapid rates of movement, have had recent earthquakes along them, experience greater total displacements, and are aligned so that movement can relieve the accumulating tectonic stresses. Geologists classify faults by their relative hazards. "Active" faults, which represent the highest hazard, are those that have ruptured to the ground surface during the Holocene period (about the last 11,000 years). In contrast, "potentially active" faults are those that displaced layers of rock from the Quaternary period (the last 1,800,000 years). Determining if a fault is "active" or "potentially active" depends on geologic evidence, which may not be available for every fault.

Shaking

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The most commonly used scale today is the Moment Magnitude (M_w) Scale. Moment magnitude is related to the total area of the fault that ruptured and the amount of offset (displacement) across the fault. It is a more uniform measure of the energy released during an earthquake.

The other commonly used measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. In general, it decreases with distance from the source of an earthquake, but it may be increased or decreased by a number of factors.

The Modified Mercalli Intensity Scale and Corresponding Richter Scale Magnitudes

Shaking intensity is often described using the Modified Mercalli Intensity Scale, which rates an earthquake’s effects based on human observation. While an earthquake has only one magnitude it may have many intensity values, which will generally decrease with distance from the epicenter. The table below lists the Mercalli Scale’s various intensity levels and corresponding Richter Scale magnitudes.

Mercalli Intensity		Description	Richter Scale Magnitude
I	Instrumental	Detected only by a seismograph	
II	Feeble	Noticed by sensitive people	0.1 to 3.4
III	Slight	Like the vibrations due to a passing truck	3.5 to 4.2
IV	Moderate	Felt by people while walking; rocking of loose objects, including standing vehicles	4.3 to 4.8
V	Rather Strong	Felt generally; most sleepers are awakened and bells ring	
VI	Strong	Trees sway and all suspended objects swing; damage by over-turning and falling of loose objects	4.9 to 5.4
VII	Very Strong	General alarm; walls crack; plaster falls	
VIII	Destructive	Car drivers seriously disturbed; masonry fissured; chimneys fall; poor constructed buildings damaged	5.5 to 6.1
IX	Ruinous	Some houses collapse where ground begins to crack, and pipes break	6.2 to 6.9
X	Disastrous	Ground cracks badly; many buildings destroyed and railway lines bent; landslides on steep slopes	7.0 to 7.3
XI	Very disastrous	Few buildings remain standing; bridges destroyed; all services (railway, pipes, and cables) out of action; great landslides and floods	7.4 to 8.1
XII	Catastrophic	Total Destruction; objects thrown into air; ground rises and falls in waves	8.1 +

Amplification of Seismic Shaking

Although seismic waves radiate from their source like ripples on a pond, the radiation is not uniform due to the complex nature of an earthquake rupture, the different paths the waves follow through the earth, and the different rock and soil layers near the earth's surface. Large earthquakes begin to rupture at their hypocenter deep in the earth and the fault ruptures outward from that point. Because the speed of an earthquake rupture on a fault is similar to the speed of seismic waves, waves closer to the epicenter can be compounded by waves from farther along the rupture, creating a pulse of very strong seismic waves that moves along the fault in the direction of the fault rupture. Seismic waves may also be modified as they travel through the earth's crust. As seismic waves approach the ground surface, they commonly enter areas of loose soils where the waves travel more slowly. As the waves slow down, their amplitude increases, resulting in larger waves with frequencies that are more likely to damage structures. Waves can also be trapped within soft sediments between the ground surface and deep, hard basement rocks, their destructive energy multiplying as they bounce back and forth, producing much greater shaking at the ground surface.

Ground Failure

Fissuring, settlement, and permanent horizontal and vertical shifting of the ground often accompany large earthquakes. Although not as pervasive or as costly as the shaking itself, these ground failures can significantly increase damage and under certain circumstances can be the dominant cause of damage. Because of the geographic extent, the City of Santa Clarita water distribution pipelines are particularly vulnerable to ground failures.

Fault Rupture

The sudden sliding of one part of the earth's crust past another releases the vast store of elastic energy in the rocks as an earthquake. The resulting fracture is known as a fault, while the sliding movement of earth on either side of a fault is called fault rupture. Fault rupture begins below the ground surface at the earthquake hypocenter, typically between three and ten miles below the ground surface in California. If an earthquake is large enough, the fault rupture will actually travel all the way to the ground surface, wreaking havoc on structures built across its path. Recent large earthquakes in Turkey and Taiwan have shown that few structures built across the surface traces of faults can withstand the large displacement that occurs during an earthquake.

Liquefaction

In addition to the primary fault rupture that occurs right along a fault during an earthquake, the ground many miles away can also fail during the intense shaking. One common type of failure occurs when soft, water-saturated soil settles, causing the water to eject sediment particles as it works its way to the ground surface. This phenomenon, known as liquefaction, turns the soil into a fluid, causing it to lose the ability to support buildings and other structures. Areas susceptible to liquefaction include places where sandy sediments have been deposited by rivers along their course or by wave action along beaches.

Landslides

Landslides are the result of the down-slope movement of unstable hillside materials under the influence of weathering and gravity over time. Strength of rock and soil, steepness of slope, and weight of the hillside material all play an important role in the stability of hillside areas. Weathering and absorption of water can weaken slopes, while the added weight of saturated materials or overlying construction can increase the chances of slope failure. Sudden failure can be triggered by heavy rainfall, excavation of weak slopes, and earthquake shaking, among other factors.

Dam Failure

In 1971, the near-failure of the Los Angeles dam during a magnitude 6.7 earthquake forced 80,000 people to evacuate their residences. Embankments and outlet towers respond to earthquake vibrations. Shaking an unstable slope that has been weakened after saturation by rises in ground water levels may produce a landslide into the reservoir. A dam failure is defined as the collapse, breach, or other failure resulting in downstream flooding. Dam failures are considered secondary events to natural hazards. Both earthquakes and landslides have the potential to cause dam failures in the Cascadian region. Earthquakes can undermine the structure of dams and cause breaches or complete failures.

Fires

Fire following an earthquake can have devastating consequences, as tragically seen worldwide, notably after the 1906 San Francisco, 1923 Tokyo, and 1995 Kobe earthquakes. It is a significant problem in urban areas of southern California. In fact, the 2008 U.S. Geological Survey, California Department of Conservation and California Geological Survey's ShakeOut Scenario doubles the fatalities and economic losses. In the 7.8 ShakeOut scenario approximately 1,600 ignitions occur that require the response of a fire engine.ⁱ

Utility Failure

Power outages and other utility disruptions caused by earthquakes are secondary effects that can exacerbate primary hazards and prolong response activities. The hydroelectric-power plants located on the California and Los Angeles Aqueducts in the area will be out of service for an extended period of time due to major damage to both of these aqueduct systems. Numerous damaged or collapsed towers are expected along transmission routes. Moreover and specific to the City of Santa Clarita, the Saugus, Pardee, and Sylmar substations would shut down due to damage caused by liquefaction and intense groundshaking.

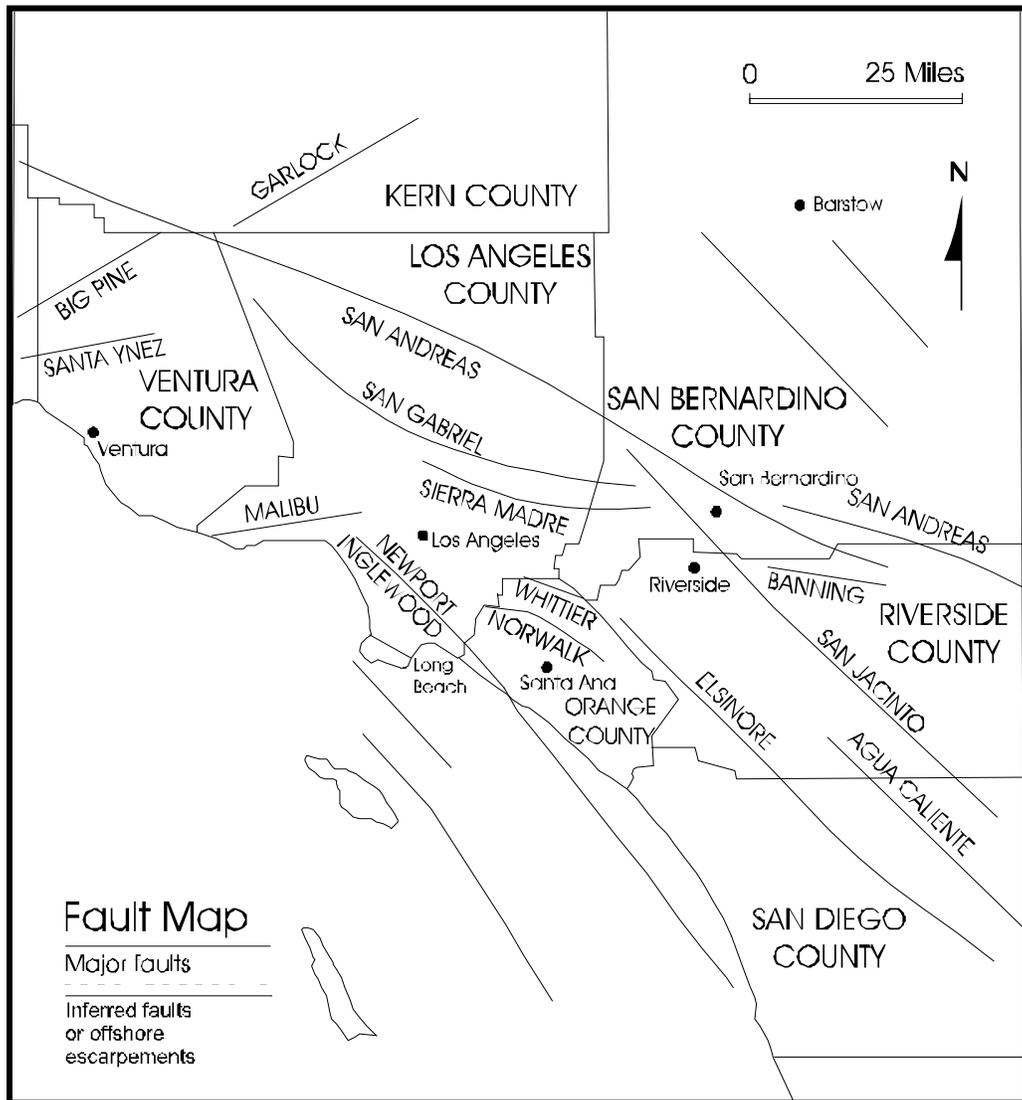
ⁱ Jones, Lucile M., Bernknopf, Richard, Cox, Dale, Goltz, James, Hudnut, Kenneth, Mileti, Dennis, Perry, Suzanne, Ponti, Daniel, Porter, Keith, Reichle, Michael, Seligson, Hope, Shoaf, Kimberley, Treiman, Jerry, and Wein, Anne, 2008, The ShakeOut Scenario: U.S. Geological Survey Open-File Report 2008-1150 and California Geological Survey Preliminary Report 25 [<http://pubs.usgs.gov/of/2008/1150/>].

Fault rupture will sever the imported natural gas supplies from the San Joaquin Valley that cross the fault near Tejon Pass. These lines will be shut off automatically. Underground storage facilities within the area will provide gas for users in many parts during the post-earthquake period. More damage would occur to those pipes crossing Castaic Creek and Santa Clara River.

Imports of crude oil from the San Joaquin Valley will be disrupted in lines route through Tejon Pass. Oil spills and fires may occur along the rupture portions of the line. The petroleum producing area parallel to the Santa Clara River between Newhall and Saugus may incur some damage, which could have minor affects on the industry.

Map 5.1 illustrates the known earthquake faults in Southern California.

Map 5.1 – Southern California Earthquake Fault Map



In California, many agencies are focused on seismic safety issues: the State's Seismic Safety Commission, the Applied Technology Council, the California Emergency Management Agency, United States Geological Survey, Cal Tech, the California Geological Survey as well as a number of universities and private foundations.

These organizations, in partnership with other state and federal agencies, have undertaken a rigorous program in California to identify seismic hazards and risks including active fault identification, bedrock shaking, tsunami inundation zones, ground motion amplification, liquefaction, and earthquake induced landslides. Seismic hazard maps have been published and are available for many communities in California through the State Division of Mines and Geology.

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

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. 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>

Earthquake History

Historical earthquake records can generally be divided into records of the pre-instrumental period and the instrumental period. In the absence of instrumentation, the detection of earthquakes is based on observations and felt reports, and is dependent upon population density and distribution. Since California was sparsely populated in the 1800s, the detection of pre-instrumental earthquakes is relatively difficult. However, two very large earthquakes, the Fort Tejon in 1857 (7.9) and the Owens Valley in 1872 (7.6) are evidence of the tremendously damaging potential of earthquakes in Southern California. In more recent times two 7.3 earthquakes struck Southern California, in Kern County (1952) and Landers (1992). The damage from these four large earthquakes was limited because they occurred in areas which were sparsely populated at the time they happened. The seismic risk is much more severe today than in the past because the population at risk is in the millions, rather than a few hundred or a few thousand persons.

Table 5-2, Significant Earthquakes Felt within City Limits, lists the principal historic earthquakes that have affected the area within City limits from 1850 to 2010.

Table 5.2 Historic Earthquakes Affecting the Santa Clarita Valley Planning Area from 1850-2010

Year	Location	Richter Magnitude
1855	Los Angeles, Los Angeles County	Est. 6.0
1857	Fort Tejon, Kern County	Est. 8.0
1883	Ventura-Kern County border	Est. 6.0
1893	San Fernando Valley, Los Angeles County	Est. 5.5 – 5.9
1916	Near Lebec, Kern County	5.2
1925	Santa Barbara Channel, Santa Barbara County	6.3
1933	Huntington Beach, Orange County	6.3
1941	Santa Barbara Channel, Santa Barbara County	5.9
1946	Northeastern Kern County	6.3
1947	Central San Bernardino County	6.2
1948	Near Desert Hot Springs, Riverside County	6.5
1952	White Wolf Fault, Kern County	7.5
1971	San Fernando (Sylmar), Los Angeles County	6.7
1987	Whittier Narrows, Los Angeles County	5.9
1988	Pasadena, Los Angeles County	5.5
1991	Sierra Madre, Los Angeles County	5.8
1994	Northridge, Los Angeles	6.7
1999	Hector Mine, San Bernardino County	7.1

Source: Los Angeles County Preliminary Draft Santa Clarita Valley Area Plan, 2009

On January 17, 1994 a magnitude 6.7 earthquake occurred at 4:31 A.M. on an unknown fault near Northridge, California, located approximately 13 miles southwest of Santa Clarita. The Northridge Earthquake was the most recent and damaging earthquake to greatly affect the City of Santa Clarita and its residents. It was the largest earthquake to hit a Southern California city since 1971, and the 11th largest earthquake to be recorded in California since 1769. In the following days and weeks, thousands of aftershocks occurred, causing additional damage to affected structures.

57 people were killed (no deaths were recorded in Santa Clarita) and more than 1,500 people seriously injured, with a widespread damage of \$40 billion. 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 event resulted in record economic losses to Los Angeles County, with the direct and indirect economic losses ran into the 10's of billions of dollars.

Probability, Frequency and Magnitude

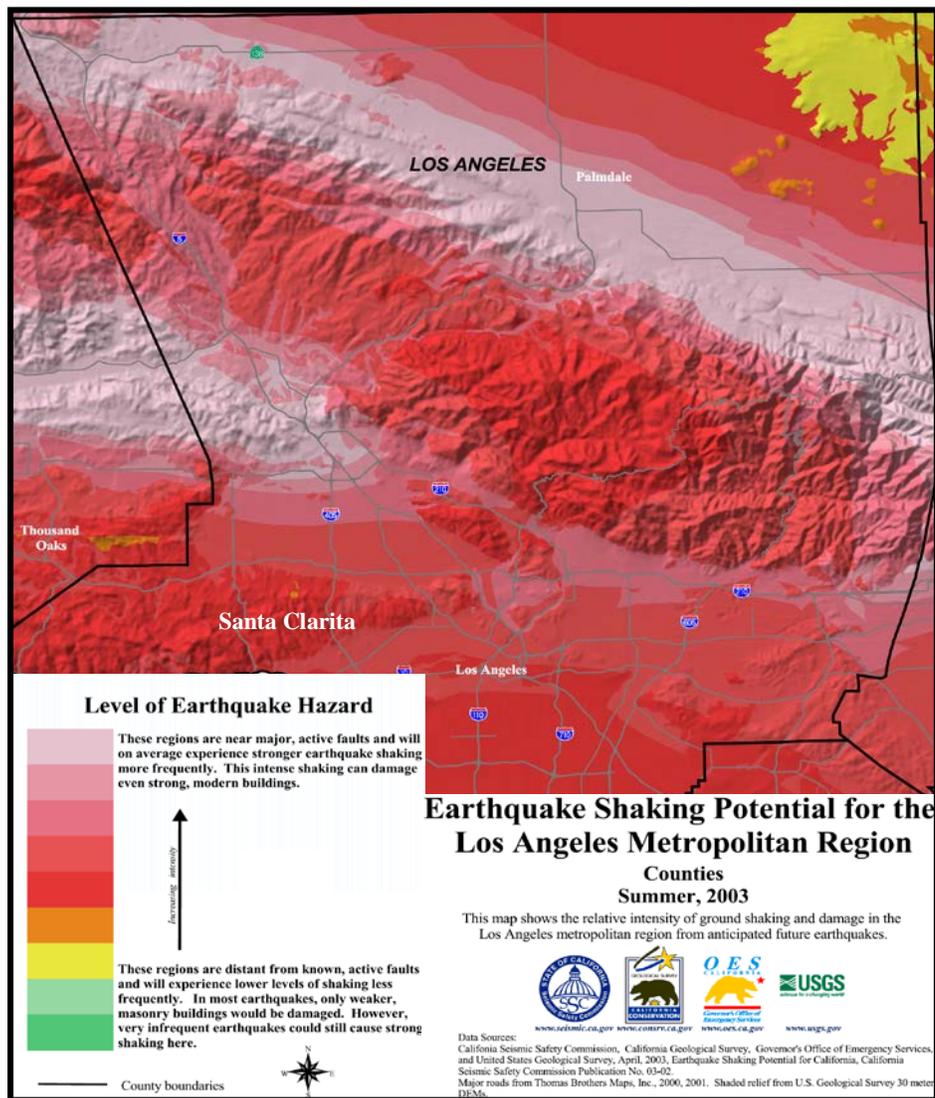
The City of Santa Clarita is located within a geologically active region of the Los Angeles County. The most significant geological hazard identified is the presence of the active San Gabriel fault, which crosses the City. The City of Santa Clarita is within the Transverse Ranges Geomorphic Province. This province is extensively faulted with known active faults. Some of the large faults in or near the province include the San Andreas, Oak Ridge, Holser, San Fernando, Santa Susana, Red Mountain, Garlock, Newport-Inglewood and Malibu Coast faults. Historically, the area within the City limits has been subject to seismically induced ground shaking. Future seismically-induced ground shaking will likely affect the area within City limits. The City of Santa Clarita is located within the Santa Clarita Valley. This valley is bordered to the southeast by the San Gabriel Mountains, to the southwest by the Santa Susana Mountains, and to the north by the Sierra Pelona.

- The San Andreas Fault Zone is the dominant active fault in California. It is located 16 miles northeast of the City. There have been numerous historic earthquakes along the San Andrea fault. This fault is capable of producing a moment magnitude of 8-8.5 earthquake. Geologists estimate the recurrence interval of a major quake along this fault to be 130 -140 years.
- The Oak Ridge Fault is located seven miles west of the City. The fault is a steep south-dipping fault that forms the boundary between Oak Ridge to the south and the Santa Clara River to the north. Activity along the Oak Ridge fault is known to have occurred during the Pliocene times (5.3 to 7.6 million years ago) and into the Pleistocene. The magnitude 6.7 Northridge earthquake (in 1994) is thought to have occurred along the eastern end of the Oak Ridge fault. The interval between major ruptures on this fault is unknown.
- The Holser fault is similar in orientation to the San Cayetano fault and might be considered as an extension of the same geological feature. The Holser fault trends along the northern border of the Santa Clara River Valley. Based on a conversation with the Department of Conservation Division of Mines and Geology, the exact location in the City of Santa Clarita is concealed beneath alluvium. Therefore, it has not been determined if this fault runs through the City. The fault is an east-west trending fault that dips to the north. The fault has a reverse sense of offset. It is modeled as being capable of generating a maximum moment magnitude of 6.5. The interval between major ruptures on this fault is uncertain.
- The San Fernando fault is located six miles south of the City. This fault is part of the Sierra Madre-San Fernando (Sylmar) earthquake. The fault has reverse displacement. It is modeled as being capable of generating a maximum moment magnitude of 6.7. It is estimated that this fault will experience a major rupture approximately every 200 years.
- The Santa Susana fault is an active fault located one mile south of the City. This fault is a reverse fault that extends from the northern edge of Simi Valley through the northern end of the San Fernando Valley. This fault has a length of about 16 miles and an

estimated maximum moment magnitude of 6.6. The interval between major ruptures on this fault is uncertain.

Since the 1970's, seismologists have been testing different ways of predicting earthquakes. The goal is to be able to predict the location, strength, and time of occurrence of a particular earthquake. Scientists believe that an earthquake will occur when stress in the earth at a given place is larger than the rock's strength. Unfortunately, both stress and strength are very difficult to measure, especially deep within the Earth. Scientists are looking for easier ways to measure changes in stress and strength, such as a sudden lowering of ground water levels, tilts and bulges in the Earth's surface, changes in the speed of P and S waves, increases of rare gases in well water, changes in Earth's magnetic field. Map 5.3 shows the relative intensity of ground shaking and damage in the Los Angeles metropolitan region from anticipated future earthquakes.

Map 5.3 – Earthquake Shaking Potential for the Los Angeles Metropolitan Region



Historic Losses and Impacts

The City of Santa Clarita was greatly affected by the Northridge Earthquake. The City was not only impacted because of its proximity to the epicenter, but also as a result of the significant damage done to the surrounding transportation infrastructure; which serves as the doorway in and out of the City. The City is nestled just north of the San Fernando Valley and south of the Antelope Valley; surrounded by some of the busiest freeways in the world. Included in these failures was the the Antelope Valley Freeway (State Route 14) - Golden State Freeway (I-5) interchange. These failures created severe hardship for the residents of Santa Clarita. The earthquake also damaged the water distribution and filtration systems, natural gas service, electrical services, and roads and bridges. Other damage resulting from the earthquake included a crude oil release from a pipeline rupture and other hazard materials spills.

Total disaster reimbursement to the City for the Northridge Earthquake total approximately \$27 million dollars.

Designated Hazard Areas

The entire City of Santa Clarita is in a seismically active region. Refer to Appendix C, Maps C.1 and C.2, to identify the areas subject to earthquakes, landslides and liquefaction.

Because of the large number of faults in California and their proximity to Santa Clarita, many could have an impact on the City. The San Andrea Fault zone is the greatest threat to the City of Santa Clarita. It is one of the largest faults in the state and the larger the fault, the larger the earthquake it can generate. Most loss of life and damage to property during an earthquake stems from strong ground shaking. Our society--our way of life--depends on a complex network of infrastructure systems. These systems are lifelines that provide transportation and communication services, a supply of energy and fresh water, and the disposal of wastewater and waste products. Among the oldest of these lifelines are our transportation systems--highways, railroads, mass transit, ports, waterways, and airports. Damage is always extensive to residential and commercial buildings and lifelines located in the epicentral region.

Vulnerability Assessment

Risk analysis is a phase of a hazard assessment and involves estimating the damage and costs likely to be experienced in a geographic area over a period of time². 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

² Burby, R. (Ed.) Cooperating with Nature: Confronting Natural Hazards with Land Use Planning for Sustainable Communities (1998), Washington D.C., Joseph Henry Press.

location and size of potential earthquakes, economic data, and other information to estimate losses from a potential earthquake.³

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.

Damages for a large earthquake almost anywhere in Southern California are likely to run into the billions of dollars. Although building codes are some of the most stringent in the world, tens of thousands of older existing buildings were built under much less rigid codes. California has laws affecting unreinforced masonry buildings (URM's) and although many building owners have retrofitted their buildings, hundreds of pre-1933 buildings still have not been brought up to current standards. The City of Santa Clarita has made an effort to provide education and assistance on the reinforcement of masonry buildings.

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.

Community Earthquake Issues

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

Dams

There are a total of 103 dams in Los Angeles County, owned by 23 agencies or organizations, ranging from the Federal government to Home Owner Associations.⁴ These dams hold billions of gallons of water in reservoirs. Releases of water from the major reservoirs are designed to protect Southern California from flood waters and to store domestic water. Seismic activity can compromise the dam structures, and the resultant flooding could cause catastrophic flooding. Following the 1971 Sylmar earthquake the Lower Van Norman Dam showed signs of structural compromise, and tens of thousands of persons had to be evacuated until the dam could be drained. The dam has never been

³ FEMA HAZUS <http://www.fema.gov/hazus/hazus2.htm> (May 2001).

⁴ Source: Los Angeles County Public Works Department, March 2004

refilled. There are two dams very near the City of Santa Clarita: Bouquet Canyon and Castaic dams. Both are located in the unincorporated area but, if failure were to occur, they would have a great impact on the City.

Buildings

The built environment is susceptible to damage from earthquakes. Buildings that collapse can trap and bury people. Lives are at risk and the cost to clean up the damages is great. In most California communities, including the City of Santa Clarita, many buildings were built before 1993 when building codes were not as strict. In addition, retrofitting is not required except under certain conditions and can be expensive. However, all buildings are at risk in one form or another. No building is earthquake-proof, regardless of the code they were designed under, there is always a possibility that the right type of earthquake with the right frequency can severely damage or destroy any structure. Because the City of Santa Clarita is a much newer city, as compared to other cities within Southern California, the buildings are generally newer. The California Seismic Safety Commission makes annual reports on the progress of the retrofitting of unreinforced masonry buildings.

Infrastructure and Communication

Residents in the City of Santa Clarita commute frequently by automobiles and public transportation such as buses and light rail. An earthquake can greatly damage bridges and roads, hampering emergency response efforts and the normal movement of people and goods. Damaged infrastructure strongly affects the economy of the community because it disconnects people from work, school, food, and leisure, and separates businesses from their customers and suppliers. The City owns three Metrolink stations and operates a full service transportation system, including a local, commuter and paratransit service. On average, 255,138 residents, per year, depend on the Metrolink Station transportation service as their connection to work/school/home. Additionally, on average the City's Transit (local and commuter) service carries approx 4.2 million passengers annually.

Bridge Damage

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

Much of the interstate highway system was built in the mid to late 1960's. The bridges in the City of Santa Clarita are state, county or privately owned (including railroad bridges). Cal Trans has retrofitted most bridges on the freeway systems (I-5 and Hwy 14); however there are still some county maintained bridges that are not retrofitted. The FHWA requires that bridges on the National Bridge Inventory be inspected every 2 years. The County

Department of Public Works through Cal Trans funding reviews all City bridges every two years and forwards a comprehensive report to the City with recommended work.

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 police stations, fire stations, hospitals, shelters, and other facilities that provide important services to the community. These facilities and their services need to be functional after an earthquake event. A few of the City's critical facilities are housed in older buildings that are not up to current seismic codes; however many have been designed and constructed to current seismic codes.

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.⁵

Individual Preparedness

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

Death and Injury

⁵ http://www.chamber101.com/programs_committee/natural_disasters/DisasterPreparedness/Forty.htm

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

Fire

Downed power lines or broken gas mains can trigger fires. When fire stations suffer building or lifeline damage, quick response to extinguish fires is less likely. Furthermore, major incidents will demand a larger share of resources, and initially smaller fires and problems will receive little or insufficient resources in the initial hours after a major earthquake event. Loss of electricity may cause a loss of water pressure in some communities, further hampering fire fighting ability.

Debris

After damage to a variety of structures, much time is spent cleaning up brick, glass, wood, steel or concrete building elements, office and home contents, and other materials. Developing a strong debris management strategy is essential in post-disaster recovery. Occurrence of a disaster does not exempt the City of Santa Clarita from compliance with AB 939 recycling regulations.

Potential Damages

Extensive research was completed for the 2008 ShakeOut scenario. As a result, communities within each of the impacted counties received valuable data created using Hazards – U.S. (HAZUS) which provided estimates of earthquake losses based on the 7.8 magnitude earthquake with an epicenter near the Salton Sea. Although the epicenter for this hypothetical event lies over hundreds of miles from the City, the shaking it created in the Santa Clarita Valley was strong or very strong. The following tables are taken from the Los Angeles County HAZUS. It is understood that the figures resulting from this scenario may not reflect the worst-case scenario for the City. If the epicenter were to move north closer to the City, the losses could be even greater.

Table 5.4 – Building Damage Count by General Occupancy – Shaking Only

LOS ANGELES COUNTY		# of Buildings					
City	General Occupancy	None	Slight	Moderate	Extensive	Complete	Total
SANTA CLARITA	Agriculture	18	1	0	0	0	19
SANTA CLARITA	Commercial	803	140	53	8	1	1,004
SANTA CLARITA	Education	35	3	1	0	0	39
SANTA CLARITA	Government	0	0	0	0	0	0
SANTA CLARITA	Industrial	188	60	35	7	0	291
SANTA CLARITA	Other Residential	1,836	272	88	22	4	2,222
SANTA CLARITA	Religion	82	9	1	0	0	92
SANTA CLARITA	Single Family	21,295	1,818	40	0	0	23,153
SANTA CLARITA Total		24,256	2,303	219	38	5	26,820

The City’s seventeen critical facilities were calculated separately with more accurate data provided for the following Building Damage Count by General Occupancy results:

- 7 – Damage Unlikely or Slightly
- 8 – Moderate Damage Possible
- 2 – Extensive Damage Possible (Central Park/Office Building and Transit Maintenance Facility)

Table 5.5 – Building Damage Count by General Building Type – Shaking Only

LOS ANGELES COUNTY		# of Buildings					
City	General Building Type	None	Slight	Moderate	Extensive	Complete	Total
SANTA CLARITA	Concrete	180	64	46	10	1	301
SANTA CLARITA	Manuf Housing	2	3	16	20	4	44
SANTA CLARITA	Precast Concrete	122	24	4	0	0	151
SANTA CLARITA	Reinforced Masonry	377	45	16	3	0	442
SANTA CLARITA	Steel	60	29	16	2	0	107
SANTA CLARITA	Unreinforced Masonry	25	6	2	0	0	33
SANTA CLARITA	Wood Frame	1,440	255	78	3	0	1,776
SANTA CLARITA	Wood Frame (Single-family)	22,050	1,875	41	0	0	23,966
SANTA CLARITA Total		24,256	2,303	219	38	5	26,820

In addition, it is estimated that 14 tons of brick, wood and other material, 28 tons of concrete and steel will be generated for a total of 42 tons of debris.

Existing Mitigation Activities

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

City of Santa Clarita Codes

Implementation of earthquake mitigation policy most often takes place at the local government level. The City of Santa Clarita Department of Building and Safety enforces building codes pertaining to earthquake hazards.

The following sections of the UBC address the earthquake hazard:

- 1605, 1 (Distribution of Horizontal Sheer);
- 1605. 2 (Stability against Overturning);
- 1626 (Seismic);
- 1605. 3 (Anchorage); and
- 1632 , 1633, 1633. 9 deal with specific earthquake hazards.

The City of Santa Clarita Planning Department enforces the zoning and land use regulations relating to earthquake hazards.

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

Coordination among Building Officials

The City of Santa Clarita Building Code sets the minimum design and construction standards for new buildings. The City adopts the California Code of Regulations, Title 24 (the California State Building Codes), as the set of codes regulations construction within its jurisdiction. The City of Santa Clarita adopts additional amendments to the State Codes based on local climatic, geological and/or topographical conditions. These codes set the minimum design and construction standards for new building in the City's jurisdiction. The codes currently in effect in the City of Santa Clarita are the 2007 California Building Codes and the 2008 City of Santa Clarita amendments. The City of Santa Clarita, along with every other jurisdiction in California, is mandated to adopt the State Codes within a certain time frame after their adoptions by the State. In the past, this process occurred every three years. The City of Santa Clarita does not arbitrarily enforce more restrictive requirements than those in these codes.

The City of Santa Clarita also requires that site-specific seismic hazard investigations be performed for new essential facilities, major structures, hazardous facilities, and special occupancy structures such as schools, hospitals, and emergency response facilities. The City has required site specific soils and geology investigations for projects such as these since its incorporation. The consultants preparing these reports routinely include a section on many hazards such as seismic activity, tsunamis, liquefaction and other as appropriate. However, the City of Santa Clarita does not plan check, inspect or approve "essential facilities" such as hospitals, schools and emergency response facilities (police, fire, ect). These are under the jurisdiction of the Department of the State Architect.

Businesses/Private Sector

Natural hazards have a devastating impact on businesses. In fact, of all businesses which close following a disaster, more than forty-three percent never reopen, and an additional twenty-nine percent close for good within the next two years.⁶ The Institute of Business and Home Safety has developed "Open for Business", which is a disaster planning toolkit to help guide businesses in preparing for and dealing with the adverse affects natural hazards. The kit integrates protection from natural disasters into the company's risk reduction measures to safeguard employees, customers, and the investment itself. The guide helps businesses secure human and physical resources during disasters, and helps to develop strategies to maintain business continuity before, during, and after a disaster occurs.

Hospitals

"The Alfred E. Alquist Hospital Seismic Safety Act ("Hospital Act") was enacted in 1973 in response to the moderate Magnitude 6.6 Sylmar Earthquake in 1971 when four major hospital campuses were severely damaged and evacuated. Two hospital buildings collapsed killing forty seven people. Three others were killed in another hospital that nearly collapsed.

⁶ Institute for Business and Home Safety Resources (April 2001),

In approving the Act, the Legislature noted that:

Hospitals, that house patients who have less than the capacity of normally healthy persons to protect themselves, and that must be reasonably capable of providing services to the public after a disaster, shall be designed and constructed to resist, insofar as practical, the forces generated by earthquakes, gravity and winds (Health and Safety Code Section 129680).

When the Hospital Act was passed in 1973, the State anticipated that, based on the regular and timely replacement of aging hospital facilities, the majority of hospital buildings would be in compliance with the Act's standards within 25 years. However, hospital buildings were not, and are not, being replaced at that anticipated rate. In fact, the great majority of the State's urgent care facilities are now more than 40 years old. Henry Mayo, the City's major hospital has vowed to use every means it has to keep its doors open to serve the community when there is a disaster. Additionally, the hospital just went through its accreditation, and did quite well. This is very significant because it deals with how they operate in an emergency situation.

The moderate Magnitude 6.7 Northridge Earthquake in 1994 caused \$3 billion in hospital-related damage and evacuations. Twelve hospital buildings constructed before the Act were cited (red tagged) as unsafe for occupancy after the earthquake. Those hospitals that had been built in accordance with the 1973 Hospital Act were very successful in resisting structural damage. However, nonstructural damage (for example, plumbing and ceiling systems) was still extensive in those post-1973 buildings.

Senate Bill 1953 ("SB 1953"), enacted in 1994 after the Northridge Earthquake, expanded the scope of the 1973 Hospital Act. Under SB 1953, all hospitals are required, as of January 1, 2008, to survive earthquakes without collapsing or posing the threat of significant loss of life. The 1994 Act further mandates that all existing hospitals be seismically evaluated, and retrofitted, if needed, by 2030, so that they are in substantial compliance with the Act (which requires that the hospital buildings be reasonably capable of providing services to the public after disasters). SB 1953 applies to all urgent care facilities (including those built prior to the 1973 Hospital Act) and affects approximately 2,500 buildings on 475 campuses.

SB 1953 directed the Office of Statewide Health Planning and Development ("OSHPD"), in consultation with the Hospital Building Safety Board, to develop emergency regulations including "...earthquake performance categories with sub-gradations for risk to life, structural soundness, building contents, and nonstructural systems that are critical to providing basic services to hospital inpatients and the public after a disaster." (Health and Safety Code Section 130005).

In 2001, recognizing the continuing need to assess the adequacy of policies, and the application of advances in technical knowledge and understanding, the California Seismic Safety Commission created an Ad Hoc Committee to re-examine the compliance with the

Alquist Hospital Seismic Safety Act. The formation of the Committee was also prompted by the recent evaluations of hospital buildings reported to OSHPD that revealed that a large percentage (40%) of California’s operating hospitals are in the highest category of collapse risk.”⁷.

California Earthquake Mitigation Legislation

California is painfully aware of the threats it faces from earthquakes. Dating back to the 19th century, Californians have been killed, injured, and lost property as a result of earthquakes. As the State’s population continues to grow, and urban areas become even 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. The table below provides a sampling of some of the 200 plus laws in the State’s codes.

Partial List of the Over 200 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 unreinforced masonry buildings.
Health and Safety Code Section 1596.80-1596.879	Required all child day care facilities to include an Earthquake Preparedness Checklist as an attachment to their disaster plan.
Source: http://www.leginfo.ca.gov/calaw.html	

Earthquake Education

Earthquake research and education activities are conducted at several major universities in the Southern California region, including Cal Tech, USC, UCLA, UCSB, UCI, and UCSB. The local

⁷ http://www.seismic.ca.gov/pub/CSSC_2001-04_Hospital.pdf

clearinghouse for earthquake information is the Southern California Earthquake Center located at the University of Southern California, Los Angeles, CA 90089, Telephone: (213) 740-5843, Fax: (213) 740-0011, Email: SCEinfo@usc.edu, Website: <http://www.scec.org>. The Southern California Earthquake Center (SCEC) is a community of scientists and specialists who actively coordinate research on earthquake hazards at nine core institutions, and communicate earthquake information to the public. SCEC is a National Science Foundation (NSF) Science and Technology Center and is co-funded by the United States Geological Survey (USGS).

In addition, Los Angeles County along with other Southern California counties, sponsors the Emergency Survival Program (ESP), an educational program for learning how to prepare for earthquakes and other disasters. Many school districts have very active emergency preparedness programs that include earthquake drills and periodic disaster response team exercises.

The City of Santa Clarita has implemented an aggressive Emergency Management Program, inclusive of education and outreach to the residents of Santa Clarita. In addition, the City, community, schools, hospitals and businesses actively participate in the State's annual Great Shakeout exercise.

Earthquake Mitigation Action Items

The earthquake mitigation action items provide guidance on suggesting specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from earthquake events. Each action item is followed by activities for implementation, which can be used by the steering committee and local decision makers in pursuing strategies for implementation.

E1: Identify funding sources for structural and nonstructural retrofitting of structures that are identified as seismically vulnerable.

Activities:

- 1. Provide information for property owners, small businesses, and organizations on sources of funds (loans, grants, etc.)*
- 2. Explore options for including seismic retrofitting in existing programs such as low-income housing, insurance reimbursements, and pre and post disaster repairs.*

Priority:	Low
Coordinating Organization:	Public Works, City Manager's Office
Timeline:	Ongoing
Plan Goals Addressed:	Partnerships and Public Awareness
Funding Source:	General Fund

E2: Seismically retrofit city-owned facilities to meet essential and critical building codes and standards, as needed.

Activities:

- 3. Seismically retrofit City Hall (primary EOC.)*
- 4. Seismically retrofit Transportation Maintenance Facility to perform as an essential facility (alternate EOC).*
- 5. Seismically retrofit Sports Complex Facility to perform as a critical facility (community shelter).*

Priority:	Medium
Coordinating Organization:	Building and Safety Division
Timeline:	5 years
Plan Goals Addressed:	Protect Life and Property and Emergency Services
Funding Source:	Capital Improvement Projects

E3: Educate citizens about seismic risks, the potential impacts of earthquakes and opportunities for mitigation actions.

Activities:

- 6. Print and distribute emergency preparedness booklet.*
- 7. Organize and hold an annual Earthquake Forum.*

8. *Distribute emergency preparedness information through other social media outlets.*
9. *Encourage residents to prepare an earthquake kit, an evacuation plan and mitigate non-structural hazards.*

Priority: Medium

Coordinating Organization: Parks and Recreation and Community Services, Community Services Division, Building and Safety Division

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property and Public Awareness

Funding Source: General Funding

E4: Encourage seismic strength evaluations of critical facilities in the City of Santa Clarita to identify vulnerabilities for mitigation of schools and universities, public infrastructure, and critical facilities to meet current seismic standards.

Activities:

10. *Develop an inventory of schools, universities, and critical facilities that do not meet current seismic standards.*
11. *Encourage owners of non-retrofitted structures to upgrade them to meet seismic standards.*
12. *Encourage water providers to replace old cast iron pipes with more ductile iron, and identify partnership opportunities with other agencies for pipe replacement.*

Priority: Medium

Coordinating Organization: Building and Safety Division, local water agencies, school districts, and LA County Public Works

Timeline: 5 years

Plan Goals Addressed: Protect Life and Property and Emergency Services

Funding Source: General Fund

E5: Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.

Activities:

13. *Provide information to government building and school facility managers and teachers on securing bookcases, filing cabinets, light fixtures, and other objects that can cause injuries and block exits.*
14. *Encourage facility managers, business owners, and teachers to refer to FEMA's practical guidebook: "Reducing the Risks Nonstructural Earthquake Damage."*
15. *Encourage homeowners and renters to use "Is Your Home Protected from Earthquake Disaster? A Homeowner's Guide to Earthquake Retrofit" (IBHS) for economic and efficient mitigation techniques.*

Priority: Medium

Coordinating Organization: Building and Safety Division, Parks and Recreation and Community Services, Community Services Division, school districts, Chamber of Commerce, Valley Industrial Association (VIA), Building and Industry Association (BIA), and residents

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property, and Public Awareness

Funding Source: General Fund

E6: Identify and require analysis and modification of structures that are vulnerable to earthquake damage: pre-cast concrete, soft-story structures, and non-ductile frame buildings.

Activities:

- 17. Perform a seismic retrofit analysis of Santa Clarita City Hall - the primary emergency operations center (EOC) for the Santa Clarita Valley.*
- 18. Implement a program to investigate critical connections within existing buildings for unrepaired damage caused by the 1994 Northridge Earthquake. Where damage is uncovered, mandate further investigation and repairs in accordance with City Council direction.*

Priority: High

Coordinating Organization: Building and Safety Division of Public Works Dept., FEMA, CalEMA

Timeline: 5 years

Plan Goals Addressed: Protect Life and Property, Public Awareness, Partnerships and Implementation and Emergency Services

Funding Source: Hazard Mitigation Grant Program, FEMA

Earthquake Resource Directory

Local and Regional Resources

<u>Los Angeles County Public Works Department</u>		
Level: County	Hazard: Multi	http://ladpw.org
900 S. Fremont Ave.		
Alhambra, CA 91803		Ph: 626-458-5100 Fx:
Notes: The Los Angeles County Department of Public Works protects property and promotes public safety through Flood Control, Water Conservation, Road Maintenance, Bridges, Buses and Bicycle Trails, Building and Safety, Land Development, Waterworks, Sewers, Engineering, Capital Projects and Airports		
<u>Southern California Earthquake Center (SCEC)</u>		
Level: Regional	Hazard: Earthquake	www.scec.org

3651 Trousdale Parkway	Suite 169	
Los Angeles, CA 90089-0742	Ph: 213-740-5843	Fx: 213/740-0011
Notes: The Southern California Earthquake Center (SCEC) gathers new information about earthquakes in Southern California, integrates this information into a comprehensive and predictive understanding of earthquake phenomena, and communicates this understanding to end-users and the general public in order to increase earthquake awareness, reduce economic losses, and save lives.		

State Resources

California Department of Transportation (CalTrans)		
Level: State	Hazard: Multi	http://www.dot.ca.gov/
120 S. Spring Street		
Los Angeles, CA 90012	Ph: 213-897-3656	Fx:
Notes: CalTrans is responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries. Alone and in partnership with Amtrak, CalTrans is also involved in the support of intercity passenger rail service in California.		
California Resources Agency		
Level: State	Hazard: Multi	http://resources.ca.gov/
1416 Ninth Street		
Sacramento, CA 95814	Ph: 916-653-5656	Fx:
Notes: The California Resources Agency restores, protects and manages the state's natural, historical and cultural resources for current and future generations using solutions based on science, collaboration and respect for all the communities and interests involved.		
California Division of Mines and Geology (DMG)		
Level: State	Hazard: Multi	www.consrv.ca.gov/cgs/index.htm
801 K Street		
Sacramento, CA 95814	Ph: 916-445-1825	Fx: 916-445-5718
Notes: The California Geological Survey develops and disseminates technical information and advice on California's geology, geologic hazards, and mineral resources.		
California Department of Conservation: Southern California Regional Office		
Level: State	Hazard: Multi	www.consrv.ca.gov
655 S. Hope Street		
Los Angeles, CA 90017-2321	Ph: 213-239-0878	Fx: 213-239-0984
Notes: The Department of Conservation provides services and information that promote environmental health, economic vitality, informed land-use decisions and sound management of our state's natural resources.		
California Planning Information Network		
Level: State	Hazard: Multi	www.calpin.ca.gov
Notes: The Governor's Office of Planning and Research (OPR) publishes basic information on local planning		
California Emergency Management Agency (CALEMA)		
Level: State	Hazard: Multi	www.oes.ca.gov
P.O. Box 419047		
Rancho Cordova, CA 95741-9047	Ph: 916 845- 8911	Fx: 916 845- 8910

Notes: The Governor's Office of Emergency Services coordinates overall state agency response to major disasters in support of local government. The office is responsible for assuring the state's readiness to respond to and recover from natural, manmade, and war-caused emergencies, and for assisting local governments in their emergency preparedness, response and recovery efforts.

Federal and National Resources

Building Seismic Safety Council (BSSC)		
Level: National	Hazard: Earthquake	www.bssconline.org
1090 Vermont Ave., NW		Suite 700
Washington, DC 20005	Ph: 202-289-7800	Fx: 202-289-109
Notes: The Building Seismic Safety Council (BSSC) develops and promotes building earthquake risk mitigation regulatory provisions for the nation.		
Federal Emergency Management Agency, Region IX		
Level: Federal	Hazard: Multi	www.fema.gov
1111 Broadway		Suite 1200
Oakland, CA 94607	Ph: 510-627-7100	Fx: 510-627-7112
Notes: The Federal Emergency Management Agency is tasked with responding to, planning for, recovering from and mitigating against disasters.		
Federal Emergency Management Agency, Mitigation Division		
Level: Federal	Hazard: Multi	www.fema.gov/fima/planhowto.shtm
500 C Street, S.W.		
Washington, D.C. 20472	Ph: 202-566-1600	Fx:
Notes: The Mitigation Division manages the National Flood Insurance Program and oversees FEMA's mitigation programs. It has a number of programs and activities which provide citizens Protection, with flood insurance; Prevention, with mitigation measures and Partnerships, with communities throughout the country.		
United States Geological Survey		
Level: Federal	Hazard: Multi	http://www.usgs.gov/
345 Middlefield Road		
Menlo Park, CA 94025	Ph: 650-853-8300	Fx:
Notes: The USGS provides reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.		
Western States Seismic Policy Council (WSSPC)		
Level: Regional	Hazard: Earthquake	www.wsspc.org/home.html
125 California Avenue		Suite D201, #1
Palo Alto, CA 94306	Ph: 650-330-1101	Fx: 650-326-1769
Notes: WSSPC is a regional earthquake consortium funded mainly by FEMA. Its website is a great resource, with information clearly categorized - from policy to engineering to education.		
Institute for Business & Home Safety		
Level: National	Hazard: Multi	http://www.ibhs.org/
4775 E. Fowler Avenue		
Tampa, FL 33617	Ph: 813-286-3400	Fx: 813-286-9960
The Institute for Business & Home Safety (IBHS) is a nonprofit association that engages in communication, education, engineering and research. The Institute works to reduce deaths, injuries, property damage, economic losses and human suffering caused by natural disasters.		

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>

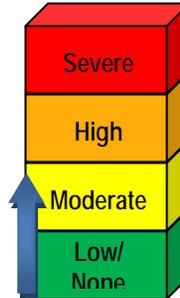
“Public Assistance Debris Management Guide”, FEMA (July 2000).

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.

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SECTION SIX – FLOOD HAZARD PROFILE

CATEGORY OF RISK	LEVEL OF RISK
Probability/Frequency:	Highly Likely
Magnitude/Severity:	Negligible
Warning Time:	More than 24 hours
Duration:	Less than 1 week



Flood Hazard Information and Background

Flooding in Santa Clarita could occur as a result of any of the following conditions: (1) heavy, prolonged rainfall; (2) the collapse or leakage of a nearby dam; (3) a smaller precipitation event in a degraded watershed or drainage system resulting from a recent fire or excessive grading; and (4) a sudden release of water caused by the rupture of the California aqueduct. In the Santa Clarita Valley the primary flood hazard areas occur in and along natural drainage channels, rivers, washes, and blue-line streams.

Santa Clarita enjoys a mild Southern California Mediterranean climate. Winters are temperate and semi-moist, typically in the 40° - 65° range. Precipitation reaches 15 to 18 inches primarily between the months of November and March. Flooding is most common from October through March, when El Nino storms have the potential to bring intense rainfall to the area. Santa Clarita receives approximately 14 inches of rain on average each year. During the rainy season, monthly rainfall totals average far higher than other months of the year.

Two types of flooding primarily affect the City of Santa Clarita: riverine flooding and urban flooding. In addition, any low-lying area has the potential to flood. The flooding of developed areas may occur when the amount of water generated from rainfall and runoff exceeds a storm water system's (ditch or sewer) capability to remove it.

Riverine Flooding

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

Urban Flooding

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. The water moves from the clouds, to the ground, and into streams at a much faster rate in

urban areas. Adding these elements to the hydrological systems can result in floodwaters that rise very rapidly and peak with violent force. During periods of urban flooding, streets can become swift moving rivers and basements can fill with water. Storm drains often back up with vegetative debris causing additional, localized flooding.

The City of Santa Clarita is bisected by the Santa Clara River, the largest Significant Ecological Area (SEA) in the Santa Clarita Valley. It extends through the City of Santa Clarita and along the entire Santa Clara River watershed. The river supports a variety of natural habitats, although a great portion of the river channel remains dry for most of the year. In scattered areas, however, the water table under the stream bed is high and contains lush riparian. The assemblage of vegetation, described as a broad wash association in the SEA descriptions, is unlike that found in steeper mountain canyons and is rare in the Los Angeles basin. The Santa Clara River is the only major river drainage from the San Gabriel Mountains that remains unchannelized for most of its length.

The Santa Clara River which runs through the City of Santa Clarita is susceptible to flooding events. Flooding poses a threat to life and safety, and can cause severe damage to public and private property.

Description of Drainage Area

Physiography and Topography

The Santa Clara River originates in the watershed areas of the San Gabriel Mountain and flows approximately 84 miles westward. It then empties into the Pacific Ocean near Ventura, California, approximately 60 miles northwest of Los Angeles. It drains an area of approximately 1,634 square miles. An estimated 90 percent of the drainage area is mountainous with steep, rocky ridges and numerous canyons. The remaining 10 percent consist of narrow alluvial valleys and coastal plain. Generally, the upper sub basins of various tributaries drain mountainous terrain at substantially steeper slopes than the lower sub basins which traverse a relatively plain area. Three major mountain ridges border on or near the drainage area; namely, Coast Range on the west, Tehachapi Mountains to the north, and San Gabriel Mountains to the south. Maximum elevation occurs within the subject basin at Mount Pinos near the western end of the northern boundary, and is approximately 8,826 feet above Mean Sea Level. Gently sloping alluvial valleys are found along the Santa Clara River downstream from the mouth of Soledad Canyon and along the downstream parts of some of the principal tributaries.

Principal tributaries in the downstream order are:

- Soledad Canyon
- Live Oak Springs Canyon
- Sand Canyon
- Mint Canyon
- Bouquet Canyon
- South Fork of the Santa Clara River
- San Francisquito Canyon
- Castaic Creek

The South Fork, as the name implies, flows into the Santa Clara River from the south. Approximately 90 percent of the drainage area is on the north side of the river.

Downstream from Soledad Canyon, the riverbed becomes a wide sandy wash that extends to the ocean. Various other blueline streams and drainage courses allows flow through the City. The flood hazard areas are identified on Flood Zones, Map C-2 in Appendix C of this Plan.

Castaic Reservoir Inundation

Type:	Earthen
Capacity:	323,700 acre feet
Dam Crest Elevation:	1535 feet
Dam Length:	5,200 feet
Dam Height:	340 feet
Dam Crest Width:	40 feet
Year Built:	1973
Spillway gates:	Ungated/Unrestricted
Use:	Storage, Irrigation, Municipal Water & Recreation
Owned by:	California Department of Water Resources

Castaic Reservoir inundation maps, prepared by the California Department of Water Resources, indicate areas of potential flooding in Castaic, Val Verde, and Valencia in the event of a dam failure. Under such conditions, floodwaters would rapidly travel southward, flooding Castaic, Val Verde, and Valencia within 15 minutes. At the Castaic Junction, the flow would cease at Magic Mountain Parkway.

Bouquet Reservoir Inundation

Type:	Earthen Dam
Capacity:	36,505 acre feet
Dam Crest Elevation:	3008 feet
Dam Length:	1180 feet
Dam Height:	190 feet
Dam Crest Width:	50 feet
Year built:	1934
Spillway gates:	Ungated/unrestricted
Use:	Storage/Municipal Water
Owned by:	Los Angeles Department of Water & Power

Bouquet Reservoir inundation maps provided by the City of Los Angeles Department of Water and Power depict possible flood areas in Saugus and Valencia. In such a situation, any structure situated north of McBean Parkway in the Bouquet Canyon area at an elevation under 1,200 feet would be exposed to flood waters within 49 minutes of dam failure. This area includes Rosedell Elementary School and Saugus High School and residential areas around King Crest and Alaminos Drive. After flooding down Bouquet Canyon, the floodwaters would enter the Santa Clara River. The water level would rise and likely inundate Newhall Ranch Road and parts of Interstate 5 south of Castaic Junction.

Flood Terminology

100-Year Flood

The 100-year flooding event is the flooding level that has a one percent chance of being equaled or exceeded in magnitude in any given year. Contrary to popular belief, it is not a flood occurring once every 100 years. The 100-year floodplain is the area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood. Flood Zones, Map C-2 in Appendix C of this Plan illustrates the 100-year and 500-year flood zones in Santa Clarita.

Base Flood Elevation (BFE)

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

Floodplain

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

Floodway

The floodway is one of two main sections that make up the floodplain. Floodways are defined for regulatory purposes. Unlike floodplains, floodways do not reflect a recognizable geologic feature. For NFIP purposes, floodways are defined as the channel of a river or stream, and the overbank areas adjacent to the channel. The floodway carries the bulk of the floodwater downstream and is usually the area where water velocities and forces are the greatest. NFIP regulations require that the floodway be kept open and free from development or other structures that would obstruct or divert flood flows onto other properties. The NFIP floodway definition is “the channel of a river or other watercourse and adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. Floodways are not mapped for all rivers and streams but are generally mapped in developed areas.

Flood Fringe

The flood fringe refers to the outer portions of the floodplain, beginning at the edge of the floodway and continuing outward. This is the area where development is most likely to

occur, and where precautions to protect life and property per the NFIP regulations must be met.

Seiches

A seiche is the creation of large waves on a lake or reservoir due to earthquake shaking. They can be triggered by long period ground motion from distant earthquakes, or from ground displacement beneath the body of water. In reservoirs, seiches can generate short-term flooding of downstream areas. In addition, earthquake-induced landsliding can cause seiche-like waves. A seiche may occur at Castaic or Bouquet Dams which could threaten the community of Santa Clarita.

Flood History

Table 6.1 provides a listing of major flood events that have occurred in Los Angeles County since the early sixties.

Table 6.1 – Major Flood Events in Los Angeles County

Declaration Date	Disaster Number	State	Federal	Disaster Description
03/08/10	1884	Yes	Yes	Severe Winter Storms, Flooding, and Debris and Mud Flows
04/15/05	1585	Yes	Yes	Severe Storms, Flooding, Landslides, and Mud/debris slides
02/04/05	1577	Yes	Yes	Severe Storms, Flooding, Debris Flows, and Mudslides
02/09/98	1203	Yes	Yes	Severe Winter Storms and Flooding
03/12/95	1046	Yes	Yes	Severe winter storms, flooding, mud/landslides
01/10/95	1044	Yes	Yes	Severe winter storms, flooding, mud/landslides
10/28/93	1005	Yes	Yes	Fires, mudslides, flooding, soil erosion
2/3/93	979	Yes	Yes	Severe Storm, Winter Storm, Mud & Landslides, Flooding
2/25/92	935	Yes	Yes	Severe winter storm
2/9/83	Unknown	Yes	Yes	Flood/Winter Storms
2/9/83	677	Yes	Yes	Flood, Severe Storm
2/21/80	615	Yes	Yes	Flood
2/15/78	Unknown	Yes	Yes	Severe Storm
2/1/73	Unknown	Yes	No	High Ocean Tides and Wind-driven waves
2/23/73	364	Yes	Yes	Coastal Flooding
5/19/71	Unknown	Yes	No	High Ocean Tides and Wind-driven waves
1/26/69	Unknown	Yes	Yes	Flood, storms
12/7/65	Unknown	Yes	Yes	Flood, Severe Storm

Probability, Frequency and Magnitude

According to the Flood Zones Map, C.2, in Appendix C which incorporates the FEMA Flood Insurance Rate Map (FIRM) data, some areas of the City of Santa Clarita are located in 100-year and 500-year floodplains. The 100-year and 500-year recurrence intervals indicate a 0.01 and 0.002 annual probability of a flooding event, respectively. Although the recurrence interval represents the long-term average period between floods of specific magnitude, significant floods could occur at shorter intervals or even within the same year.

Historic Losses and Impacts

The primary effect of flooding is the threat to life and property. People and animals may drown; structures and their contents may be washed away or destroyed; roads, bridges, and railroad tracks may be washed out; and crops may be destroyed.

Floods may also create health hazards due to the discharge of raw sewage from damaged septic tank leach fields, sewer lines, and sewage treatment plants and due to flammable, explosive, or toxic materials carried off by flood waters. In addition, vital public services may be disrupted.

1928 St. Francis Dam failure

Construction began on the 600-foot-long, 185-foot-high St. Francis Dam in August 1924. With a 12.5 billion-gallon capacity, the reservoir began to fill with water on March 1, 1926. On March 12, 1928, the dam failed, sending a 180-foot-high wall of water crashing down San Francisquito Canyon, washing out the original Santa Clara River Bridge and parts of Piru, Fillmore, Santa Paula, Montalvo, Saticoy, and Ventura. An estimated 470 people were dead by the time the floodwaters reached the Pacific Ocean south of Ventura 5 1/2 hours later. It was the second-worst disaster in California history, after the great San Francisco earthquake and fire of 1906, in terms of lives lost. Damages were estimated at \$862.2 million (year 2010 dollars). This event pre-dates Santa Clarita cityhood.

1983 El Nino

In January and February of 1983, the Sand Canyon Road Bridge was washed out by El Nino floods. This event pre-dates Santa Clarita cityhood.

1992 Winter Storms/1992 Late Winter Storms

The winter storms in February of 1992 resulted in flooding, rainstorms, and mud slides in the City of Santa Clarita. FEMA declared parts of Los Angeles County a disaster area on February 12, 1992 (FEMA 935-DR-CA).

In December of 1992, rain and high winds resulted in FEMA declaring Los Angeles County a disaster area on February 19, 1993 (FEMA 979-DR-CA). Impacts from these two storm events together included:

- The evacuation of a mobile home park, due to debris being blocked from the run-off into the culvert off of the Gavin pass and directly impacting the Wiley Canyon Stream which is adjacent to a farm and mobile home park. The City engaged in debris removal and protective measures to restore the sight. Subsequent projects realigned the road and mitigated drainage issues.
- City Park, Canyon Country Park suffered damage to the lower part of a slope which sloughed off. City installed French drains to mitigate this from happening again.
- Roadway flooding occurred along the Soledad Canyon Corridor by the Saugus Speedway. City added riprap embankments along with an adjacent trail system to lessen the flooding hazard.

- A complete drainage system was developed by the City, and Los Angeles County to mitigate drainage issues from the Sand Canyon Area to prevent road closure occurrences (there was only one egress in the Canyon).
- Ongoing mitigation activities of the Soledad Canyon road way—ongoing work.
- A dewatering project by the community near the riverbed.

1995 Severe Winter Storms

In January of 1995, severe winter storms resulted in FEMA declaring Los Angeles County a disaster area on January 6, 1995 (FEMA 1044-DR-CA). Impacts from this storm event included:

- Extreme runoff of the Newhall creek, following a brush fire.
- Emergency excavation of debris from the stream channel, preventing potential flooding and wash out of a mobile park. The excavation assisted with the future development of a park along the river embankment.

1995 Late Winter Storms

In February of 1995, late winter storms resulted in FEMA declaring Los Angeles County a disaster area on March 12, 1995 (FEMA 1046-DR-CA).

1998 El Nino

In February of 1998, the El Nino condition resulted in FEMA declaring Los Angeles County a disaster on February 9, 1998 (FEMA 1203-DR-CA). Impacts from this storm event included:

- A washout of the Bouquet Canyon Bridge—a key arterial roadway within the City. Water from the Santa Clara River beat against abutments of the bridge caused a sinkhole on the bridge. Mitigation activities included the widening of the bridge.

2005 Severe Storms In January and February of 2005, severe storms resulted in a Federal declaration of a disaster for Los Angeles County (FEMA 1577-DR-CA). Public damages were approximately \$1.8 million while residents suffered approximately \$4 million. The winter storms resulted in the loss of one mobile home on the Santa Clara River, and the loss of trails and paths along the Santa Clara River and several tributaries. Significant damage and flooding occurred to a mobile home park adjacent to Newhall Creek. Fast moving water gushed through the Polynesian Mobile Home Park causing 150 residents to evacuate from the mobile home park for several days. No serious injuries were reported.¹ In all 38 mobile homes were red tagged, 15 mobile homes were destroyed, 5 residential homes were red tagged due to landslide potential. Building and Safety surveyed 31 residential sites regarding debris flow, hillside slope movement, landslides, culverts and property damage.

¹ Jia-Rui Chong, Amanda Covarrubias and Richard Fausset. "3 Killed as Unrelenting Storms Batter Southland; Flooding and mudslides close roads and damage houses. Rain is expected to last through Tuesday :[HOME EDITION]. "Los Angeles Times 10 Jan. 2005, Los Angeles Times, ProQuest. Web. 23 Apr. 2010.

2010 Sever Storms – In January and February of 2010, severe winter storms, flooding, and debris and mud flows resulted in a Federal declaration of a disaster for Los Angeles County (FEMA 1884-DR). Impacts from this storm event included:

- Typical roadway debris and tree removal.
- Slope erosion at the City’s Sports Complex—Water erosion caused some hill sloughing, causing debris to impact recreational area and the pools.

Designated Hazard Areas

Localized flooding has been experienced intermittently in some areas of the Valley due to local drainage conditions. During heavy rains over the last few years some areas of Castaic, Newhall, Friendly Valley, and Bouquet Canyon have experienced mudflows or flooding. Two areas of the City known to experience intermittent flooding are portions of Placerita Canyon and Sand Canyon. During storm events, transmission of storm flows within the street right-of-way may cause localized flooding in these areas, rendering some roads impassable. Throughout most areas of the City, curbs and gutters have been designed to contain and carry storm flows into drainage structures; in these areas, stormwater water within the street that is contained by the curbs is an indication that the combined roadway-drainage system is functioning correctly. In County areas, major drainage improvements will be constructed by developers as part of the infrastructure requirements for new master-planned communities. Portions of Sierra Highway north of the Santa Clara River are subject to flooding from Mint Canyon, and the lack of adequate flood control facilities in this area represents the last major constraint to development along this arterial corridor in Canyon Country. It is expected that new development along Sierra Highway will generate requirements for flood control improvements in this area. Within both jurisdictions, localized, short-term flooding resulting from excessive rainfall, soil erosion resulting from wildland fires, or inadequate local drainage infrastructure will be addressed by providing or requiring local improvements as needed.²

Map C.2 – Flood Zones Map, in the Appendix of this Plan, depicts the FEMA Flood Insurance Rate Map (FIRM) for the City of Santa Clarita. All Special Flood Hazard Areas (SFHAs) are all zones beginning with the letter A (A, AE, AO, AH) and are considered the 100-year or high risk zones. The 500-year or X zones and the D zone are considered low-to-medium risk zones.

Potential Damages

The City’s Technology Services Division, GIS Group used the FEMA FIRM data and the City’s own GIS data to identify the structures that lie within the flood hazard zones. It is understood that if a structure is identified in a flood hazard area that it has a higher probability of being impacted by a flood than a structure that is not in the flood hazard area. Table 6.2 - Potential Building Count by General Occupancy identifies these structures in the city’s flood hazard zones.

² City of Santa Clarita, General Plan, Safety Element, DRAFT, October 2008.

Table 6.2 - Potential Building Count by General Occupancy

General Occupancy	# of Buildings in High Risk Flood Zone	# of Buildings in Low-Medium Risk Flood Zone
Commercial	360	14
Industrial	323	0
Residential	2,213	893
Special Purpose	37	8

Repetitive Loss Properties

Two properties within the City experienced repeated flooding and were considered by FEMA as repetitive loss properties. Repetitive loss properties include every NFIP insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced:

- Four or more paid flood losses of more than \$1,000 each; or
- Two paid flood losses within a 10-year period that, in the aggregate, equal or exceed the current value of the insured property; or
- Three or more paid losses that, in the aggregate, equal or exceed the current value of the insured property

Depending on individual circumstances, appropriate mitigation measures commonly include elevating buildings above the level of the base flood, demolishing buildings, and removing buildings from the Special Flood Hazard Area. Sometimes, mitigation takes the form of a local drainage-improvement project that meets NFIP standards.

One of the repetitive loss properties is located in the Newhall area of Santa Clarita. The flooding was a result of the property’s inability to adequately absorb all of the water from heavy rains. A storm drain channel was constructed directly adjacent to that property draining stormwater from this, and all adjoining neighborhoods in this sub-basin of Newhall, and drains into the South Fork of the Santa Clara River. The mitigation information was received by FEMA and the property is no longer considered a repetitive loss property as of March 1990.

The second property is located in the Canyon Country area of Santa Clarita. The flooding was a result of improper grading and blockage of drainage paths. The owner of the property re-graded the entire lot and installed drainage swales and area drains to convey the stormwater directly to the storm drain system. The mitigation information was received by FEMA and the property is no longer considered a repetitive loss property as of January 2005.

The primary objective of the Repetitive Loss Properties Strategy is to eliminate or reduce the damage to properties and the disruption of life caused by repeated flooding of the same properties. Specific target groups of repetitive loss properties are identified and serviced separately from other NFIP policies by the Special Direct Facility (SDF).

If the property is mitigated for the flood issues, the property will be removed from the target group at the next policy renewal, and the policy then will be transferred from the SDF to the Write Your Own (WYO) company that previously serviced the policy.

Existing Mitigation Activities

The City has adopted numerous ordinances and policies, which govern development in the floodplain areas. The latest adopted, Ordinance No. 08-11 is the City's Floodplain Management Ordinance. It was adopted in compliance with FEMA and the National Flood Insurance Program. City Resolution No. 88-93 establishes and assures compliance with Section 44 of the Code of Federal Regulations and other floodplain management requirements.

The City has adopted Chapter 11.60 of the Los Angeles County Code by reference. This chapter adopts floodway maps, governs construction within floodways, and establishes water surface elevations. The floodway maps are more precise and more restrictive than the Flood Insurance Rate Maps (FIRMs). The maps designate floodway areas in which no construction is allowed and flood fringe areas where construction is allowed upon complying with all applicable flood-proofing requirements. The ordinance and maps provide greater control over new developments and assures more adequate protection from flood hazards. FEMA is undergoing new Flood Insurance Studies (FIS) for the Santa Clara River and its major tributaries and these studies will be used to develop new FIRMs with regulatory floodways to be adopted in 2011. These maps will supersede the Los Angeles County floodway maps but the Los Angeles County floodway maps will still be used in floodplain areas not restudied by FEMA.

The City has also adopted the Uniform Building Code (UBC), which has provisions for flood hazard areas. Section 308(a) of the UBC requires the proposed buildings and walls to comply with Title 44 of the Code of Federal Regulations and the floodway ordinance prior to issuance of permits.

The Building Code Section 308(b) addresses geologic hazards. It prohibits the construction of buildings in areas, which are subject to hazard from landslide, settlement, or slippage from loose debris, slope wash, and mud flows. It requires all proposed structures to be reviewed and to be determined to be geologically safe. Where the applicant cannot demonstrate that the building will be safe, the Building Official may deny issuance of a permit.

Chapter 10.06 of the Municipal Code governs channels and drainage courses. This chapter prohibits any obstructions, alterations, and encroachments within channels, rivers, and washes.

The Development Services Division of the Public Works Department reviews all development proposals for compliance with flood regulations. Any project within a Special Flood Hazard Area (SFHA) must meet floodplain management regulations and comply with applicable flood ordinances and policies. Development and construction requirements are established for each project through conditions of approval. All conditions must be met prior to occupancy of the structure.

All structures are required to be located outside of the floodway. Structures proposed to be built in the flood fringe area are required to be elevated and/or adequately protected and must comply with FEMA and City design standards. Structures finished floors must be elevated a minimum of one foot above the Base Flood Elevation. Elevation certificates must be provided and are kept on file in the Development Services Division.

All storm drains and drainage devices must be constructed per Los Angeles County Flood Control Design Standards. Plans for those projects are submitted to the County for review and approval. Upon construction of the storm drains, the drains are transferred to the Los Angeles County Flood Control District for maintenance.

California Department of Water Resources reviewed the City policies and procedures regarding implementation of the local floodplain management regulations on April 30, 1992. A report was issued on May 11, 1992, which commended the City and staff on the excellent work in implementing the National Flood Insurance Program. The findings of the report indicated that there were no problems with the regulations, enforcement, programs, or data currently being used by the City. The City undergoes a review of the program approximately every five years and has continued to meet the requirements and remain in compliance.

Community Rating System

The City of Santa Clarita has participated in the Community Rating System (CRS) since 2001. The CRS is a voluntary program for National Flood Insurance Program (NFIP) participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. The CRS has been developed to provide incentives in the form of premium discounts for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. The NFIP's CRS program ranks Cities according to outreach conducted and flood protection provided for residents in floodplains. Since Santa Clarita's inception to the CRS program in 2001, the City maintained a class 9 rating, giving community members a 5 percent reduction in federal flood insurance premiums.

Due to City of Santa Clarita staff efforts and outreach in 2009, the NFIP improved Santa Clarita's "Community Rating" from a "9" to an "8" in the NFIP CRS, resulting in a 5 percent increase in discounts applied to flood insurance policies. Community members residing in local floodplains areas will now receive a 10 percent discount on new federal flood insurance policies written after the new rating goes into effect on October 1, 2009.

Flood Mitigation Action Items

The flood mitigation action items provide guidance on suggesting specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from flood events. Each action item is followed by activities for implementation, which can be used by the steering committee and local decision makers in pursuing strategies for implementation.

F1: Continue participation in programs.

Activities:

1. *Continue the participation in the National Flood Insurance Program (NFIP).*
2. *Continue in the participation of the Community Rating System (CRS). This program consists of additional "activities" which are all defined by FEMA and have points associated with each activity.*

Priority: High

Coordinating Organization: Public Works Dept., Developers, Homeowners, and FEMA

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property, Natural Systems, and Emergency Services

Funding Source: General Fund

F2: Lower CRS rating.

Activities:

3. *Research CRS activities to apply for credit to lower CRS rating from 9 to 8 to further educate public on flood hazards, reduce flooding potential and reduce property owners flood insurance premiums an additional 5% lower than the class 9 discount.*
4. *Research CRS activities to apply for credit to lower CRS rating from 8 to 7 to further educate public on flood hazards, reduce flooding potential and reduce property owners flood insurance premiums an additional 5% lower than the class 8 discount.*

Priority: High

Coordinating Organization: Public Works Dept., FEMA, Cal EMA, Insurance Services Office

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property, Public Awareness, Natural Systems, and Partnerships and Implementation

Funding Source: General Fund

F3: Minimize damage and hazards to development in areas subject to risk resulting from flooding conditions.

Activities:

5. *Promote open space and recreational uses in designated flood zones.*
6. *Continued clearance of the Santa Clara River of non-native plant species that may impede flood flow.*
7. *Continue to review all permits for development in designated flood hazard areas to meet the requirements of the NFIP and reduce damages and loss of life during flooding events.*

Priority: High

Coordinating Organization: Public Works Dept., FEMA, Cal EMA

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property, Public Awareness and Natural Systems

Funding Source: General Funding

F4: Update existing 30-yr old Flood Insurance Rate Maps (FIRMs) to provide most current flood data to regulate development standards.

Activities:

8. *Coordinate review and implementation of new Flood Insurance Study*
9. *Submit Letter Of Map Review for storm drain improvements in downtown Newhall to reduce floodplain in affected area.*

Priority: High

Coordinating Organization: City of Santa Clarita, HDR Inc., FEMA

Timeline: 2 years

Plan Goals Addressed: Protect Life and Property, Public Awareness and Natural Systems

Funding Source: General Fund

Local and Regional Resources

City Council Approved Plans, Policies, and Codes

- City of Santa Clarita Ordinance No. 08-11 – Floodplain Ordinance
- City of Santa Clarita Resolution No. 88-93 – Flood Insurance Resolution
- City of Santa Clarita Resolution 90-142 – Adoption of Emergency Plan
- City of Santa Clarita Code, Chapter 10.06 – Floodplain Management
- City of Santa Clarita Building Code, Section 308 – Flood and Geologic Hazards
- City of Santa Clarita General Plan
- City of Santa Clarita Flood Hazard Mitigation Plan

Santa Clara River Plan

The Santa Clara River Plan was adopted to ensure that adequate flood control protection is maintained by encouraging the use of non-structural flood and erosion control techniques whenever possible, and the use of structural flood and erosion control techniques when necessary.

The wide, dry natural river bottom and occasional riprap or concrete face levees, typifies the physical character of the Santa Clara River. Throughout most of the year, the river appears to be a non-threatening dry river wash. However, citizens who experienced the 1969 flood will testify to the river's devastating power that threatened human lives and property. The desire to maintain the river's natural character, yet provide adequate safety through the use of appropriate non-structural flood/erosion control measures, requires a commitment that future planning decisions respect the river's potential threat.

Objectives

- Prohibit human-made structures within the floodway and adjacent riparian and wetland areas, unless it can be demonstrated to significantly benefit the public's health, safety, and welfare.
- Maintain the natural character of the river.
- Utilize recreational features that are compatible with the floodplain storage needs.

Additionally, impacts to any wetlands will require at a minimum, filing a Section 1603 Agreement application. Impacts to non-vireo habitat totaling more than one will also require either a nationwide permit or individual permit under the 404 guidelines.

Los Angeles County Flood Control District

Many existing storm drains and drainage facilities are located within the City. The Los Angeles County Flood Control District (LACFCD) is responsible for regular maintenance and routine inspections of these facilities and systems. The City entered into an agreement with the LACFCD on March 14, 1989, to allow the transfer and maintenance of all new

storm drains constructed within the City. The agreement states that the Flood Control District is authorized by the Flood Control Act to accept the transfer and conveyance of flood control facilities for the operation maintenance and repair. The City requires that all new drains and facilities be constructed to LACFCD flood control improvement standards. The new facilities are routinely transferred over to the Flood Control District upon completion. The City's Public Works - Storm Water Group maintains a small percentage of City storm drains.

Emergency Preparedness Coordinator

The City hired a full time Emergency Preparedness Coordinator in December 1989. The coordinator has developed an emergency response plan, which was submitted to California Emergency Management Agency (previously the State Office of Emergency Services). This "Multi-Hazard Functional Plan" addressed the City's preparedness, response, recovery, and mitigation in the event of a major disaster. Such disasters include flooding, dam failure, major earthquake, hazardous materials incident, national security emergency, transportation incident, and major fires in either the wild land or urban areas. The City recently updated the Emergency Operations Plan (previously the Multi-Hazard Function Plan) in 2009. This plan is consistent with the Los Angeles County Emergency Operations Plan, the Standardized Emergency Management System and the National Incident Management System.

Besides developing the City's Emergency Operations Plan, the Emergency Preparedness Coordinator is also responsible for coordinating federal, state, and local agencies in response and recovery, educating and training the City, and the City's Emergency Operating Center.

Federal Resources

Flood Insurance Rate Maps (FIRM) and Flood Insurance Studies (FIS)

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 SFHA in 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 National Flood Insurance Program provide assessments of the probability of flooding at a given location.

National Flood Insurance Program (NFIP)

The three components of the National Flood Insurance Program (NFIP) are:

- Flood Insurance
- Floodplain Management
- Flood Hazard Mapping

Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary.

Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage is reduced by nearly \$1 billion a year through communities implementing sound floodplain management requirements and property owners purchasing of flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance.

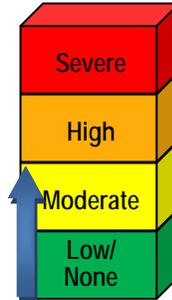
In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the Nation's floodplains. Mapping flood hazards creates broad-based awareness of the flood hazards and provides the data needed for floodplain management programs.

Federal Emergency Management Agency
500 C Street, SW
Washington, DC 20472
(202) 566-1600
<http://www.fema.gov/fima/nfip.shtm>

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
1325 East West Highway
Silver Spring, MD 20910
www.nwsla.noaa.gov

SECTION SEVEN – HAZARDOUS MATERIALS HAZARD PROFILE

CATEGORY OF RISK	LEVEL OF RISK
Probability/Frequency:	Highly Likely
Magnitude/Severity:	Negligible
Warning Time:	Less than 6 hours
Duration:	Less than 6 hours



Hazardous Materials Hazard Information and Background

Hazardous materials include hundreds of substances that can potentially pose a significant risk to the general population if released. These substances may be highly toxic, reactive, corrosive, flammable, radioactive or infectious. They are present in nearly every community in the U.S., where they may be manufactured, used, stored, transported, or disposed. Because of their nearly ubiquitous presence, there are hundreds of hazardous material release events annually in the U.S. that contaminate air, soil, and groundwater resources, potentially triggering millions of dollars in clean-up costs, human and wildlife injuries, and occasionally cause human deaths.

Releases of explosive, caustic and flammable materials have caused injuries and deaths and necessitated large-scale evacuations. Toxic chemicals in gaseous and liquid form have caused injuries among emergency response personnel as well as passersby. When toxic materials have entered either surface, ground or reservoir water supplies, serious health effects have resulted. Releases of hazardous chemicals can be especially damaging when they occur in highly populated areas or along transportation routes used simultaneously by commuters and hazardous materials haulers.

A hazardous chemical release in the City of Santa Clarita would most likely involve either transportation of chemicals by railroad or truck, use of chemicals at a business, or illegal dumping of chemical waste. The Los Angeles County Fire Department's Health Hazardous Materials Division (LACoFD HHMD) is responsible for maintaining information about the types of hazardous materials used, produced, or stored in Santa Clarita. The information required by the Fire Department is exhaustive. It includes but is not limited to location of hazardous materials; emergency contacts; location of utility shut-offs; location of emergency medical assistance; site diagrams; and type of hazardous material training received by employees. The City is also home to a number of smaller chemical users such as school laboratories and stores with supplies of pool chemicals, etc. A complete list of businesses with hazardous materials stored or used on site is maintained by the LACoFD HHMD.

Facilities that store or handle hazardous materials above the threshold quantities of 55 gallons for liquids, 200 cubic feet for gases, or 500 pounds for solids are required by the California Health and Safety Code to submit a Hazardous Materials Business Plan (inventory statement)

and an Emergency Response/Contingency Plan to the LACoFD HHMD, the Administering Agency for the County's Hazardous Material Area Plan. The inventory statements include a list of the facility's stored hazardous substances, their volumes, locations, and 24 hour emergency contacts. This information is maintained on a computerized data base. Emergency response vehicles maintained by the LACoFD HHMD carry this data base and allows emergency responders to identify the types, amounts, and locations of hazardous substances during an emergency at a fixed facility. LACoFD HHMD is the lead agency in Santa Clarita in the event of a hazardous materials incident and maintains an Emergency Operations Section (EOS) that is specifically trained and equipped to respond to emergencies involving potentially hazardous materials.

There are three County fire stations that handle hazardous materials incidents (known as Haz Mat Stations); one of these, Station 76, is located in Valencia and serves the Santa Clarita Valley.

The threat of a major hazardous material incident in Santa Clarita exists from commercial vehicles; fixed facility; and clandestine dumping.

Transportation

The greatest probability of a major hazmat incident is from a transportation accident. Historically, hazardous material incidents frequently occur on the heaviest traveled streets and at major intersections and freeway interchanges. Hazardous materials are transported to and through the City by vehicles using I-5, SR-14, and SR-126, and the Union Pacific Railroad. The risk of hazardous material spills during transport exists and may increase with continued industrial development in the City.

Fixed Facility

The second most likely serious hazmat threat exists from an accidental spill and/or incident at one of the facilities that manufacture, warehouse, and process toxic chemicals and/or generate hazardous waste materials within or next to City boundaries. There are approximately 723 businesses and government facilities in Santa Clarita using and/or storing materials which are classified as hazardous. Refer to Appendix C, Map C.4 for an overview of where these hazardous material users are located. Although there are numerous facilities involved with hazardous materials throughout the City, they are less of a threat due to required plant inventory statements, emergency response/contingency plan and evacuation plans. The LACoFD HHMD reviews these plans and makes sure they are in compliance with current laws and regulations. The City will coordinate all hazardous materials incidents with the LACoFD.

Pipelines

Natural gas service to Santa Clarita is provided by the Southern California Gas Company (SCG). SCG operates numerous natural gas pipelines in Santa Clarita. Gas service lines in the Santa Clarita Valley range in size from 2 to 34 inch mains. In the eastern part of the

Valley, a 30-inch diameter gas line runs along the Santa Clara River. In the western portion of the Valley a 34 inch and 22 inch main cross the river. Fire is a serious threat if leaking products are ignited. The City does have a map of the area pipelines, but for security purposes this map will not be available to the public.

Illegal Clandestine Dumping

Clandestine dumping is the criminal act of disposing of toxic materials and hazardous waste on public or private property. Acts of Illegal disposal of hazardous materials/wastes has declined over the last several years, but high disposal costs and restricted disposal options will likely result in the continuation of this environmental crime.

The role of the Department of Toxic Substances Control (DTSC), a Division of the California Environmental Protection Agency, is to protect California and Californians from exposures to hazardous wastes by regulating hazardous waste, cleaning up existing contamination, and looking for ways to reduce the hazardous waste produced in California. The DTSC regulates hazardous waste in California primarily under the authority of the federal Resource Conservation and Recovery Act (RCRA) of 1976, and the California Health and Safety Code. Other laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning. In addition, DTSC reviews and monitors legislation to ensure that the position reflects DTSC's goals. From these laws, DTSC's major program areas develop regulations and consistent program policies and procedures. The regulations spell out what those who handle hazardous waste must do to comply with the laws. Under RCRA, DTSC has the authority to implement permitting, inspection, compliance and corrective action programs to ensure that people who manage hazardous waste follow state and federal requirements. As such, the management of hazardous sites in the City of Santa Clarita would be under regulation by the DTSC, to ensure that state and federal regulations pertaining to hazardous waste are complied with.

Businesses are required to disclose all hazardous materials and wastes above certain designated quantities which are used, stored, or handled at their facility. Any significant changes must be reported to LACoFD HHMD within 15 days on an ongoing basis, and updated at least annually. Businesses must also prepare safety and hazard mitigation plans, review the plans regularly, and perform training at least annually. Any releases or threatened releases of hazardous materials must be reported to the LACoFD HHMD and to the California Emergency Management Agency (CalEMA) Warning Center. Those businesses using certain Regulated Substances (a list of substances comprises about 260 specific flammable or toxic chemicals) must also develop an RMP upon request by LACoFD HHMD. The RMP includes analysis of operations on-site, and projection of off-site consequences with accompanying mitigation plans.

Business practices and the laws that regulate them have changed dramatically over the year. Many businesses through intentional action, lack of awareness, or accidental occurrences have caused contamination of and around their properties. The City of Santa Clarita and the

surrounding unincorporated area of Los Angeles County contains properties that were once contaminated and are now clean, as well as a few properties that are contaminated with a clean-up process underway. The California Department of Toxic Substance Control maintains a list of all contaminated sites in the state for which it is providing oversight and enforcement of clean-up activities. This list is known as the EnviroStor Data Management System. Table 7.1 lists the sites in the City and the surrounding unincorporated county area. This information was gathered through use of the aforementioned databases through the internet.

Table 7.1 – Cleanup Sites in the City of Santa Clarita

Site / Facility Name	Cleanup Status	Status Date	Address	Description	City	Zip
Former Flamingo Cleaners	Active	9/8/2009	26512 Bouquet Canyon Rd		Santa Clarita	91350
Merle Norman Cosmetics, Inc.	No Further Action	5/2/1999	26407 Golden Valley Rd		Santa Clarita	91350
National Technical Systems	No Further Action	3/16/2010	20988 Golden Triangle Rd		Santa Clarita	91350
Saugus Industrial Center (Former Keysor-Century Corp.)	Active	4/19/2007	26000 Springbrook Rd		Santa Clarita	91350
Saugus Swap Meet Property	Inactive - Action Required	5/8/2008	22500 Soledad Canyon Rd		Santa Clarita	91350
Sos - Placerita Canyon	Certified / Operation & Maintenance	4/23/1996	25977 Sand Canyon Rd		Santa Clarita	91387
Whittaker Bermite - Ou6 Area 318	Active	1/1/2008	22116 W Soledad Cyn Rd		Santa Clarita	91350
Whittaker Bermite/Rail Station - Site A	Active	9/9/2009	22116 West Soledad Canyon Rd		Santa Clarita	91350
Whittaker Offsite Groundwater/Clwa (Castaic Lake Water Agency)	Active	3/10/2003	Area West & North Of 22116 Soledad Canyon Rd		Santa Clarita	91350
Whittaker/Bermite Facility	Active	4/14/1995	22116 Soledad Canyon Rd		Santa Clarita	91350

Hazardous Materials History

Laws governing hazardous materials came into effect at a rapid rate during the 1980s and 1990s, largely as a result of the public's perception of risk. The December, 1984 release of methyl isocyanate gas from a pesticide manufacturing plant in Bhopal, India, resulted in the deaths of over 3,000 people, with long-term health consequences that may never be calculated. The media had covered numerous hazardous materials incidents throughout the United States for years, but since the City's incorporation, **no significant events have occurred in Santa Clarita.** A significant event, for the purposes of this report, is defined as an evacuation of a neighborhood and or closure of a residential or commercial area for a prolonged period of

time. Senate Bill 1082 (1993) established the "Unified Hazardous Waste and Hazardous Materials Management Regulatory Program". The Unified Program consolidates, coordinates, and makes consistent the following hazardous materials and hazardous waste programs (Program Elements):

- Hazardous Waste Generation (including onsite treatment under Tiered Permitting)
- Aboveground Petroleum Storage Tanks (only the Spill Prevention Control and Countermeasure Plan or "SPCC")
- Underground Storage Tanks (USTs)
- Hazardous Material Release Response Plans and Inventories
- California Accidental Release Prevention Program (Cal ARP)
- Uniform Fire Code Hazardous Material Management Plans and Inventories

The LACoFD HHMD regulates generation and onsite treatment of hazardous waste throughout the Los Angeles County CUPA.

Probability, Frequency and Magnitude

Hazardous materials are everywhere and are accidentally released or spilled many times during any given day. The California State Warning Center receives approximately 10,000 hazardous material spill reports per year on hazardous material incidents and potential hazardous material incidents. Of these incidents most are minor but some do cause significant impacts like injuries, evacuation, and clean-up.

In Santa Clarita the vast majority of hazardous material incidents are handled prior to their becoming a major disaster. Nevertheless, the emergency organization needs to be flexible and evolutionary in its response to a developing incident.

The increasing volume and variety of hazardous materials that are generated, stored, or transported within Santa Clarita is a problem of great concern to public officials and the community. A major hazmat accident and/or spill could endanger the health and safety of untold numbers of men, women and children who may be within a mile of the accident scene.

The severity of hazmat releases are directly related to the type, volume, composition, characteristics, and chemical state of the material(s) involved. Releases of highly hazardous, infectious, radioactive, flammable, corrosive, or industrial chemicals, fuels, or wastes, can result in large, regional impacts if gasses or vapors are formed, if surface water is impacted, or if they occur in populated areas. The emergency response capabilities of the City are excellent; however, location and characteristics of a spill can determine the amount of time necessary to stabilize a release, keep down costs, and minimize the amount of damage that could result to people, assets, and resources.

Historic Losses and Impacts

Table 7.1 depicts the hazardous materials incidents that have been reported to the National Response Center. The National Response Center (NRC) is the sole federal point of contact for reporting oil and chemical spills. None of these events required an evacuation of a neighborhood and or closure of a residential or commercial area for a prolonged period of time.

Table 7.1 – NRC Hazardous Materials Incidents – Santa Clarita – 2001-2009

Date	Description Of Incident	Type Of Incident	Medium Affected	Material Name
7/24/08	Gasoline released from tractor trailer to a nearby storm drain	Mobile	Water	Gasoline
8/31/07	Valve dripping oil into a storm drain due to unknown causes	Fixed	Water	Unknown oil
6/30/07	Gasoline/oil from tractor trailer to a nearby storm drain	Mobile	Water	Oil: diesel
6/19/07	Release of oil into the ground/ storm drain	Storage tank	Water	Unknown oil
6/8/07	Release of material to the atmosphere	Fixed	Air	Sf6
8/31/06	Diesel fuel spilled onto the pavement	Mobile	Land	Oil: diesel
12/2/05	30 gals of diesel released from saddle tank of tractor trailer	Mobile	Land	Oil, fuel
10/4/05	Material released from a 3 inch oil well gathering line	Pipeline	Soil	Oily water
6/25/05	A release of crude oil onto the ground and into a dry stream	Fixed	Water	Oil: diesel
6/21/05	A material release	Pipeline	Water	Oil: crude
5/6/05	A release of produced water and crude oil onto the pavement and into a dry creek bed	Fixed	Water	Oil: crude
5/2/05	Safety cool 65 released from a clogged sump that overflowed.	Fixed	Water	Safety cool 65
3/23/05	Material release from a 14 inch pipeline (crude oil trunk line) possibly due to a landslide.	Pipeline	Water	Oil: crude
3/18/05	30 gals. oil spill is flowing into Santa Clarita River.	Mobile	Water	Oil, fuel: no. 2-d
2/17/05	Release of materials from a pad mounted transformer	Fixed	Water	Oil, misc: transformer
1/11/05	Material released from a 4" shipping pipeline	Pipeline	Water	Gas condensate
4/27/04	Material released from a "Ryder" truck carrying pool supplies.	Mobile	Land	Lime
11/23/02	Release of sewage from manhole due to unknown causes.	Fixed	Water	Raw sewage
11/19/02	A material release	Pipeline	Soil	Produced water
2/16/02	Material spilled out of a pad mounted transformer	Fixed	Water	Oil, misc: mineral
11/14/01	Material released out of the six inch gas gathering line	Pipeline	Water	Oil: crude

I-5 Tunnel Incident

October 13, 2007 the disastrous Interstate 5 tunnel fire occurred when a big rig crashed inside a truck route tunnel spewing gas and oil that later ignited. The entire tunnel was ablaze. The result was a 31-plus big rig and vehicle pileup that cost three lives and caused the closure of Interstate 5.

Interstate 5 is California's main north/south freeway, and economic corridor. Locally, the freeway handles upwards of 250,000 cars per day. Due to the impact to local streets, the City activated the EOC, along with its state-of-the-art traffic monitoring and control

technology, which gave the City of Santa Clarita's traffic engineers the ability to view local roadways and make real-time changes to traffic signal timing lights as freeway detours emptied thousands of cars into the City of Santa Clarita. The city coordinated a traffic detour plan with Caltrans, LA County Sheriff and CHP where traffic was diverted on the three detour routes through City. Twenty four thousand vehicles where detoured on each route, in addition to 4,750 trucks.

Since the freeway would not open for the Monday morning rush hour, the City of Santa Clarita worked with Metrolink and coordinated a transportation plan to add additional commuter trains and parking at the City's three Metrolink Stations. City staff not only were able to obtain additional parking for commuters at nearby lots, but City transit staff were positioned at each Metrolink of its three station by 5 a.m., personally directing commuters to the newly expanded parking Monday morning and providing shuttle service for quick access to the stations. The Governor declared a State of Emergency that enabled the City to submit claims for reimbursement totaling \$12,281.

Designated Hazard Areas

Refer to Appendix C, Map C.4 – City of Santa Clarita Hazardous Materials Users for an overview of where hazardous materials users are located throughout the City and Map C.1 for an overview of the City's Land Use by categories.

Potential Damages

All persons and properties in Santa Clarita are susceptible to a hazardous material release or spill with little or no warning. The magnitude and severity to which the population and properties depends on factor multiplied by various conditions. These factors and conditions include the material, the materials toxicity, the duration of the release and environmental conditions such as the wind, water action, and geological terrain. The probability of a significant hazardous material incident is low. There is limited data available to project the magnitude and severity of a release. The City will work regulatory and response agencies to collect data to measure the magnitude and severity of a release.

Until more data is available, the City's Technology Services Division, GIS Group used the Hazardous Materials Users data from the LACoFD HHMD and the city's own GIS data to identify the structures and transportation corridors that lie within a one-mile buffer zone from all major transportation corridors and railroad tracks. All areas within the one-mile buffer zone are considered to be in a "high" hazard area. Table 7.2 identifies all structures by general occupancy that are in a high risk hazardous materials zone. Structural losses due to hazardous materials incidents are usually minor and are primarily focused on clean-up and decontamination. No readily available information exists for estimating loss-to-exposure ratios.

Table 7.2 – Hazardous Materials – Potential High Risk Buildings

General Occupancy	# of Buildings in High Risk Hazardous Materials Zone
Commercial	1,299
Industrial	972
Residential	34,602
Special Purpose	1,054

Existing Mitigation Activities

The Santa Clarita Chamber of Commerce and other key facilities, such as the Henry Mayo Newhall Hospital and the County of Los Angeles have created brochures on the risks of toxic substances and their control.

Public outreach programs continue to include information on handling hazardous materials, and informing residents on what they should avoid and how to respond in case of a catastrophic release.

Annually, at the beginning of the calendar year, the LACoFD HHMD mails each permitted hazardous materials user business a Hazardous Materials Business Plan (HMBP) Certification Form requiring the business owner/operator to certify that their HMBP is current and up to date. Beyond this annually required recertification, hazardous materials handling businesses are inspected every third year.

Hazardous Materials Mitigation Action Items

The hazardous materials mitigation action items provide guidance on suggesting specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from hazardous materials events. Each action item is followed by activities for implementation, which can be used by the steering committee and local decision makers in pursuing strategies for implementation.

HM1:Conduct a public awareness and educational campaign to raise awareness about hazardous and toxic materials.

Activities:

- 1. Support LACoFD's efforts to disseminate and keep current emergency information on hazardous materials. Include phone numbers for contacting the proper agencies.*
- 2. Continue to promote and update information on hazardous materials that may be found in the home and the proper antidotes for them.*
- 3. Conduct information meetings on how to "shelter-in-place for residences as well as businesses.*

Priority:	Low
Coordinating Organization:	LACoFD (contract city) and Community Services, Community Services Division,
Timeline:	Ongoing
Plan Goals Addressed:	Public Awareness and Partnerships and Implementation
Funding Source:	General Fund

HM2:Create an inventory of the sites that are contaminated with chemicals and other hazardous materials, and promote clean-up efforts..

Activities:

- 4. Create a hazardous materials users GIS layer for the city's hazard map*

Priority:	High
Coordinating Organization:	Technology Services Division, LACoFD (contract city) and LA Co Industrial Waste Division
Timeline:	2 years
Plan Goals Addressed:	Protect Life and Property, Partnerships and Implementation, and Emergency Services
Funding Source:	General Fund

Hazardous Materials Resource Directory

Los Angeles County Resources

Los Angeles County Fire Department, Health Hazardous Materials Division
Information on waste management and regulatory compliance.

5825 Rickenbacker Road
Commerce, CA 90040
Phone: (323) 890-4045
fire.co.la.ca.us

Los Angeles County Department of Public Works, Environmental Programs Division
900 S. Fremont Ave, 3rd Floor Annex
Alhambra, CA 91803-1331
Call toll free at 1(888)CLEAN LA
[ADA](#) Information: (626) 458-4081
TDD: (626) 282-7829
<http://ladpw.org>

County Sanitation Districts of Los Angeles County
Information on wastewater treatment and solid waste facilities, water reuse, industrial waste, and Household Hazardous Waste Collection Events.
1-800-238-0172
www.lacsd.org

Los Angeles County Environmental Hotline
Information on Household Hazardous Waste Collection Events, certified used motor oil recycling centers, recycling, composting and other County environmental programs.
Residents can report illegal dumping into the storm drain system.
1 (888) CLEAN-LA 1 (888) 253-2652
www.888cleanla.com

State Resources

California Emergency Management Agency
3650 Schriever Avenue
Mather, CA 95655
<http://www.oes.ca.gov>

California Department of Toxic Substances Control
1001 I Street
Sacramento, CA 95814-2828
<http://www.dtsc.ca.gov/>

California Environmental Protection Agency (CAL/EPA)
Information on CAL/EPA and how to safeguard California's natural environment - air, water, and land.
(916) 445-3846
www.calepa.ca.gov

California Integrated Waste Management Board (CIWMB)
Information on waste reduction programs, recycling centers, composting and grasscycling.
(916) 255-2200
www.ciwmb.ca.gov

Federal Resources

Office of Hazardous Materials Standards
U.S. DOT/RSPA (DHM-10)
400 7th Street S.W.
Washington, D.C. 20590-0001

Hazardous Materials Information Center
1-800-HMR-4922 (1-800-467-4922)
(202) 366-4488 (*Washington, D.C.*)

National Office of Housing and Urban Development (HUD)
1-800-HUDS-FHA (1-800-483-7342)
www.hud.gov/hhchild.html
Tips on making your home safe and healthy.

Additional Resources

Earth's 911
Information on environmental programs nationwide.
1-800-CLEAN-UP (1-800-253-2687)
www.1800cleanup.org

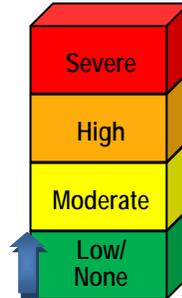
Los Angeles Regional Drug & Poison Information Center
24-hour emergency information on poison contact including swallowing, eye or skin irritation, inhalation, animal or insect bites, food or drug reactions, and pet exposure.
1-800-8-POISON (1-800-876-4766)
www.calpoison.org

National Inhalant Prevention Coalition (NIPC)
Information on toxic products that are used as inhalants.
1-800-269-4273
www.inhalants.org

US Consumer Product Safety Commission (CPSC)
Obtain product safety information or report unsafe products.
1-800-638-2772
www.cpsc.gov

SECTION EIGHT – LANDSLIDE HAZARD PROFILE

CATEGORY OF RISK	LEVEL OF RISK
Probability/Frequency:	Possibly
Magnitude/Severity:	Negligible
Warning Time:	Less than 6 hours
Duration:	Less than 6 hours



Landslide Information and Background

Landslides are a serious geologic hazard in almost every state in America. Nationally, landslides cause 25 to 50 deaths each year.¹ The best estimate of direct and indirect costs of landslide damage in the United States range between \$1 and \$2 billion annually.² As a seismically active region, California has had 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 mudslides), and (2) slow moving. Rapidly moving landslides or debris flows present the greatest risk to human life, and people living in or traveling through areas prone to rapidly moving landslides are at increased risk of serious injury. Slow moving landslides can cause significant property damage, but are less likely to result in serious human injuries.

The terrain of the City of Santa Clarita is varied in topography and has significant ridgelines. There is high potential for landslide activity. The City has liquefaction and landslide zones as indicated on the Seismic Hazard Zones Map in Appendix C, map C.2.2.

Landslide

A landslide is the movement of a mass of rock, debris, or earth 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.

¹ Mileti, Dennis, *Disasters by Design: A Reassessment of Natural Hazards in the United States* (1999) Joseph Henry Press, Washington D.C.

² Brabb, E.E., and B.L Harrod. (Eds) *Landslides: Extent and Economic Significance. Proceedings of the 28th International Geological Congress Symposium on Landslides.* (1989) Washington D.C., Rotterdam: Balkema.

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 relatively gentle slopes and can cause significant property damage, but are far less likely to result in serious injuries than rapidly moving landslides.³

“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.”⁴

Debris Flow/Mud 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.⁵ This high rate of speed makes debris flows extremely dangerous to people and property in its path.

Sink Hole

Sinkholes are formed when rain dissolves underground limestone or when surface materials collapse into underlying cavities in the rock. Abrupt collapse-type sinkholes have become more common over the past twenty-five years, primarily due to activities of humans such as withdrawal of groundwater, diversion of surface water, or construction of ponds.

³ Interagency Hazard Mitigation Team, *State Hazard Mitigation Plan* (2000) Oregon Emergency Management

⁴ Ibid.

⁵ Barrows, Alan and Smith, Ted, DMG Note 13,
http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_33/

Sinkholes come in all sizes. They are unpredictable, but they all develop in basically the same way. As rainwater seeps into the ground, acid in the water dissolves the thick layers of underground limestone that underlie the entire state. This creates big, empty underground holes or gaps. If the layers of sand and dirt which sit on top of the limestone fall into these holes and gaps, the result is a sinkhole.

Factors which may contribute to sinkhole development include (as identified by sinkhole website at <http://www.sinkholelawyer.com>):

- Large changes in the water table caused by too much to too little rain
- Drilling a well into the cavity
- Constructing buildings above the cavity
- Diverting drainage to the areas where a cavity exists

Liquefaction

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world. Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other.

Earthquake shaking often triggers this increase in water pressure, but construction related activities such as blasting can also cause an increase in water pressure. When liquefaction occurs, the strength of the soil decreases and, the ability of a soil deposit to support foundations for buildings and bridges is reduced. (As defined in University of Washington website at <http://www.ce.washington.edu/~liquefaction/html/what/what1.html>).

Landslide History

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 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.⁶ Debris flows normally occur when a landslide moves downslope 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.⁷ Flows often occur during heavy rainfall, can occur on gentle slopes, and can move rapidly for large distances.

Landslides are often triggered by periods of heavy rainfall. Earthquakes, subterranean water flow 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.⁸

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 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.

⁶ Robert Olson Associates, *Metro Regional Hazard Mitigation and Planning Guide* (June 1999) Metro

⁷ Ibid.

⁸ Planning For Natural Hazards: *The Oregon Technical Resource Guide*, Department of Land Conservation and Development (2000), Ch 5.

Between June of 2004 and March of 2005, the City of Santa Clarita received 38.51” of rainfall.⁹ The severe rains, in combination with dry soils and burned vegetation, caused several mud slides, the most severe of which destroyed two homes and caused a single family home in the Friendly Valley area of Santa Clarita to be red tagged and another to be yellow tagged. In all, 64 homes and/or buildings reported damage. These severe storms caused the City of Santa Clarita to declare a state of emergency. The City claimed \$1.8 million in public damages and private damages totaled over \$4 million.

1971 Juvenile Hall, San Fernando, California

Landslides caused by the February 9, 1971, San Fernando, California, earthquake Cost, \$266.6 million (2000 dollars). In addition to damaging the San Fernando Juvenile Hall, this 1.2 km-long slide damaged trunk lines of the Southern Pacific Railroad, San Fernando Boulevard, Interstate Highway 5, the Sylmar, California, electrical converter station, and several pipelines and canals.¹⁰

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. Destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. This event 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.¹¹

The Santa Clarita planning area consists of steep slopes and eroded hillsides of clays and shales. Shales are extremely susceptible to pervasive fracturing which weaken slopes. These slopes are apt to fail if disturbed by heavy rains or grading. Potential landslide areas have been identified. Clays become slippery when wet and are likely to slide against underlying rock if water enters a slope. Moreover, clays are considered expansive soils. When saturated, expansive soils lose all cohesiveness and fail. Damage from expansive soils can be hastened by landscape irrigation or long-term rainfall. Landslides caused by heavy rains and irrigation pose a danger to development on hillsides.¹²

Landslides are often associated with earthquakes though there are other factors that may influence the occurrence of landslides. These factors include the slope, the moisture content of the soil, and the composition of the soils and subsurface geology. In addition to an earthquake, heavy rain or the improper grading of a construction site may trigger a landslide. Much of the

⁹ Preliminary figures from the National Weather Service from July 1, 2004 through March 24, 2005.

¹⁰ Highland, L.M., and Schuster, R.L., *Significant Landslide Events in the United States*. (No Date) USGS, Washington D.C., http://landslides.usgs.gov.html_files/pubs/report1/Landslides_pass_508.pdf

¹¹ Ibid.

¹² City of Santa Clarita, Los Angeles County, *One Valley One Vision City/County General Plan*, DRAFT 2008.

land area within the Planning Area consists of mountainous or hilly terrain. As a result, there are a number of areas in portions of the Planning Area where landslides and/or unstable soils are present.

Probability, Frequency and Magnitude

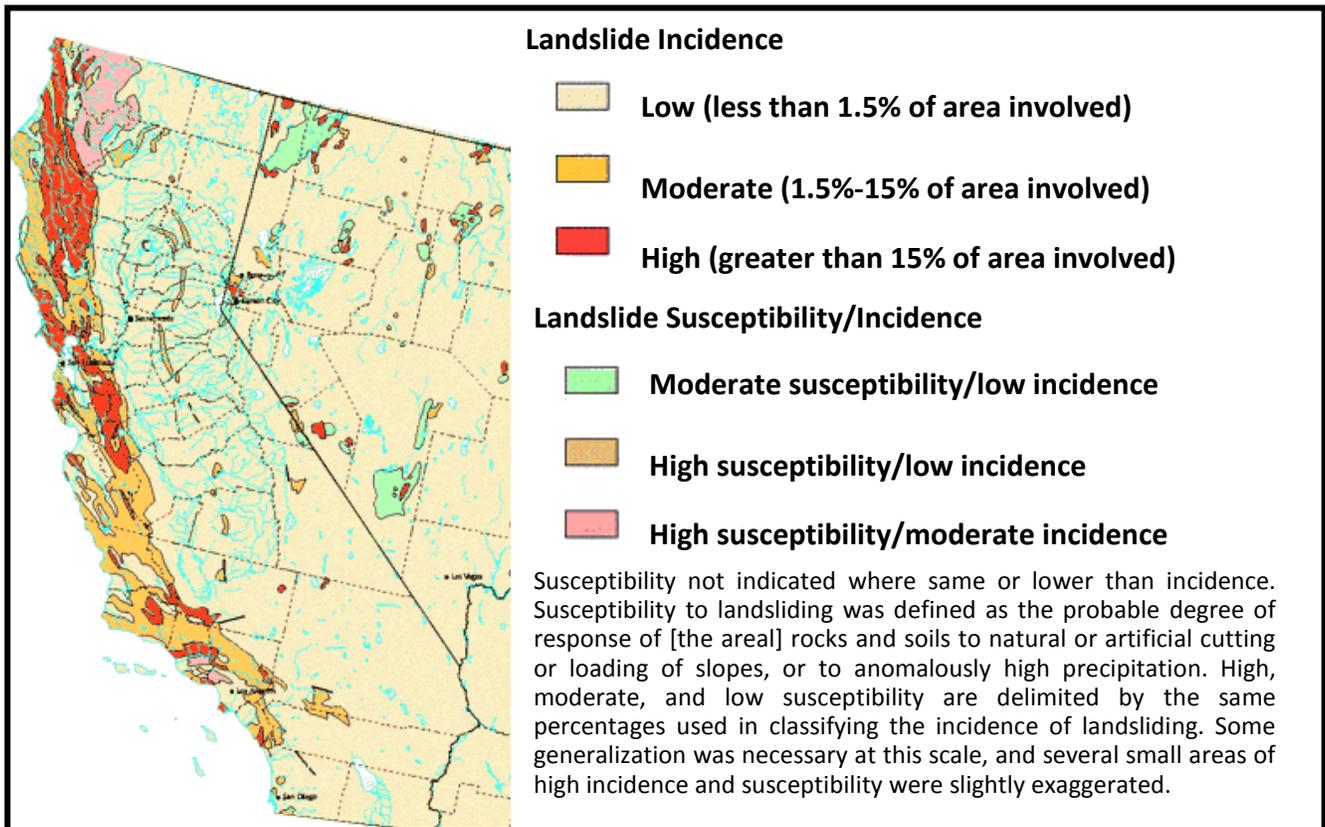
The California Department of Conservation, Division of Mines and Geology (CDMG) has mapped areas of Los Angeles County that are at risk due to seismically induced liquefaction and landslides. These zones represent areas where liquefaction and landslides may occur during a strong earthquake. A single earthquake capable of causing liquefaction or triggering landslide failures will not uniformly affect the entire area zoned; conversely there may be areas outside of these zones that have the potential for liquefaction or landslides that may not be identified. According to the California Department of Conservation, Division of Mines and Geology's *Seismic Hazard Zone Report for the Newhall 7.5 Minute Quadrangle, Los Angeles County, California*, of the roughly 26% of the land in the Newhall Quadrangle lies within the landslide hazard zone, and approximately 30-40% of the area is subject to liquefaction.¹³

As a part of the geologic data compilation, an inventory of existing landslides in the Newhall Quadrangle was prepared. For each landslide included on the map a number of characteristics (attributes) were compiled. These characteristics include the confidence of interpretation (definite, probable and questionable) and other properties, such as activity, thickness, and associated geologic unit(s). Landslides rated as definite and probable were carried into the slope stability analysis. Landslides rated as questionable were not carried into the slope stability analysis due to the uncertainty of their existence. The completed hand-drawn landslide map was scanned, digitized, and the attributes were compiled in a database. The data from this map has been incorporated into the City's GIS system to produce the City's Seismic Hazard Map, C.2.2, in Appendix C of this Plan.

Table 8.1 depicts the United States Geological Survey's (USGS), Landslide Overview Map of the Conterminous United States. This map identifies the Santa Clarita Valley as having a high landslide incidence and high susceptibility/low incidence.

¹³ *Seismic Hazard Evaluation of the Newhall 7.5-Minute Quadrangle, Los Angeles County, California*, California Department of Conservation, Division of Mines and Geology 1997

Table 8.1 – Landslide Overview Map of the Conterminous US – (Western Portion)



Source: USGS, <http://landslides.usgs.gov/learning/nationalmap/index.php>

Historic Losses and Impacts

Table 8.2 depicts events, pre 1997 going back to 1991, that have occurred in the City of Santa Clarita include the following: (note that the cause of each occurrence varies)

Table 8.2 – Historic Landslides in Santa Clarita

Location	Landslide Description
Goldstream	Rear hill slope failure and V-ditch washing out
Oat Flat Ct., Area	Slope failure, retaining wall put in place without proper footing
Abdale	Vacant lot, slope failures from 1960s
Green Mountain	V-ditches blocked and some surface slope failures
Larkhaven	Slide area from the 1960s
Fairgate	Very large hole dug on slope, filled and small retaining wall done without engineering, permits or inspections. Slope failure problem, earth movement with v-ditch at top destroyed.
Beach Grove	Slope failure
Maple Bay	Slope failure
Bougainvillea Way	Large bolder and surface slide behind house
Rosemont Drive	V-ditch unclean causing overflow on to rear up slope of homes because all down drain are full of rock and silt
Point Arena, Fairgate	Rear property V-ditch falling apart
Bella Court	Lot sinking and movement, house not being lived in. Vacant.

Designated Hazard Areas

The City's Technology Services Division, GIS Group used the data from CDMG's Seismic Hazard Zone Reports for the area and the city's GIS data to create the Seismic Hazard Map for the City of Santa Clarita, Map C.2.2 in the Appendix of this Plan. This map identifies pre-existing landslide and liquefaction areas in the City which are susceptible to landslides and liquefaction in the future.

Potential Damages

The City's Technology Services Division, GIS Group used the CDMG's Seismic Hazard Zone Reports data and the city's own GIS data to identify the structures that lie within the landslide or liquefaction hazard zones. It is understood that if a structure is identified in a landslide or liquefaction hazard area that it has a higher probability of being impacted by a landslide or liquefaction than a structure that is not in the seismic hazard area. Table 8.3 - Potential Building Count by General Occupancy identifies these structures in the city's seismic hazard zones.

Table 8.3 – Potential Building Count by General Occupancy with Potential Seismic Impact

General Occupancy	# of Buildings in Landslide Hazard Zone	# of Buildings in Liquefaction Hazard Zone
Commercial	15	1,083
Industrial	72	864
Residential	3,010	24,806
Special Purpose	5	53

Critical Infrastructure

Landslides can affect 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. Loss of electricity has the most widespread impact on other utilities and on the whole community. Natural gas pipes may also be at risk of breakage from landslide movements as small as an inch or two.

Roads and Bridges

Losses incurred from landslide/sinkhole hazards in the City of Santa Clarita have been associated with roads. The City of Santa Clarita's Streets Division is responsible for responding to occurrences of earth movement events that inhibit the flow of traffic or are damaging a road or a bridge. The streets division does its best to communicate with residents impacted by such occurrences, but can usually only repair the road itself, as well as the areas adjacent to the occurrence where the city has the right of way.

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 city organizations.

Codes

The City of Santa Clarita Unified Development Code (UDC) addresses development on steep slopes in subsection 17.080.040. This section outlines standards for steep slope hazard areas on slopes of 10 percent or more. Generally, the ordinance requires soils and engineering geologic studies for developments proposed on slopes of 10 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.

Hazard Mapping

The California Division of Mines and Geology has prepared Seismic Hazard Zone Maps of the Newhall, Mint Canyon, Oat Mountain, and San Fernando 7.5 minute quadrangles have been used to create the City's Seismic Hazard Map. Data from the Reports were incorporated into the City's GIS data to identify areas of liquefaction hazard and earthquake induced landslide hazard. In general areas underlain by unconsolidated alluvium, such as along the Santa Clara River and tributary washes, are prone to liquefaction. Areas that are on topographic highlands, such as hill slopes are subject to landslide. The City's Seismic Hazard Map, C.2.2, can be found in the Appendix of this Plan.

Geologic maps of the Santa Clarita area have been prepared by Thomas Dibblee, Jr. (Geologic Map of the Newhall Quadrangle, 1996; Geologic Map of the Mint Canyon Quadrangle, 1996; Geologic Map of the San Fernando and Van Nuys (North Half) Quadrangles, 1991; Geologic Map of the Oat Mountain and Canoga Park (North Half) Quadrangles, 1992). These four maps comprise the City of Santa Clarita area. Many landslides have been within City limits. These landslides are depicted on the Newhall and

Mint Canyon quadrangles. The majority of the landslides are mapped within the Saugus and Mint Canyon formations.

The seismic hazard maps differ from the geologic maps in the following way. The seismic hazard maps show areas that have the potential to be affected by liquefaction and landslides, whereas the geologic maps show existing landslides. Potential hazard areas are not shown on geologic maps.

CDMG prepared Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California, 1997. This document provides recommendations to effectively reduce seismic hazards to acceptable levels as defined in California Code of Regulations (CCR Title 14, Section 3721).

In addition, the City of Santa Clarita's Geographic Information System (GIS) Division has analyzed data and developed various hazard maps for use in planning and mitigation hazards.

Landslide Mitigation Action Items

The landslide mitigation action items provide guidance on suggesting specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from landslide events. Each action item is followed by activities for implementation, which can be used by the steering committee and local decision makers in pursuing strategies for implementation.

L1: Increase knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.

Activities:

- 1. Develop public information to emphasize risks when building on potential or historical landslide areas.*
- 2. Continue to map new earth movement hazards and make information available to staff, developers, and residents so that soil types, slope percentage, drainage, or other critical factors are used to identify landslide prone areas.*
- 3. Encourage design and placement of utilities outside of landslide areas to decrease the risk of service disruption.*

Priority: High

Coordinating Organization: Public Works Department., Development Services Division, Developers, and Homeowners, and local water and utility agencies

Timeline: Ongoing

Plan Goals Addressed: Protection of Life and Property
Public Awareness
Partnerships and Implementation
Emergency Services

Funding Source: General Fund

L2: Continue public education information program that includes material for residents with information on how to protect their property from landslides and debris flows.

Activities:

- 4. Provide information on plant ground cover for slopes and building of retaining walls.*
- 5. Provide information for mudflow areas, including information on building channels or deflection walls to direct the flow around buildings (be conscientious of diverting debris flow and the flow lands on a neighbor's property).*

6. *Provide information on installation of flexible pipe fittings to avoid gas or water leaks.*

Priority: High

Coordinating Organization: Building & Safety Division, Develop Services Division, Community Preservation, LA County. State of Ca., and Building and Industry Association (BIA)

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property
Public Awareness
Natural System

Funding Source: General Fund

L3: Review, monitor and update codes, regulations, and local ordinances.

Activities:

7. *Study ordinances including Zoning, Grading, Hillside, Subdivision, etc. and make recommendations to mitigate landslide prone areas.*
8. *Review and enforce building codes for construction standards, including minimum foundation requirements, in landslide prone areas.*
9. *Review drainage control regulations to control drainage, and reduce the risk of landslides resulting from saturated soils.*

Priority: Medium

Coordinating Organization: Building & Safety Division, Develop Services Division, Community Preservation, LA County, State of Ca., and Building and Industry Association (BIA)

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property
Public Awareness

Funding Source: General Fund

L4: Limit activities in identified potential and historical landslide areas through regulation and public outreach.

Activities:

10. *Analyze existing regulations regarding development in landslide prone areas.*
11. *Continue the open space designation efforts. Open space designations keep landslide prone areas undeveloped.*

Priority: High

Coordinating Organization: Building & Safety Division, Develop Services Division, Planning Services Division, Developers and residents

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property
Public Awareness
Partnerships and Implementation
Emergency Services

Funding Source: General Fund

L5: Identify and potentially improve if feasible landslide prone areas

Activities:

- 12. Consider acquiring landslide prone property as city open-space.*
- 13. Consider vegetation management on landslide prone property.*
- 14. Encourage public/private partnerships that encourage homeowners to mitigate landslide potential.*

Priority: High

Coordinating Organization: Planning Division, Develop Services Division, City Manager’s Office, Landscape Maintenance District

Timeline: 5 years

Plan Goals Addressed: Protect Life and Property
Public Awareness
Natural Systems
Partnerships and Implementation
Emergency Services

Funding Source: General Fund/Special District

Landslide Resource Directory

Los Angeles County Resources

Los Angeles County Department of Public Works

State Resources

Department of Conservation Headquarters

California Geological Survey Headquarters/Office of the State Geologist

California Division of Forestry

Department of Water Resources

California Emergency Management Agency (CalEMA)

California Department of Transportation (Cal Trans)

Federal Resources and Programs

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.

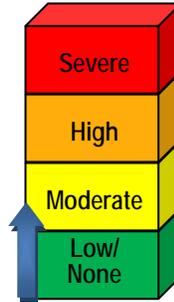
The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and city 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 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.

SECTION NINE – SEVERE WEATHER HAZARD PROFILE

CATEGORY OF RISK	LEVEL OF RISK
Probability/Frequency:	Likely
Magnitude/Severity:	Limited
Warning Time:	More than 24 hours
Duration:	Less than 1 week



Severe Weather Information and Background

Severe weather manifests itself in the Santa Clarita Valley in many ways. Extreme heat and violent winds present the greatest threat to health and safety. The affects of extreme weather leave a mark on the community. *Severe weather is not focused on any specific segment of Santa Clarita, but affects the entire community.*

Heat

Extreme heat places an extraordinary demand on the regional power grid to supply air conditioners with the needed electricity to operate. In addition, long periods of extreme heat can affect the local water table and soil quality, making the risk of flash flooding prevalent. Temperatures often exceed 100° F between the months of July and September. Weather conditions in Santa Clarita are extremely dry. An average of approximately fourteen inches of precipitation occurs in Santa Clarita each year.

The prolonged extreme heat in Santa Clarita makes the community prone to drought. Extreme heat and drought affects the overall condition of vegetation throughout the valley. Generally, under such conditions, vegetation tends to become dryer. This in turn creates a greater risk of fire danger. Because much of the Santa Clarita Valley surrounding the City is in its natural state, increased fired danger has a significant impact on the health and property of the entire regional population.

According to the South Coast Air Quality Management District, the City of Santa Clarita’s air quality ranks among the worst in the nation. Specifically, high levels of ozone threaten the area on a year-round basis. The affects of ozone are made worse in a higher temperature environment.

Tables 9.1 and 9.2 show the Heat Index (HI) as a function of heat and relative humidity. The Heat Index describes how hot the heat-humidity combination makes it feel. As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the Heat Index rises, so do health risks.

- When the Heat Index is 90°F, heat exhaustion is possible with prolonged exposure and/or physical activity.
- When it is 90°-105°F, heat exhaustion is probable with the possibility of sunstroke or heat cramps with prolonged exposure and/or physical activity.
- When it is 105°-129°F, sunstroke, heat cramps or heat exhaustion is likely, and heatstroke is possible with prolonged exposure and/or physical activity.
- When it is 130°F and higher, heatstroke and sunstroke are extremely likely with continued exposure. Physical activity and prolonged exposure to the heat increase the risks.

Table 9.1 – Air Temperature and Relative Humidity

		<i>The Heat Index</i>												
Air Temp (° F)	Relative Humidity													
	40	45	50	55	60	65	70	75	80	85	90	95	100	
110°	136	143	152											
105°	123	129	135	141	148									
100°	111	115	119	124	129	135	141	147						
95°	101	104	107	110	114	117	122	126	131	136	141			
90°	92	94	96	98	100	103	106	109	112	115	119	127	132	
85°	84	85	86	88	89	91	93	95	97	99	102	104	107	
80°	80	80	81	81	82	82	83	84	84	85	86	86	87	

Exposure to full sunshine can increase Heat Index values by up to 15° F.

(Source: National Weather Service)

The National Weather Service (NWS) will initiate its Heat Index Program Alert procedures when the high is expected to exceed 105° - 110° (depending on local climate) for at least two consecutive days.

Table 9.2 – Possible Heat Disorders by Heat Index Level

Heat Index	Category	Possible heat disorders for people in high risk groups
130°F or higher	Extreme Danger	Heatstroke risk extremely high with continued exposure.
105° - 129°F	Danger	Sunstroke, Heat Cramps and Heat Exhaustion likely, Heatstroke possible with prolonged exposure and/or physical activity.
90° - 105°F	Extreme Caution	Sunstroke, Heat Cramps and Heat Exhaustion possible with prolonged exposure and/or physical activity.
80° - 90 °F	Caution	Fatigue possible with prolonged exposure and/or physical activity.

(Source: National Weather Service)

Heat exhaustion occurs when the body is dehydrated resulting in an imbalance of electrolytes.

- Symptoms -- headache, nausea, dizziness, cool and clammy skin, pale face, cramps, weakness, profuse perspiration
- First Aid -- move to a cooler spot, drink water with a small amount of salt added (one teaspoon per quart)
- Without Intervention -- it can lead to collapse and heatstroke

Heatstroke occurs when perspiration cannot occur and the body overheats.

- Symptoms -- headache, nausea, face flushed, hot and dry skin, no perspiration, body temperature over 101°F, chills, rapid pulse
- First Aid -- cool person immediately, move to shade or indoors, wrap in a cool, wet sheet, get medical assistance
- Without Intervention -- it can lead to confusion, coma, and death

Severe Winds

Map 9.3 Santa Ana Winds



Santa Clarita is also subject to continual strong winds. Although these winds are far from the force of a tornado, they still represent a significant threat to life and property. Between the months of October and March, winds may reach speeds of up to (and over) 60 miles-per-hour. Common affects of high winds in Santa Clarita include the overturning of trees, and creating unsafe driving conditions for motorists on the local roads and freeways. In some cases, winds can reach a force great enough to threaten above ground utilities, although this is rare. However, the potential for utility failure remains real. This is compounded by the fact that most of the high wind events occur during the summer months when the demand on the power grid is at its height. A utility failure at this time would be catastrophic.

A windstorm event in the region can range from short term microburst activity lasting only minutes to a long duration Santa Ana wind condition that can last for several days, as in the case of the January 2003 Santa Ana wind event. Windstorms in the City area can cause

extensive damage to heavy tree stands, road and highway infrastructure, and critical utility facilities. Map 9.3 shows the direction of the Santa Ana winds as they travel from the stable, high-pressure weather system called the Great Basin High through the canyons and towards the low-pressure system off the Pacific. Clearly, the City of Santa Clarita is in the direct path of the ocean-bound Santa Ana winds.

“Santa Ana Winds” are generally defined as warm, dry winds that blow from the east or northeast (offshore). These regional winds typically occur from October to March and, according to most accounts, are named either for the Santa Ana River Valley where they originate or for the Santa Ana Canyon, southeast of Los Angeles, where they pick up speed. These winds occur below the passes and canyons of the coastal ranges of Southern California and in the Los Angeles basin. Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon. Forecasters at the National Weather Service offices in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots. These winds accelerate to speeds of 35 knots as they move through the canyons and passes, with gusts up to 50 to 60 knots. Table 9.4 describes the effects the wind can have at various speeds.

Table 9.4 - Effects of Wind Speed (Washington County Office of Consolidated Emergency Management)	
Wind Speed (mph)	Wind Effects
0 - 24	Marginal affects.
25-31	Large branches and/or small trees in motion.
32-38	Trees begin to move significantly. Inconvenient to walk into the wind.
39-54	Twigs and small branches begin to break away from main trunks. Wind generally impedes progress when walking. High profile vehicles become difficult to control.
55-74	Potential damage to building mounted antennas. Some trees with shallow root systems may be overturned.
75-95	Potential for minimal structural damage, particularly to unanchored buildings such as mobile homes. Power lines and street signs may be overturned.
96-110	Moderate structural damage to walls, roofs and windows. Large signs and branches blown down. Most vehicles uncontrollable on roadways.
111-130	Extensive structural damage to walls, roofs, and windows. Trees overturned. Mobile homes lifted and/or destroyed.
131-155	Extreme damage to structures. Trees entirely uprooted or snapped.
Greater Than 155	Catastrophic damage. Structures destroyed. Flying debris is lethal.

The complex topography of Southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). Clockwise circulation around the center of this high pressure area forces air down slope from the high plateau. The air warms as it descends toward the California coast at the rate of 5 degrees Fahrenheit per 1000 feet due to compressional heating. Thus, compressional heating provides the primary source of warming. The air is dry since it originated in the desert and it dries out even more as it is heated.

Severe Weather History

Heat

Heat waves do not cause damage or elicit the immediate response as do floods, fires, earthquakes, and typical disaster scenarios. They have, however, claimed more lives over the past 50 years than all other declared disaster events combined. For example, the 1989 Loma Prieta earthquake resulted in 63 deaths while the 1992 Northridge earthquake was responsible for the loss of 55 lives. The catastrophic 2003 Southern California Firestorms resulted in 24 deaths. The worst single heat wave event in California occurred in Southern California in 1955 when an eight-day heat wave resulted in 946 deaths.

Typical summer temperatures in California contribute to the untimely demise of 20 people on average per year. The July 2006 heat wave in California caused the death of at least 136 people over a 13 day period (6 deaths are still under investigation). California did not experience the billions of dollars in damage that it did in the two earthquakes cited, nor did it experience over three thousand homes damaged, as in the year 2003 firestorm; but there were approximately twice the number of human deaths due to the heat wave as in each earthquake, and almost six times the fatalities from the heat wave as were observed in the devastating firestorm of year 2003. Heat waves are obviously less dramatic and more deadly.

Heat emergencies are often slower to develop. It could take a number of days of oppressive heat for a heat wave to have a significant or quantifiable impact. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations.

Situational and physical characteristics help to identify vulnerable populations that may not comfortably or safely access and use disaster resources. Specifically, when discussing heat related emergency preparedness, the following groups could be considered vulnerable or at greater risk in a heat emergency:

- Infants and small children under age three
- Women who are pregnant
- Elderly people (age 65 and older)
- The obese
- The bedridden
- Mentally ill
- Those with cognitive disorders
- Those with medical conditions (e.g., heart disease, diabetes, high blood pressure)
- Those requiring life-saving medications (e.g., for high blood pressure, depression, insomnia)
- Individuals with drug or alcohol addictions
- Those with mobility constraints
- Non-ambulatory
- Those under extreme working conditions

- The poor
- Socially isolated
- Non-English speakers who may not have access to information

Animals, including domestic pets, livestock, and poultry are also susceptible to extreme heat. For example, dogs and cats are in danger of heat stroke in temperatures of 110 degrees Fahrenheit. The heat wave of 2006 resulted in 15 reported pet deaths and more than 25,000 cattle, and 700,000 fowl heat-related deaths.

Table 9.5 details the average high temperatures and precipitation for the City of Santa Clarita. For the purpose of comparison the figures for Los Angeles, California and Las Vegas, Nevada are also included.

Table 9.5 - Comparison of Average Temperature and Precipitation Data (30 year averages) For Santa Clarita, CA; Las Vegas, NV; and Los Angeles, CA (National Weather Service)						
Month	Santa Clarita, CA		Las Vegas, NV		Los Angeles, CA	
	Avg. High Temp.	Avg. Precip.	Avg. High Temp.	Avg. Precip.	Avg. High Temp.	Avg. Precip.
Jan	64 °F	2.99"	57 °F	0.59"	68 °F	3.33"
Feb	66 °F	3.50"	63 °F	0.69"	70 °F	3.68"
Mar	68 °F	3.03"	69 °F	0.59"	70 °F	3.14"
April	74 °F	0.63"	78 °F	0.15"	73 °F	0.83"
May	79 °F	0.22"	88 °F	0.24"	75 °F	0.31"
June	88 °F	0.01"	99 °F	0.08"	80 °F	0.06"
July	94 °F	0.01"	104 °F	0.44"	84 °F	0.01"
Aug	95 °F	0.11"	102 °F	0.45"	85 °F	0.13"
Sept	91 °F	0.27"	94 °F	0.31"	83 °F	0.32"
Oct	82 °F	0.36"	81 °F	0.24"	79 °F	0.37"
Nov	72 °F	1.22"	66 °F	0.31"	73 °F	1.05"
Dec	65 °F	1.61"	57 °F	0.40"	69 °F	1.91"
Yearly Avg.	78 °F	13.96" per year	80 °F	4.5" per year	76 °F	15.14" per year

As Table 9.5 demonstrates, extreme heat can last for prolonged periods of time in Santa Clarita. It is not uncommon for temperatures to exceed 100° F during the day for several consecutive weeks between July and August. Temperatures are nearly always in excess of 90° F between the months of June and September. As a result, the population is subjected to an extended period where outdoor activity can lead to a variety of heat related ailments including heat stroke, heat cramps, and fatigue. It is estimated that the local hospital, Henry Mayo Newhall Memorial Hospital, treats multiple cases of heat-related illness per year in the Santa Clarita Valley.

The City of Santa Clarita has a Heat Emergency Plan to provide direction and guidance to the City for responding to a Heat Emergency Advisory. An Excessive Heat Warning will be

issued by the Oxnard NWS office when heat index values are expected to be higher than the following thresholds for any length of time:

Mountains	100 degrees F or higher
Coastal sections (including downtown LA)	105 degrees F or higher
Valleys	110 degrees F or higher

Table 9.6 reflects the date, month and year of events over 100 degrees between 2003-2009 in Santa Clarita.

Table 9.6 – Extreme Weather Events between 2003 – 2009 – Santa Clarita

2003		2004		2005		2006		2007		2008		2009	
7/04/03	101.0	8/10/04	100.5	7/14/05	102.3	7/01/06	100.7	7/4/07	100.2	6/18/08	102.0	7/18/09	103.6
7/16/03	101.8			7/18/05	100.2	7/15/06	102.8	7/6/07	100.4	6/19/08	105.7	7/19/09	101.5
7/17/03	100.7			7/22/05	100.2	7/21/06	104.4	8/29/07	104.9	6/20/08	104.1	8/27/09	102.8
8/14/03	100.0			8/27/05	100.2	7/22/06	111.3	8/30/07	106.8	6/21/08	104.1	8/28/09	100.7
9/21/03	102.1			8/28/05	102.3	7/23/06	105.7	8/31/07	103.8	6/22/08	101.0	8/29/09	100.7
9/22/03	100.5					7/24/06	103.8	9/1/07	105.1			8/30/09	101.2
9/23/03	100.7					8/22/06	101.7	9/2/07	105.4			9/26/09	102.3
						9/2/06	101.7	9/3/07	104.4				

Source: <http://www.santaclaritaweather.com>

When the City becomes aware that the NWS has initiated an Excessive Heat Warning, the city will implement its heat emergency standard operating procedures and consider activating Cooling Centers. The following locations have been designated by LA County Public Health as Cooling Centers in the City of Santa Clarita:

1. Santa Clarita Valley Senior Center
2. Valencia Library
3. William S Hart Hall

The general public information message during the extreme heat event is: “during peak heat hours, stay in an air conditioned area. If you do not have air-conditioning in your home, visit public facilities such as shopping malls, parks and libraries to stay cool.”

Table 9.4 depicts Los Angeles County Public Health Heat Cooling Center Activations.

Table 9.7 - Los Angeles County Public Health Heat Cooling Center Activations

Date	Description of Activity
7/13/2005	Heat Advisories - Cooling Center Activations
8/26/2005	Heat Advisories - Cooling Center Activations
6/22/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
7/3/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
7/13/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
7/24/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
8/22/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
8/28/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
8/30/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
9/1/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
9/5/2006	Triple Digit - Extreme Heat Advisory Forecasts & Cooling Center Activations
7/2/2007	Heat Alerts - Cooling Center Activations
8/13/2007	Heat Alerts - Cooling Center Activations
8/16/2007	Heat Alerts - Cooling Center Activations
8/28/2007	Heat Alerts - Cooling Center Activations
9/11/2007	Heat Alerts - Cooling Center Activations
6/18/2008	Heat Alerts - Cooling Center Activations
7/8/2008	Heat Alerts - Cooling Center Activations
10/1/2008	Heat Advisory - Cooling Center Activations
6/29/2009	Heat Advisory –Cooling Center Activations
7/16/2009	Heat Advisory –Cooling Center Activations
8/27/2009	Heat Advisory –Cooling Center Activations
9/21/2009	Heat Advisory –Cooling Center Activations
9/24/2009	Heat Advisory –Cooling Center Activations

Wind

Like heat, wind events occur each year seasonally with great regularity and predictability. The City of Santa Clarita experiences as many as ten “Santa Ana” conditions per year between the months of October and March. These rapid, hot, dry winds originate in the high desert and descend to the west, gathering speed while shedding relative humidity. Santa Ana winds may exceed gusts of over 60 miles-per-hour.

Santa Ana winds can cause considerable damage, particularly because they are so fast, hot, and dry. Generally speaking, Santa Ana winds create ideal conditions for origin and spread of wildfires by drying out vegetation. Once ignited, the wind spreads the fire quickly. Most recently, the fires that burned in and around the Santa Clarita Valley in October of 2003 were made far more dangerous by the Santa Ana winds which continually changed

directions and allowed the fire to spread extremely quickly. Eventually, the fire threatened thousands of homes in the western Santa Clarita Valley before firefighters gained control of the blaze.

The winds are also associated with some of the area's largest and deadliest wildfires, including the state's largest fire on record, the Cedar Fire, as well as the Laguna Fire, Old Fire, Esperanza Fire, Santiago Canyon Fire of 1889 and the Witch Fire.

In October 2007 the winds fueled major wild fires in Escondido, Malibu, Rainbow, San Marcos, Carlsbad, Ranch Bernardo, Poway, and in the major cities of San Bernardino, San Diego and Los Angeles. The Santa Ana winds were also a factor in the November 2008 California wildfires.

At present, there isn't a database of wind speeds in Santa Clarita Valley, but there are sites along the ridges and passes nearby. Significant peak wind events identified by the National Weather Service include:

- October 21, 2007 – Newhall Pass gusts to 78 mph fueled 5 different fires in the area.
- January 5-7, 2007, Saugus gusts to 64 mph and Wiley Ridge gusts to 63 mph.
- December 27, 2006 – Warm Springs gusts to 75 mph.
- November 29-30, 2006 – Warm Springs gusts to 72 mph and Wiley Ridge gusts to 76 mph.

To assist the City of Santa Clarita and the National Weather Service with maintaining situational awareness during high wind events, weather spotter volunteers are used to provide real-time information all around the city. In all, there are 81 volunteer weather spotters in the City that have been trained by the National Weather Service about severe weather hazards.

Probability, Frequency and Magnitude

Extreme heat and wind hazards have occurred annually in the City of Santa Clarita. NWS reports that on an average, there have been 3 high wind events per year and close to 5 extreme heat events (over 100 degrees). It is expected that these hazards will continue to occur seasonally, from July to September for the heat and between October and March for the winds. The entire Santa Clara Valley is subject to these hazards.

Historic Losses and Impacts

Heat

Heat does not impact buildings but it does impact lives. Table 9.8 identifies the number of deaths due to excessive heat from 2005 to 2007.

Table 9.8 – Distribution of Year of Mortality Due to Excessive Natural Heat from 2005 to 2007

Year	Frequency/ Count	% of Total Frequency
2005	5	20.0%
2006	11	44.0%
2007	9	36.0%
Total	25	100%

(Source: Los Angeles County Public Health, Data Collection Unit)

Winds

There is not a lot of wind damage information available; however, the National Weather Service provided Storm Data and Unusual Weather Phenomena between 2006 and 2010 to assist with describing the historic wind damages in the area. Table 9.9 summarizes the findings in the National Weather Services' report.

Designated Hazard Areas

The entire Santa Clara Valley is subject to these hazards.

Potential Damages

Life and Property

Based on the history of the region; windstorm events can be expected annually across widespread areas of the region which can be adversely impacted during a windstorm event. This can result in the involvement of City of Santa Clarita emergency response personnel during a wide-ranging windstorm event. Both residential and commercial structures with weak reinforcement are susceptible to damage. Wind pressure can create a direct and frontal assault on a structure, pushing walls, doors, and windows inward. Conversely, passing currents can create lift suction forces that pull building components and surfaces outward. With extreme wind forces, the roof or entire building can fail, causing considerable damage. Debris carried along by extreme winds can directly contribute to loss of life and indirectly to the failure of protective building envelopes, siding, or walls. When severe windstorms strike a community, such as, downed trees, power lines, and damage to property, this can create a major hindrance to emergency response and disaster recovery.

Table 9.9 – Storm Data and Unusual Weather Phenomena – 2006 – 2010

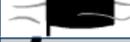
DATE	Wind Velocity Kt	DESCRIPTION OF DAMAGE
12/27/06	50	The main weather associated with this storm system was the gusty offshore winds that developed behind the storm. The gusty winds affected Santa Barbara, Ventura and Los Angeles counties and gusted as high as 100 MPH. Widespread power outages were reported across the area due to downed power lines. The winds also damaged numerous orchards across Santa Barbara and Ventura counties, resulting in over \$15 million dollars of crop damage. In Lake Casitas, the winds damaged a large boat dock, scattering numerous boats across the lake. One injury due to a falling tree was reported at a campground in Santa Barbara county. Large ocean waves also occurred during this event and resulted in the death of one man who was trying to save two family members who were swept into the ocean by the large waves. The two family members swept into the ocean were eventually saved.
1/5/07	56	An inside slider brought gusty offshore winds and light precipitation to the area. Across Santa Barbara, Ventura and Los Angeles counties, strong and gusty north to northeast winds were reported across the mountains and valleys. Wind gusts between 60 and 80 MPH were reported with a peak gust of 98 MPH reported at Laguna Peak in the coastal mountains of Ventura county. Light precipitation was reported across the area with most areas receiving less than one-half inch of rainfall.
10/21/07	60	Between October 20th and 24th, strong surface high pressure developed over the Great Basin and produced a strong and long-lasting Santa Ana wind event across Southern California. This particular Santa Ana wind event was the strongest and most widespread in recent memory with peak wind gusts over 100 mph reported at Laguna Peak and Whitaker Peak. The offshore winds produced very warm and dry conditions across Southern California which led to 9 different wildfires across Santa Barbara, Ventura and Los Angeles counties. Four of the wildfires exceeded 700 acres with one fire burning nearly 60,000 acres.
12/26/07	56	Yet another round of gusty Santa Ana winds affected sections of Southern California. Gusty north to northeast winds affected the mountains of Ventura and Los Angeles counties as well as the Santa Clarita Valley.
1/16/08	50	Strong surface high pressure in the Great Basin produced a moderate Santa Ana wind event across Southern California. Sustained winds between 20 and 40 mph with gusts as high as 80 mph were reported across Ventura and Los Angeles counties. The Santa Ana winds knocked down numerous trees and power lines, producing scattered power outages.
3/2/08	51	Strong north to northeast pressure gradients developed across Southern California, producing gusty north to northeast winds across the mountains of Ventura and Los Angeles counties as well as the Santa Clarita Valley.
11/15/08	57	An extended period of offshore winds affected Southern California. North to northeast wind gusts in excess of 65 MPH were reported in some areas. The strong winds, combined with very dry conditions, helped fuel two significant wildfires. The Tea Fire, near Montecito in Santa Barbara county, burned 1,940 acres. The Sayre Fire, north of Sylmar in Los Angeles county, burned 11,262 acres. Both fires produced significant loss of residences.
1/10/09	63	The combination of strong surface high pressure over the Great Basin and a ridge aloft produced strong and gusty Santa Ana winds across Ventura and Los Angeles counties. Across the higher terrain, wind gusts as high as 73 MPH were reported.
10/27/09	55	A powerful early-season storm dropped into the Great Basin. This storm produced very strong and gusty northerly winds. In the mountains of Los Angeles and Ventura counties, north winds gusting to 81 MPH were reported. The strong wind even filtered down to the valleys of Los Angeles county with wind gusts between 58 and 63 MPH reported while stations in the Antelope Valley reported sustained winds between 45 and 50 MPH. The strong winds did knock down some power lines and trees, producing

DATE	Wind Velocity Kt	DESCRIPTION OF DAMAGE
		numerous electric outages across the area.
12/22/09	51	A strong northwesterly wind event buffeted sections of Los Angeles and Ventura counties with strong winds. The strongest winds were reported in the mountains of Ventura and Los Angeles counties with wind gusts to 78 MPH recorded. However the strong and gusty winds did filter down into the Santa Clarita and San Fernando Valleys as well as the Antelope Valley.
1/18/10 1/20/10	56	A series of powerful winter storms affected Central and Southern California between the 18th and 22nd of January. As this series of storms moved across the area, they brought heavy rain, flash flooding, gusty winds, heavy snow and even severe weather to the area. By the 22nd, rainfall totals for this series of storms ranged from 4-8 inches over coastal areas to 8-16 inches in the foothills and mountains. Due to some very intense periods of rainfall, flash flooding and mud and debris flows occurred across the area. In the mountains of Ventura and Los Angeles counties, 1 to 3 feet of new snowfall was reported. Strong southerly winds were common as each storm moved across the area with wind gusts as high as 71 MPH reported in some spots. Along with the rain and snow, some severe weather occurred across the area with reports of waterspouts, straight-line winds and even a weak tornado in the city of Ventura.

The Beaufort Scale, Table 9.10, coined and developed by Sir Francis Beaufort in 1805, illustrates the effect that varying wind speeds can have on sea swells and structures:

Table 9.10

Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.

Utilities/ Infrastructure

Windstorms can damage buildings, power lines, and other property and infrastructure due to falling trees and branches. During wet winters, saturated soils can cause trees to become less stable and more vulnerable to uprooting from high winds. Historically, falling trees have been the major cause of power outages in the region. Windstorms, such as Santa Ana wind conditions, can cause flying debris and downed utility lines. For example, tree limbs breaking in winds of only 45 mph can be thrown over 75 feet. As such, overhead power lines can be damaged even in relatively minor windstorm events. Falling trees can bring electric power lines down to the pavement, creating the possibility of lethal electric shock.

Windstorms can result in collapsed or damaged buildings or blocked roads and bridges, damaged traffic signals, streetlights, and parks, among others. Roads blocked by fallen trees during a windstorm may have severe consequences to people who need access to emergency services. Emergency response operations can be complicated when roads are blocked or when power supplies are interrupted. Industry and commerce can suffer losses from interruptions in electric services and from extended road closures. They can also sustain direct losses to buildings, personnel, and other vital equipment. There are direct consequences to the local economy resulting from windstorms related to both physical damages and interrupted services.

Increased Fire Threat

Perhaps the greatest danger from windstorm activity in Southern California comes from the combination of the Santa Ana winds with the major fires that occur every few years in the urban/wild land interface. With the Santa Ana winds driving the flames, the speed and reach of the flames is even greater than in times of calm wind conditions. The higher fire hazard raised by a Santa Ana wind condition requires that even more care and attention be paid to proper brush clearances on property in the urban/wildlife interface areas.

Transportation

Windstorm activity can have an impact on local transportation. The problems caused by downed trees and electrical wires blocking streets and highways, are just a few problems caused by windstorms. During periods of extremely strong Santa Ana winds, major highways can be temporarily closed to truck and recreational vehicle traffic. However, typically these disruptions don't regularly occur in Santa Clarita and are not long lasting when they do occur, nor do they carry a severe long-term economic impact on the region.

Existing Mitigation Activities

Severe Weather Mitigation Action Items

The severe weather mitigation action items provide guidance on suggesting specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from severe weather events. Each action item is followed by activities for implementation, which can be used by the steering committee and local decision makers in pursuing strategies for implementation.

SW1: Continue to enhance participation in Southern California Edison’s Independent System Operator Notification Procedure Process for Rolling Blackouts.

Activities:

- 1. Continue to participate with Southern California Edison’s notification system to inform the community of impending rolling blackouts.*

Priority: Medium

Coordinating Organization: Public Works Department, and Southern California Edison

Timeline: Ongoing

Plan Goals Addressed: Public Awareness
Partnerships and Implementation
Emergency Services

Funding Source: General Fund

SW2: Create a Public Education program regarding proper precautions against exposure to heat and potential hazards of exposure to extreme heat.

Activities:

- 2. Partner with the Los Angeles County Department of Health Services to create and or/adopt their existing information regarding heat, how to monitor and/or adjust behavior depending on the specific heat index, and information to seek should specific ailments from exposure to heat occur.*
- 3. Maintain and update cooling center inventory on a bi-annual schedule.*

Priority: Medium

Coordinating Organization: Community Services Division, Environmental Services and Los Angeles County Public Health

Timeline: Ongoing

Plan Goals Addressed: Public Awareness
Partnerships and Implementation
Emergency Services

Funding Source: General Fund

SW3: Create a Public Education program regarding proper precautions against exposure to poor air quality.

Activities:

4. *Partner with the Los Angeles County Department of Health Services to create and/or adopt their existing information regarding poor air quality.*
5. *Partner with the South Coast Air Quality Management District to develop a mechanism to notify sensitive populations within the City on days when air quality standards exceed state and federal standards.*

Priority: Medium

Coordinating Organization: Environmental Services, South Coast Air Quality Management District (AQMD), LA County Public Health, and National Weather Service

Timeline: Ongoing

Plan Goals Addressed: Public Awareness
Partnerships and Implementation
Emergency Services

Funding Source: General Fund

SW4: Enhance programs to keep trees from threatening lives, property, and public infrastructure during windstorm events..

Activities:

6. *Partner with responsible agencies and organizations to design and disseminate education information to property owners to reduce risk from tree failure to life, property, and utility systems.*
7. *Develop partnerships between utility providers and City/County local public works agencies to document known hazard areas.*
8. *Identify and track potentially hazardous trees.*

Priority: Medium

Coordinating Organization: Urban Forestry, Landscape Maintenance District, LA County Fire, Utilities

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property
Natural Systems

Funding Source: General Fund

SW5: Enhance strategies for debris management for windstorm events.

Activities:

9. *Develop coordinated management strategies for clearing debris from roads of fallen trees, and clearing debris from public and private property.*

Priority: Medium
Coordinating Organization: Public Works Department
Timeline: 2 years
Plan Goals Addressed: Protect Life and Property
Emergency Services
Funding Source: General Fund

SW6: Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.

Activities:

10. *Open a dialogue with local utility companies to increase the use of underground utilities where possible.*
11. *Participate in the Underground Utilities Program*

Priority: Medium
Coordinating Organization: Public Works Department, Planning Division and Southern California Edison
Timeline: 2 years
Plan Goals Addressed: Protect Life and Property
Emergency Services
Funding Source: General Fund

SW7: Create a localized map that charts seasonal dominant wind speeds and directions.

Activities:

- 12. Expand Weather Spotters program for high winds and extreme weather to pinpoint areas that are hardest hit in the City*
- 13. Coordinate with public/private weather entities to obtain weather data and create various weather maps.*

Priority: High

Coordinating Organization: Technology Services Division, National Weather Service, U.S. Forest Service and Los Angeles County Fire Department

Timeline: 5 years

Plan Goals Addressed: Protect Life and Property
Partnerships and Implementation
Emergency Services

Funding Source: General Fund

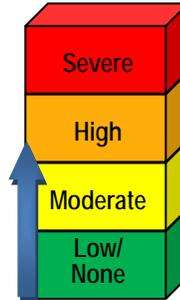
Severe Weather Resource Directory

National Weather Service
Los Angeles/Oxnard Weather Forecast Office
520 North Elevar Street
Oxnard, CA 93030
Phone: (805) 988-6610
Website: <http://www.nwsla.noaa.gov/>

Los Angeles County Department of Health Services
313 N. Figueroa Street
Los Angeles, CA 90012
Phone: (213) 240-8059
Website: <http://www.ladhs.org/>

SECTION TEN – WILDFIRES HAZARD PROFILE

CATEGORY OF RISK	LEVEL OF RISK
Probability/Frequency:	Highly Likely
Magnitude/Severity:	Limited
Warning Time:	6 to 12 hours
Duration:	Less than 1 week



Wildfires Hazard Information and Background

The City of Santa Clarita and the unincorporated parts of Los Angeles County are susceptible to wildland fires because of hilly terrain, dry weather conditions, and the plant type cover. Steep slopes in the Santa Clarita Valley allow for the quick spread of flames during fires and pose difficulty for fire suppression due to access problems for firefighting equipment. The late summer and fall months are the critical times of the year when wildland fires could occur, as the Santa Ana winds deliver hot, dry desert air in the region. In addition, highly flammable plant communities present in the Santa Clarita Valley, allows fire to spread easily in the hillside areas, which are the primary wildfire hazard areas in the Santa Clarita Valley. These plant communities consist of variable mixtures of woody shrubs and herbaceous species, such as chaparral and sage vegetation.

Wildfires are particularly a threat to the Santa Clarita Valley because of its natural topography. The Santa Clarita Valley is surrounded by mountains and is in between two major freeways (14 Freeway and Interstate 5 Freeway). This layout can create obstacles to access emergency resources from outside of the Santa Clarita Valley and facilitate evacuation during a severe fire storm. The City ensures that these obstacles are addressed through collaboration with Los Angeles County Fire and Sheriff's Departments, the City General Plan, the Unified Development Code, the Unified Building Code, and environmental analysis of development projects.

There are three categories of interface fire:¹ 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 large fuel load (dense vegetation). Once a fire has started, several

¹ Planning for Natural Hazards: The Oregon Technical Resource Guide, (July 2000) Department of Land Conservation and Development

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.

“Past fire suppression is not to blame for causing large shrubland wildfires, nor has it proven effective in halting them.” said Dr. Jon Keeley, a USGS fire researcher who studies both southern California shrublands and Sierra Nevada forests. “Under Santa Ana conditions, fires carry through all chaparral regardless of age class. Therefore, prescribed burning programs over large areas to remove old stands and maintain young growth as bands of firebreaks resistant to ignition are futile at stopping these wildfires.”²

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

“When Lewis and Clark explored the Northwest, the forests were relatively open, with 20 to 25 mature trees per acre. Periodically, lightning would start fires that would clear out underbrush and small trees, renewing the forests. Today's forests are completely different, with as many as 400 trees crowded onto each acre, along with thick undergrowth. This density of growth makes forests susceptible to disease, drought, and severe wildfires. Instead of restoring forests, these wildfires destroy them and it can take decades to recover. This radical change in our forests is the result of nearly a century of well-intentioned but misguided management.”³

The Interface

One challenge Southern California faces regarding the wildfire hazard is from the increasing number of houses being built on the urban/wildland interface. Every year the growing population has expanded further and further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas and the open spaces created by this expansion has produced a significant increase in threats to life and property from fires and has pushed existing fire protection systems beyond original or current design and capability. Property owners in the interface are not aware of the problems and threats they face. Therefore, many owners have done very little to manage or offset fire hazards or

² http://www.usgs.gov/public/press/public_affairs/press_releases/pr1805m.html

³ Overgrown Forests Require Preventive Measures, By Gale A. Norton (Secretary of the Interior), USA Today Editorial, August 21, 2002

risks on their own property. Furthermore, human activities increase the incidence of fire ignition and potential damage.

Fuel

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

The type of fuel also influences wildfire. Chaparral is a primary fuel of Southern California wildfires. Chaparral habitat ranges in elevation from near sea level to over 5,000' in Southern California. Chaparral communities experience long dry summers and receive most of their annual precipitation from winter rains. Although chaparral is often considered as a single species, there are two distinct types; hard chaparral and soft chaparral. Within these two types are dozens of different plants, each with its own particular characteristics.

"Fire has been important in the life cycle of chaparral communities for over 2 million years; however, the true nature of the "fire cycle" has been subject to interpretation. In a period of 750 years, it generally thought that fire occurs once every 65 years in coastal drainages and once every 30 to 35 years inland."⁴

"The vegetation of chaparral communities has evolved to a point it requires fire to spawn regeneration. Many species invite fire through the production of plant materials with large surface-to-volume ratios, volatile oils and through periodic die-back of vegetation. These species have further adapted to possess special reproductive mechanisms following fire. Several species produce vast quantities of seeds which lie dormant until fire triggers germination. The parent plant which produces these seeds defends itself from fire by a thick layer of bark which allows enough of the plant to survive so that the plant can crown sprout following the blaze. In general, chaparral community plants have adapted to fire through the following methods: a) fire induced flowering; b) bud production and sprouting subsequent to fire; c) in-soil seed storage and fire stimulated germination; and d) on plant seed storage and fire stimulated dispersal."⁵

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.

⁴ <http://www.coastal.ca.gov/fire/ucsbfire.html>

⁵ Ibid

Topography

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

Weather

Weather patterns combined with certain geographic locations can create a favorable climate for wildfire activity. Areas where annual precipitation is less than 30 inches per year are extremely fire susceptible.⁶ High-risk areas in Southern California share a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. The so-called “Santa Ana” winds, which are heated by compression as they flow down to Southern California from Utah, create a particularly high risk, as they can rapidly spread what might otherwise be a small fire.

Drought

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

Development

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

⁶ Planning for Natural Hazards: The Oregon Technical Resource Guide, (July 2000), Department of Land Conservation and Development

The Threat of Urban Conflagration

Although communities without an urban/wildland interface are much less likely to experience a catastrophic fire, in Southern California there is a scenario where any community might be exposed to an urban conflagration similar to the fires that occurred following the 1906 San Francisco earthquake.

“Large fires following an earthquake in an urban region are relatively rare phenomena, but have occasionally been of catastrophic proportions. The two largest peace-time urban fires in history, 1906 San Francisco and 1923 Tokyo, were both caused by earthquakes. The fact that fire following earthquake has been little researched or considered in the United States is particularly surprising when one realizes that the conflagration in San Francisco after the 1906 earthquake was the single largest urban fire, and the single largest earthquake loss, in U.S. history. The loss over three days of more than 28,000 buildings within an area of 12 km² was staggering: \$250 million in 1906 dollars, or about \$5 billion at today’s prices.

The 1989 Loma Prieta Earthquake, the 1991 Oakland hills fire, and Japan’s recent Hokkaido Nansei-oki Earthquake all demonstrate the current, real possibility of a large fire, such as a fire following an earthquake, developing into a conflagration. In the United States, all the elements that would hamper fire-fighting capabilities are present: density of wooden structures, limited personnel and equipment to address multiple fires, debris blocking the access of fire-fighting equipment, and a limited water supply.”⁷

Wildfires History

Large fires have been part of the Southern California landscape for millennia. “Written documents reveal that during the 19th century human settlement of southern California altered the fire regime of coastal California by increasing the fire frequency. This was an era of very limited fire suppression, and yet like today, large crown fires covering tens of thousands of acres were not uncommon. One of the largest fires in Los Angeles County (60,000 acres) occurred in 1878, and the largest fire in Orange County’s history, in 1889, was over half a million acres.”⁸

Records from the U.S. Department of Forestry reveal that wildland fires occur on a regular basis almost every year, while large fires occur fairly regularly every ten years. The occurrence of major wildfires in a particular region corresponds to the age of its vegetation. Often, renewed growth of vegetation after a major fire tends to pose a lesser risk during the first ten years of growth. However, as dead vegetation accumulates, the potential for a major wildfire increases as these materials are more susceptible to ignition and facilitate the spreading of flames. It is important to note the recent rainstorm where the Santa Clarita Valley experienced over 38.51 inches of rainfall since June 2004. This rainfall is the second highest rainfall in recorded history

⁷ <http://www.eqe.com/publications/revf93/firefall.htm>

⁸ http://www.usgs.gov/public/press/public_affairs/press_releases/pr1805m.html

in Los Angeles County. This rainfall has resulted in increased vegetation in fire prone areas. During the next several years as this vegetation dries, this area might be susceptible to ignition and facilitate the spreading of flames. Therefore, the occurrence of wildland fires tends to be cyclical, where a decade will pass with few fires followed by a decade with several large fires. In addition, the occurrence of the largest fires also corresponds to periods of extremely high wind conditions.

Table 10.1 reveals major wildland fires in the Santa Clarita Valley since 1990 and Table 10.2 depicts the 20 Largest California Wildfires (by structures).

Table 10.1 – Major Wildland Fires in the Santa Clarita Valley Since 1991

Year	Name	Acres	Year	Name	Acres
1990	Calgrove Fire	89	2001	Bouquet Fire	194
1990	Cypress Fire	105	2001	Sloan Fire	1,789
1991	Polk Fire	115	2001	Stables Fire	6,402
1991	Sylmar Fire	235	2002	Bouquet Fire	4,458
1992	Bouquet Fire	120	2002	Copper Fire	19,104
1992	Devil Fire	1,351	2002	Freeway Fire 2	1,028
1992	Huntstock Fire	40	2002	Oasis Fire	1,151
1992	Madd Fire	71	2003	Verdale Fire	8,650
1993	Rio Vista Burn	307	2003	Piru Fire	63,991*
1993	San Fernando Fire	177	2004	Foothill Fire	6,002
1993	Tapia Burn	464	2005	Sierra Fire	48
1994	Agua Dulce Fire	1,155	2005	Vasquez Fire	48
1994	San Fran Burn	24	2006	Calgrove Fire	40
1994	Shooting Fire	3,538	2006	Cross Fire	665
1995	East Burn	57	2007	Ranch Fire	58,401
1995	Freeway Fire No 1	235	2007	October Fire	40
1995	Freeway Fire No. 2	1,223	2007	Buckweed	38,356
1995	Rio Visa Burn	45	2007	Magic Fire	2,284
1995	Towsley Fire	813	2007	Soledad Fire	50
1995	Trotter Fire	267	2007	Meadowridge	40
1996	Agua Dulce Fire	237			
1996	Bouquet Fire No. 2	99			
1996	Camp ANF Fire	794			
1996	Haskell Fire	84			
1996	Hasley Fire	238			
1996	Marple Fire	19,861			
1997	Freeway IC Fire	45			
1997	Linda Fire	215			
1997	Placerita Fire	459			
1997	Sierra Fire	522			
1997	Soledad Fire	166			
1998	Derby Fire	362			
1998	San Fran Fire	233			
1998	Wayside Fire	19			
1999	Holser Fire	106			
1999	Interstate Complex	273			
1999	Shannon Fire	206			
2000	Burke Fire	171			
2000	Dry Fire	253			
2000	Paradise Fire	350			
2000	West Fire	121			
2000	Yucca Fire	788			
*Includes acres burned in Ventura County					
Source: LACoFD					

Table 10.2 – 20 Largest California Wildland Fires (By Structures Destroyed)

20 Largest California Wildland Fires (By Structures Destroyed)

	FIRE NAME/CAUSE	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1	TUNNEL (<i>REKINDLE</i>)	October 1991	ALAMEDA	1,600	2,900	25
2	CEDAR (<i>HUMAN</i>)	October 2003	SAN DIEGO	273,246	2,820	15
3	WITCH (<i>UNDER INVESTIGATION</i>)	October 2007	SAN DIEGO	197,990	1,650	2
4	OLD (<i>HUMAN</i>)	October 2003	SAN BERNARDINO	91,281	1,003	6
5	JONES (<i>UNDETERMINED</i>)	October 1999	SHASTA	26,200	954	1
6	PAINT (<i>ARSON</i>)	June 1990	SANTA BARBARA	4,900	641	1
7	FOUNTAIN (<i>ARSON</i>)	August 1992	SHASTA	63,960	636	0
8	SAYRE (<i>MISC</i>)	November 2008	LOS ANGELES	11,262	604	0
9	CITY OF BERKELEY (<i>POWERLINES</i>)	September 1923	ALAMEDA	130	584	0
10	HARRIS (<i>UNDER INVESTIGATION</i>)	October 2007	SAN DIEGO	90,440	548	8
11	BEL AIR (<i>UNDETERMINED</i>)	November 1961	LOS ANGELES	6,090	484	0
12	LAGUNA FIRE (<i>ARSON</i>)	October 1993	ORANGE	14,437	441	0
13	LAGUNA (<i>POWERLINES</i>)	September 1970	SAN DIEGO	175,425	382	5
14	HUMBOLDT (<i>ARSON</i>)	June 2008	BUTTE	23,344	351	0
15	PANORAMA (<i>ARSON</i>)	November 1980	SAN BERNARDINO	23,600	325	4
16	TOPANGA (<i>ARSON</i>)	November 1993	LOS ANGELES	18,000	323	3
17	49ER (<i>BURNING DEBRIS</i>)	September 1988	NEVADA	33,700	312	0
18	ANGORA (<i>HUMAN</i>)	June 2007	EL DORADO	3,100	309	0
19	SIMI (<i>UNDER INVESTIGATION</i>)	October 2003	VENTURA	108,204	300	0
20	SLIDE (<i>UNDER INVESTIGATION</i>)	October 2007	SAN BERNARDINO	12,759	272	0

Note that this list does not include fire jurisdiction. These are the Top 20 within California, regardless of whether they were state, federal, or local responsibility. Also note that "structures" is meant to include all loss - homes and outbuildings, etc.



11/4/2009

Probability, Frequency and Magnitude

According to the Los Angeles County Fire Department (LACoFD), approximately 80 to 90 percent of the Santa Clarita Valley is in a Very High Fire Hazard Severity Zone, which is the department’s highest classification for areas prone to wildfires. In the event of a severe firestorm in these areas, it is anticipated that the City could incur a fiscal impact of over \$40 million to replace impacted City owned critical facilities. These facilities are outlined under Section 3 – Risk Assessment. Map C.5, Firezone Map, found in the Appendix of this Plan, identifies the areas identified in and around the City that are considered Very High Fire Hazard Severity Zones. These areas include portions of Newhall and Canyon Country, areas surrounding Sand Canyon, portions of Pico Canyon, Placerita Canyon, Hasley Canyon, Whites Canyon, Bouquet Canyon, and all areas that interface with urban development.

Historic Losses and Impacts

During the 2002 fire season, more than 6.9 million acres of public and private lands burned in the U.S., resulting in loss of property, damage to resources and disruption of community

services.⁹ Taxpayers spent more than \$1.6 billion¹⁰ to combat more than 88,400 fires nationwide. Many of these fires burned in wildland/urban interface areas and exceeded the fire suppression capabilities of those areas. Table 10.3 illustrates fire suppression costs for state, private and federal lands.

Table 10.3 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
http://research.yale.edu/gisf/assets/pdf/ppf/wildfire_report.pdf			

The 2003 Southern California Fires

The fall of 2003 was the most destructive wildfire season in California history. In a 10-day period, 12 separate fires raged across Los Angeles, Riverside, San Bernardino, San Diego, and Ventura Counties, burning almost 750,000 acres and resulting in the loss of 22 lives and 4,812 homes. The magnitude of the 2003 fires resulted from a combination of factors, including extended drought followed by thunderstorms, lightning strikes and windy conditions; an infestation of bark beetles that killed thousands of mature trees; and the practice of suppressing wildfires over the last century that has led to buildup of brush and highly flammable fuel loads.¹¹

Ranch Fire

10/20/07 – 10/29/07

Acres: 58,401

\$9 Million in estimated suppression costs

Structures Destroyed: 2 homes, 9 outbuildings

“Other” structures destroyed: 7

The Ranch Fire (or Castaic Fire) burned along the Los Angeles-Ventura county line about 5 miles (8.0 km) north of Santa Clarita, in the Angeles and Los Padres national forests. About 500 residences lie in the fire's path. Evacuations were recommended in all of Piru and portions of Fillmore. Angeles National Forest officials implemented a total forest closure on October 23.

⁹ <http://www.nifc.gov/stats/wildlandfirestats.html>

¹⁰ http://research.yale.edu/gisf/assets/pdf/ppf/wildfire_report.pdf

¹¹ *Los Angeles County Preliminary Draft Santa Clarita Valley Area Plan, 2009*

Buckweed Fire

10/21/07 – 10/26/07

Acres: 38,356

Structures Destroyed: 21

\$7.5 Million in estimated suppression costs

\$2.8 Million in estimated private property losses

The Buckweed Fire was reported near Mint Canyon Road and Sierra Highway at 12:55 p.m. on October 21, 2007. It was rapidly spread by strong, gusty Santa Ana winds. By 4:30 p.m., about 2,000 acres had burned, Sierra Highway and many other roads were closed, and the fire was moving toward the city of Santa Clarita. At 5:43 p.m. the fire was reported to be about 10,000 acres, numerous structures had been destroyed, and another 200 were threatened. Evacuations were in progress for upper Bouquet Canyon, San Francisquito Canyon, and Green Valley areas. Evacuation centers were established. As of 8:25 a.m., on October 22, the Santa Ana winds continued. The area had burned nearly 30,000 acres, and at least 25 structures had been destroyed. As the fire burned toward the Magic Mountain area of Santa Clarita, evacuations continued and now included Vasquez Canyon, Copperhill, and areas up to Spunky Canyon. A total of 3,800 residences as well as major electrical transmission lines were threatened. The L.A. County Sheriff, and L.A. County Animal Care and Control coordinated animal evacuations. Only residents were allowed into the evacuation areas. Schools, both private and public, cancelled classes. The incident exceeded capabilities of available firefighting resources.¹² By 2:00 p.m. the burn area exceeded 38,000 acres, 43 structures including 21 single family dwellings (seven family dwellings within the City boundaries).¹³ It was estimated that 15,000 people were evacuated from 5,500 homes.

At one point, the Santa Clarita fires (numbering up to four at one time and burning out of control) were the number one priority in the state. Both the Governor and the County declared a State of Emergency for the area. A Federal Declaration quickly followed.

The strong Santa Ana winds, the dry weather, and drought conditions caused the “perfect storm” for the fires that spread quickly, jumped canyons, and destroyed everything in its path. At one point, nearly every major roadway out of the area was closed due to the fires, leaving only the freeways to exit the community.

For the first time, the City of Santa Clarita utilized its Emergency Mass Notification System to send telephone evacuation notifications to 1,200 homes in under one hour. The City’s home page (www.santa-clarita.com) was transformed into an emergency information site, and was updated almost every minute with all manner of information of importance to

¹² http://www.fire.ca.gov/fire_protection/downloads/siege/2007/Overview_Appendix_2.pdf

¹³ Donna Nuzzi and Adele Macpherson, personal memo giving a summary of the Buckweed Fire, April 28, 2010.

Santa Clarita residents. This City's emergency information web site received 151,195 unique visitors during the three-day fire disaster.

The City partnered with the American Red Cross and the William S. Hart School District to set up shelters at local high schools, including Golden Valley and Saugus High Schools. Over 490 residents were served at both Red Cross shelters in two days. On the final day, 103 people were using the shelters.

The City submitted claims totaling \$92,746 through the Public Assistance program with FEMA and CalEMA for debris removal, traffic control, road closures, evacuation and city buses. An additional \$20,792 was claimed with the Federal Highway Administration for a destroyed guard rail. Private property losses are estimated at approximately \$2.8 million.

Magic Fire

10/22/07-10/24/07

Acres: 2,284

The Magic Fire started shortly after 2:00 p.m., October 22, near the Six Flags Magic Mountain amusement park on the western side of Santa Clarita. By October 23 the fire had grown to 1,200 acres. Only 20% contained, it was considered a threat to Simi Valley if the winds continued. However, weather conditions improved, and by evening there was little fire spread, and control lines were holding. Efforts shifted to mop-up and patrol.¹⁴

Designated Hazard Areas

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.

Table 10.4 on the following page 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).

¹⁴ Ibid.

Sample Hazard Identification Rating System (Table 10.4)		
Category	Indicator	Rating
Roads and Signage	Steep; narrow; poorly signed	3
	One or two of the above	2
	Meets all requirements	1
Water Supply	None, except domestic	3
	Hydrant, tank, or pool over 500 feet away	2
	Hydrant, tank, or pool within 500 feet	1
Location of the Structure	Top of steep slope with brush/grass below	3
	Mid-slope with clearance	2
	Level with lawn, or watered groundcover	1
Exterior Construction	Combustible roofing, open eaves, Combustible siding	3
	One or two of the above	2
	Non-combustible roof, boxed eaves, non-combustible siding	1

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 City's Technology Services Division, GIS Group used data from LA County Fire Department and City of Santa Clarita Building and Safety for the area and the City's GIS data to create the Firezones Map for City of Santa Clarita. Map C.5 – Firezones Map, in the Appendix of this Plan, depicts the Very High Fire Hazard Severity Zones within and surrounding the City.

Vulnerability Assessment

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

Key factors included in assessing wildfire risk include ignition sources, building materials and design, 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>.

Growth and Development in the Interface

The hills and mountainous areas of Southern California are considered to be interface areas. The development of homes and other structures is encroaching onto the wildlands and is expanding the wildland/urban interface. The interface neighborhoods are characterized by a diverse mixture of varying housing structures, development patterns, ornamental and natural vegetation, and natural fuels.

In the event of a wildfire, vegetation, structures, and other flammables can merge into unwieldy and unpredictable events. Factors important to the fighting of such fires include access, firebreaks, proximity of water sources, distance from a fire station, and available firefighting personnel and equipment. Reviewing past wildland/urban interface fires shows that many structures are destroyed or damaged for one or more of the following reasons:

- Combustible roofing material;
- Wood construction;
- Structures with no defensible space;
- Fire department 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, fire fighters are challenged by narrow roads and limited access. When there is inadequate turn around space, the fire fighters can only work to remove the occupants, but cannot safely remain to save the threatened structures.

Water Supply

Fire fighters in remote and rural areas are faced by limited water supply and lack of hydrant taps. Rural areas are characteristically outfitted with small diameter pipe water systems, inadequate for providing sustained fire fighting flows.

Interface Fire Education Programs and Enforcement

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

The Need for Mitigation Programs

Continued development into the interface areas will have growing impacts on the wildland/urban interface. Periodically, the historical losses from wildfires in Southern California have been catastrophic, with deadly and expensive fires going back decades. The continued growth and development increases the public need for natural hazards mitigation planning in Southern California.

Potential Damages

The City’s Technology Services Division, GIS Group used the LACoFD’s Firezone data and the city’s own GIS data to identify the structures that lie within the fire hazard zones. It is understood that if a structure is identified in a fire hazard area that it has a higher probability of being impacted by a fire than a structure that is not in the fire hazard area. Table 10.5 - Potential Building Count by General Occupancy identifies these structures in the city’s fire hazard zones.

Table 10.5 - Potential Building Count by General Occupancy

General Occupancy	# of Buildings in Very High Fire Hazard Severity Zone
Commercial	382
Industrial	492
Residential	18,183
Special	105

Wildfire Services and Mitigation Activities

Los Angeles County Fire Department

The City of Santa Clarita and the unincorporated parts of the Santa Clarita Valley receive urban and wildland fire suppression service from the LACoFD. Mutual aid or assistance pacts are maintained with several local, state, and federal agencies. As of 2010, there are fifteen fire stations with 15 engine companies, four paramedic squads, one hazardous materials squad, and two ladder trucks serving the Santa Clarita Valley. The five person hazardous materials squad operates out of Station 76. Approximately 70 firefighters are on duty every day, 24 hours a day (not including chief officers and fire prevention staff). A list and location of the facilities are shown in the Table 10.6, Fire Station Facilities.

Aside from the personnel and equipment listed above, the LACoFD has additional resources available to provide back-up services to the Santa Clarita Valley as needed, including additional engine companies, truck companies, paramedic squads, hazardous material squads, firefighting helicopters, other fire camps, and a variety of specialty equipment.

Another major activity area of the LACoFD, Emergency Medical Service (EMS) was established in 1969. This service allows paramedics to go straight to a medical call and, if necessary, implement advance life support while being able to contact a nurses at a hospital over a specially designed radio system. Aside from EMS provided by the LACoFD, there is also a private ambulance service in the Santa Clarita Valley.

The mission of the Health Hazardous Materials Division is “to protect the public health and the environment throughout Los Angeles County from accidental releases and improper handling, storage, transportation and disposal of hazardous materials and waters through coordinated efforts of inspections, emergency response, enforcement, and site mitigation oversight.”

LACoFD also provides the Urban Search and Rescue (USAR) services, an activity that requires special training and equipment, allows the LACoFD to offer advanced technical rescue capabilities during disasters. Members of the USAR Committee, which consists of LACoFD personnel certified as California State instructors for Rescue Systems 1 and Emergency Trench Rescue, are trained in confined space rescue, high angle rescue, the use of Biopack self-contained breathing apparatuses (SCBAs), helicopter rescue, rescue diving, and other specialties.

Table 10.6. Fire Station Facilities

<i>Station</i>	<i>Location</i>
Stations in City of Santa Clarita	
Fire Station 73*	24875 N. San Fernando Road Santa Clarita, CA 91321
Fire Station 104*	26201 Golden Valley Road Santa Clarita, CA 91350
Fire Station 107*	18239 W. Soledad Canyon Santa Clarita, CA 91351
Fire Station 123*	26321 N. Sand Canyon Road Santa Clarita, CA 91387
Fire Station 111*	26829 Seco Canyon Road Santa Clarita, CA 91350
Fire Station 126	26320 Citrus Street Santa Clarita, CA 91355
Fire Station 132*	29310 Sand Canyon Road Santa Clarita, CA 91387
Stations Outside of the City – Serving the City of Santa Clarita	
Fire Station 76	27223 Henry Mayo Drive Valencia, CA 91355
Fire Station 77	46833 Peace Valley Road Gorman, CA 93243
Fire Station 80	1533 W. Sierra Highway Acton, CA 93510
Fire Station 81	8710 W. Sierra Highway Agua Dulce, CA 91350
Fire Station 108	28799 Rock Canyon Drive Saugus, CA 91390
Fire Station 124	25870 Hemingway Avenue Stevenson Ranch, CA 91381
Fire Station 149*	31770 Ridge Route Castaic, CA 91384
Fire Station 156	24525 Copper Hill Drive Valencia, CA 91354
* Paramedic Units	
Source: LACoFD 2010	

However, in addition to fire suppression, another major focus of LACoFD is fire prevention, which is headed up by the Fire Marshal. As of January 1, 2003, fire prevention services offered by LACoFD's Fire Prevention Bureau include the following:

- Codes and Ordinances Unit that participates in updating codes to the latest standards
- Fire Prevention Engineering that assists in plan checking, particularly for fire sprinkler installation and fire alarm plans
- Inspections of occupancies (except one and two-family dwellings)
- Forestry services that includes a Brush Clearance Compliance Program and a Fuel modification program
- Special Unites Section that includes a Petroleum/Chemical Unit, Schools and Institutions Unit, and Fire Investigation Unit
- Water, Subdivision and Access Unit that reviews development impact issues
- Area Sections Unit to inspect and plan check specific buildings/structures
- Environmental Review

In addition to the above list of fire prevention activities, one of the focal points of LACoFD programs is emergency preparedness. Each year, LACoFD sponsors Fire Safety Day events throughout the County to provide residents with the knowledge base for safe fire protection strategies and tips on emergency preparedness. In addition, the LACoFD also provides programs to educate youth about fire safety as well as helping to promote healthy communities. Some of the current youth programs offered by the LACoFD to the community include the following:

- Junior Fire Chiefs – Promoting fire safety to elementary school youths.
- Rescue Youth – LACoFD joining with the District Attorney to assist “at risk” youths.
- Explorers – LACoFD’s explorer program in association with the Boy Scouts of America for young adults interested in a career in Fire Service.
- WATCH (Water Awareness Training for Children in the Home) – A 5-Step program for poolside safety.
- Spark of Love – Firefighter interacting with the community to bring the spirit of togetherness.
- Yogi Bear Schoolhouse – Using a mobile earthquake simulator to stimulate heightened public awareness about earthquake preparedness.

The City of Santa Clarita currently offers two training programs on emergency preparedness for its community. The Community Emergency Response Training (CERT) Program, which is under the leadership of the City and LACoFD, is designed to help families, neighborhoods, schools, and businesses prepare for effective disaster/emergency response through training and pre-planning. Emergency responders, emergency management personnel, and emergency trained volunteers provide training on preparation and response to fires and other life-threatening situations.

The Santa Clarita Educated Communities United in Response to Emergencies (SECURE) Program provides free emergency preparedness training for residents and businesses so they can be prepared through the critical first 72 hours from when a disaster/emergency,

such as a fire, occurs. Over the past years, this program has been effective in training families, businesses, seniors, and schools about basic emergency preparedness skills. Recently, training has been expanded to also reach residents who speak Spanish as their primary language. Additionally, the program now includes specific emergency preparedness information for senior citizens and individuals with disabilities.

The City also performs outreach to its community through the Internet and libraries. Materials provided to community members include tips on emergency preparedness, such as information on how to prepare 72-Hour Emergency Financial Kits and Emergency Car Kits, how to get disaster assistance, and how to locate emergency shelters. Other non-fire-related services provided by the City depend on issues that are currently important at hand, such as information on bioterrorism preparedness and response, sand-bagging classes for El Niño season, updates on epidemics, etc.

An outreach event hosted by the City of Santa Clarita is the annual Emergency Expo. This event has been in place for ten years and helps educate approximately 1,500-2,000 people per year on emergency preparedness and safety, and on the emergency services available to them in the Valley.

Fire Codes

City and County programs directed toward wildland fire prevention include the adoption of the State Fire Code for regulations and standards to be applied toward new development in “hazardous fire areas.” Fire prevention items addressed in the Fire Code include provision of access roads, adequate road widths, and clearance of brush around structures located in hillside areas that are considered primary wildland fire risk areas. Compliance with County and City Building Codes also requires that new development within high fire hazard areas show proof through certification with the LACoFD that new development is located within a designated distance of a water source such as water supply tanks or retention basins for emergency fire fighting purposes. Furthermore, the Water Code specifies that water storage facilities be placed to ensure gravity emergency fire flow in the event power lines are damaged.

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 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.¹⁵

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.

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 of U.S. forest lands.

¹⁵ Source: National Interagency Fire Center, Boise ID and California Division of Forestry, Riverside Fire Lab.

Other Mitigation Programs and Activities

Some areas of the country are facing wildland/urban issues collaboratively. These are model programs that include local solutions. Summit County, Colorado, has developed a hazard and risk assessment process that mitigates hazards through zoning requirements. In California, the LACoFD 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 of 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.

Prescribed Burning

The health and condition of a forest will determine the magnitude of wildfire. 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.

Firewise

Firewise is a program developed within the National Wildland/ Urban Interface Fire Protection Program and it is the primary federal program addressing interface fire. It is administered through the National Wildfire Coordinating Group whose extensive list of participants includes a wide range of federal agencies. The program is intended to empower planners and decision makers at the local level. Through conferences and information dissemination, Firewise increases support for interface wildfire mitigation by educating professionals and the general public about hazard evaluation and policy implementation techniques. Firewise offers online wildfire protection information and checklists, as well as listings of other publications, videos and conferences. The interactive home page allows users to ask fire protection experts questions and to register for new information as it becomes available.

FireFree Program

FireFree is a unique private/public program for interface wildfire mitigation involving partnerships between an insurance company and local government agencies. It is an example of an effective non-regulatory approach to hazard mitigation. Originating in Bend, Oregon, the program was developed in response to the city's "Skeleton Fire" of 1996, which burned over 17,000 acres and damaged or destroyed 30 homes and structures. Bend sought to create a new kind of public education initiative that emphasized local involvement. SAFECO Insurance Corporation was a willing collaborator in this effort. Bend's pilot program included:

- A short video production featuring local citizens as actors, made available at local video stores, libraries, and fire stations;
- Two city-wide yard debris removal events;
- A 3D-minute program on a model FireFree home, aired on a local cable television station; and
- Distribution of brochures, featuring a property owner evaluation checklist and a listing of fire-resistant indigenous plants.

Wildfire Mitigation Action Items

The wildfire mitigation action items provide guidance on suggesting specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from wildfire events. Each action item is followed by activities for implementation, which can be used by the steering committee and local decision makers in pursuing strategies for implementation.

WF1: Work with Los Angeles County Fire Department Division III, North Regional Operations Bureau (LACoFD Division III) to enhance emergency services to increase the efficiency of wildfire response and recovery activities

Activities:

- 1. Support LACoFD Division III's efforts to install more fire stations for better access and coverage.*
- 2. Coordinate with LACoFD Division III and Sheriff's Department to coordinate the Public Alert and Warning Notification System to quickly contact all at-risk urban/wildland interface residents in the Santa Clarita Valley regarding evacuations. Incorporate the use of e-texting, mass notification and social media, i.e. Twitter, Facebook, My Space.*

Priority:	Low
Coordinating Organization:	LACoFD Division III (contract city), Technology Services Division Communications Division, City Manager's Office, and LA County Sheriff's Department
Timeline:	Ongoing
Plan Goals Addressed:	Emergency Services
Funding Source:	General Fund

WF2: Collaborate with LACoFD Division III in educating City staff and fire personnel on federal cost-share and grant programs, Fire Protection Agreements and other related federal programs so the full array of assistance available to local agencies is understood.

Activities:

- 3. Collaborate with LACoFD to secure potential funding opportunities for individual mitigation projects.*
- 4. Work with LACoFD Division III's to develop, approve, and promote Fire Protection Agreements and partnerships to clarify roles and responsibilities and to provide for fire mitigation activities and suppression preparedness.*

Priority:	Medium
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Coordinating Organization: LACoFD Division III (contract city), Parks and Recreation and Community Services Department

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property
Public Awareness

Funding Source: General Fund

WF3: Continue collaborating with LACoFD Division III's to develop and disseminate maps relating to fire hazards to help educate and assist builders and homeowners in being engaged in wildfire mitigation activities and to help guide emergency services during response.

Activities:

5. *Work with LACoFD Division III to update wildland/urban interface maps.*
6. *Encourage LACoFD Division III and USDA Forest Service to continue to conduct risk analysis incorporating data and creating hazard maps using GIS technology to identify risk sites and further assist in prioritizing mitigation activities.*

Priority: Medium

Coordinating Organization: LACoFD Division III (contract city), Technology Services Division and Building and Safety Division

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property

Funding Source: General Fund

WF4: Collaborate with LACoFD Division III's to enhance outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to natural and man-made hazards.

Activities:

7. *Support LACoFD Division III's efforts to hire and educate fire prevention staff to oversee education programs.*
8. *Work with LACoFD Division III and USDA Forest Service to visit urban interface neighborhoods and rural areas and conduct education and outreach activities.*
9. *Work with LACoFD Division III to conduct specific community-based demonstration projects of fire prevention and mitigation in the urban interface.*
10. *Continue to work with LACoFD Division III to establish neighborhood "drive-through" activities that pinpoint site-specific mitigation activities. Fire crews can give property owners personal suggestions and assistance.*

11. Continue to work with LACoFD Division III to organize public outreach and information activities at fire stations, such as "Wildfire Awareness Week" activities. This allows the public to visit fire stations, see the equipment, and discuss wildfire mitigation with the station crews.

Priority: Medium
Coordinating Organization: LACoFD Division III (contract city), Community Services Division and Communications Division
Timeline: Ongoing
Plan Goals Addressed: Protect Life and Property
Public Awareness
Funding Source: General Fund

WF5: Work with LACoFD Division III to encourage and increase communication, coordination, and collaboration between wildland/urban interface property owners, County and officials to address risks, existing mitigation measures and federal assistance programs.

Activities:

12. Continue to encourage single-family residences to have fire plans and practice evacuation routes.
13. Work with LACoFD Division III to continue performing fire inspections in residential homes to increase awareness among homeowners and potential fire responders.
14. Work with LACoFD Division III to encourage a standard for the State Fire Marshall to evaluate fire plans and emergency plans for businesses.
15. City and LACoFD Division III work closely with landowners and/or developers who choose to build in the wildland/urban interface to identify and mitigate conditions that aggravate wildland/urban interface wildfire hazards.
16. City to encourage all new homes and major remodels involving roof additions that are located in the interface to have fire resistant roofs and residential sprinkler systems.
17. Work with LACoFD Division III to encourage the public to evaluate access routes to rural homes for fire-fighting vehicles and to develop passable routes if they do not exist.

Priority: High
Coordinating Organization: LACoFD Division III (contract city), Community Services Division and Communications Division
Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property
Public Awareness
Partnerships and Implementation
Emergency Services

Funding Source: General Fund

WF6: Collaborate with LACoFD Division III to encourage implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.

Activities:

18. Support LACoFD Division III's effort to employ mechanical thinning and prescribed burning to abate the risk of catastrophic fire and restore the more natural regime of high frequency, low-intensity burns.

19. Support LACoFD Division III's efforts to clear trimmings, trees, brush and other debris completely from sites when performing routine maintenance and landscaping to reduce fire risk.

Priority: Low

Coordinating Organization: LACoFD Division III (contract city), Community Services Division and Communications Division

Timeline: Ongoing

Plan Goals Addressed: Natural Systems

Funding Source: General Fund

WF7: Enhance City's Urban Forestry ability to mitigate, respond to, prepare for and recovery from events that impact the more than 80,000 trees in the City.

Activities:

20. Maintain tree program in the City which includes routine inspections and review of the tree maintenance cycle

21. Mitigate tree hazards by addressing trees that pose a public safety hazard.

22. Purchase a full-size bucket truck for tree maintenance operations to enable city staff to safely perform emergency limb removal.

23. Design and develop informational and educational brochures that relate to the hazards of dead material on palm trees and problematic trees in fire areas. Brochures would educate the public on how to keep your homes fire safe and inform them of what trees are beneficial and troublesome in high fire areas.

Priority: High

Coordinating Organization: LACoFD Division III (contract city), Urban Forestry, Natural Resources Conservation Service, CalFire

Timeline: Ongoing

Plan Goals Addressed: Protect Life and Property
Public Awareness
Natural Systems
Partnerships and Implementation
Emergency Services

Funding Source: General Fund

Local and Regional Resources

Los Angeles County Fire Department Division III, North Regional Operations Bureau
24875 N. San Fernando Road
Newhall, CA 91321
Telephone: (661) 254-9665

Los Angeles County Fire Department
1320 N. Eastern Ave.
Los Angeles, CA., 90063
Telephone: (323) 881-2411
<http://www.lacofd.org/default.htm>

State Resources

California Division of Forestry & Fire Protection
1416 9th Street
PO Box 944246
Sacramento, CA 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

Federal Resources and Programs

Federal Wildland Fire Policy, Wildland/Urban Interface Protection
This is a report describing federal policy and interface fire. Areas of needed improvement are identified and addressed through recommended goals and actions.
<http://www.fs.fed.us/land/wdfire7c.htm>

National Fire Protection Association (NFPA)
This is the principal federal agency involved in the National Wildland/Urban Interface Fire Protection Initiative. NFPA has information on the Initiatives programs and documents.
Public Fire Protection Division
1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000

National Interagency Fire Center (NIFC)

The NIFC is the nation's support center for wildland firefighting. Seven federal agencies work together to coordinate and support wildland fire and disaster operations. These agencies include the Bureau of Indian Affairs, Bureau of Land Management, Forest Service, Fish and Wildlife Service, National Park Service,

National Weather Service and Office of Aircraft 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
As an entity of the Federal Emergency Management Agency, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies through leadership, advocacy, coordination and support.

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 - The National Wildland/Urban Interface Fire program

Firewise maintains a Website designed for people who live in wildfire prone areas, but it also can be of use to local planners and decision makers. The site offers online wildfire protection information and checklists, as well as listings of other publications, videos and conferences.

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.

This document, developed by the NFPA Forest and Rural Fire Protection Committee, provides criteria for fire agencies, land use planners, architects, developers and local governments to use in the development of areas that may be threatened by wildfire. To obtain this resource:

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.

This is a comprehensive bibliography of interface wildfire materials. Over 2,000
resources are included, grouped under the categories of general and technical reports,
newspaper articles and public education materials. The citation format allows the
reader to obtain most items through a library or directly from the publisher. The
bibliography is available in hard copy or diskette at no cost. It is also available in
downloadable PDF form.

Canadian Forest Service, Northern Forestry Centre, I-Zone Series
Phone: (780) 435-7210
<http://www.prefire.ucfpl.ucop.edu/uwibib.htm>

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.

Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
<http://www.firewise.org>

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SECTION ELEVEN – PUBLIC PROCESS

Public Process

Public involvement is a critical element to the strategic planning processes. Citizen participation offers citizens the chance to voice their ideas, interests, and opinions. The Federal Emergency Management Agency also requires public input during the development of mitigation plans.

The City of Santa Clarita Hazard Mitigation Plan uses a variety of methods for citizen input into the planning process. The hazard mitigation public process included the following components:

- Promoted the hazard mitigation planning process via the following media outlets: local newspapers, local magazines, city website, cable television public service announcements, and at various community meetings and organizations.
- Conducted stakeholder interviews to target the specialized knowledge of individuals working with populations or areas at risk from natural hazards.
- Conducted two public workshops to identify community hazards; and ideas regarding hazard mitigation goals and actions for the plan.
- Conducted an on-line hazard mitigation survey on the City's website.

Through community involvement, the mitigation plan reflects community issues, concerns, and views on mitigation opportunities and plan action items.

Committee Process

The hazard mitigation planning process in City of Santa Clarita is overseen by the internal core steering committee, comprised of management analysts. This steering committee guided the development of the plan, and assisted in developing plan goals and action items, identified stakeholders, and researched experts to create a comprehensive plan. Additionally the committee was responsible for the facilitation, coordination, actual plan development and plan implementation process. The public stakeholder's steering committee consisted of representatives from local business, school districts, utility company and various organizations is listed on Table 11.1.

Table 10.1 - Hazard Mitigation Steering Committee Organizations

Project Steering Committee:
The City of Santa Clarita, Department of Administrative Services
The City of Santa Clarita, Office of the City Manager
The City of Santa Clarita, Department of Public Works
The City of Santa Clarita Department of Parks, Recreation and Community Services
The City of Santa Clarita Department of Community Development
The Los Angeles County Sheriff's Department
The Los Angeles County Fire Department
The Los Angeles County Department of Public Works
The Sanitation Districts of Los Angeles County
Saugus Union School District
Newhall School District
Sulphur Springs School District
William S. Hart School District
Castaic School District
Castaic Lake Water Agency
Santa Clarita Senior Center
Santa Clarita Valley Chamber of Commerce
Henry Mayo Newhall Memorial Hospital
California Highway Patrol
California Department of Transportation (Cal-Trans)
National Weather Service
The Gas Company
Southern California Edison
Santa Monica Mountains Conservancy
Building Industry Association of Southern California

Meeting Process Flow

April 1, 2010 - Kick Off-Meeting – Planning Meeting #1

The Community Services Superintendent and Emergency Manager and Emergency Services Supervisor convened the meeting. The status of the City's Hazard Mitigation Plan was discussed as well as the new Disaster Mitigation Act of 2000 requirements. The areas of the Plan that needed updated were identified, the timeline to update the Plan was established and the internal steering committee was identified with the following individuals:

- Mike Ascione, Assistant Planner, Community Development
- Ruben Barrera, City Building Official, Public Works
- Patrick Bryant, Administrative Analyst, City Manager's Office
- Anthony Calderon, GIS Tech, Administrative Services
- Christina Clark, Risk Administrator, Risk Administration
- Stephanie English, Community Services Representative, Los Angeles County Fire Department

- Ben Jarvis, Associate Planner, Community Development
- Adele Macpherson, Community Services Superintendent and Emergency Manager, Parks, Recreation, & Community Services
- Kris Markarian, Senior Engineer, Public Works
- Christina Monde, Assistant Engineer, Public Works
- Donna Nuzzi, Emergency Services Supervisor, Parks, Recreation, and Community Services
- Debbie O’Leary, Project Development Coordinator, Public Works
- Bill Read, Assistant Building Official, Public Works
- Robert Sartain, Urban Forestry Supervisor, Public Works
- Jason Smisko, Senior Planner, Community Development
- Lisa Webber, Planning Manager, Community Development
- Eric Boldt, Warning Coordination Meteorologist, National Weather Service

April 8, 2010 – Planning Meeting #2

The internal core steering committee reviewed and updated the timeline and work plan. A contact list of stakeholders, and resources from within the city staff, community agencies, businesses, healthcare institutions, and school districts was put together. Participants discussed the various strategies for the public process. Work plan tasks were assigned. The committee discussed the hazards and the Calculated Priority Risk Index (CPRI) to evaluate the individual hazards and rank them according to an indexing system. Committee members discussed the materials for the first Public Workshop and identified speakers for the various topics to be presented. A public survey regarding the hazards in Santa Clarita and the Hazard Mitigation Plan will be posted to the City’s website. A Thursday morning standing meeting was established.

April 9, 2010 City Website Survey Launched-Appendix D

The Hazard Mitigation Plan Survey includes input from 378 participants. These participants represent residents living within the City of Santa Clarita, in addition to the neighboring unincorporated communities of Los Angeles County.

The survey reports that 63.9% of the participants have a family emergency plan. The predominant numbers of participants live in single-family homes. Natural hazards rated under “very concerned” include earthquakes, and wildfires. Several themes are documented in the open comments section of the survey:

- Enforce, monitor urban land interface with development
- Increase public education

This survey was promoted via various newspaper outlets, cable television, and through e-mail notifications. The survey was accessible for three weeks.

April 15, 2010 – Planning Meeting #3

The committee reviewed the new mitigation measures submitted by Building and Safety and Public Works. Each of the mitigation measures were reviewed, prioritized, assigned Coordinating Organizations and identified any funding available for the activities if known. Committee members discussed plan revisions to the Executive Summary, Section One and Two. Committee briefly discussed the items that are still needed for the update and identified sources where this information can be obtained.

Committee members discussed the Public Workshop, the hazard maps, hazard summaries, and hazard prioritization table and posted displays around the room. Committee members discussed which members would present the PowerPoint presentation. The presentation would be given by Donna Nuzzi and Wendy Milligan.

April 15, 2010 – Public Workshop #1

Donna Nuzzi welcomed the participants and introduced the Hazard Mitigation Committee members present. Wendy Milligan gave a brief overview of what Mitigation is according to the Federal Emergency Management Agency's Disaster Mitigation Act of 2000. She described the benefits of a Hazard Mitigation Plan and identified why the current Hazard Mitigation Plan needs to be updated. The timeline and the process to update the Hazard Mitigation Plan were presented along with the roles of the City Council, the Hazard Mitigation Working Group and the public. An introduction of the hazards the City is subject to was presented along with the difference between a Hazard Mitigation Plan and an Emergency Operations Plan.

Donna Nuzzi presented and discussed the hazards of concern that would be included in the Hazard Mitigation Plan Update: Earthquake, Fire, Landslide, Flood, Hazardous Materials, and Severe Weather.

Donna Nuzzi wrapped up the Hazard Mitigation presentation and invited the public to review each of the hazard maps and hazard summaries and identify their home or organization with a colored label dot. Committee members were on hand at each map to answer questions and discuss the hazard in more detail. Participants used the provided sticky notes to post concerns or questions for each hazard. The committee would address these in the next planning meeting. Participants were also encouraged to visit <http://www.surveymonkey.com/s/8ZBHFJK> and take the public survey.

April 22, 2010 – Planning Meeting #4

Committee discussed the materials that have been reviewed and provided missing information. Adele provided the Steering Committee list. Erin Lay provided Housing Element 2009 and identified information that would be valuable to describe the demand for available housing and existing homes. She also provided the latest CDBG allocation figures. As a committee, each critical facility was evaluated for each hazard. The bridges will be

assessed once GIS receives the bridge listing. Donna Nuzzi provided average annual ridership on Metrolink.

The Public Survey was discussed. The deadline is April 23, 2010. Donna will provide a summary of the survey results and send to Wendy on Monday.

Committee discussed the values of properties in hazard areas. Currently the city's GIS is not capable of generating values on the identified properties. It was discussed that this information is sensitive to the city. Since the values of properties is not a required element in the plan, the committee decided not to include this information. Donna Nuzzi will be working with Adele to develop the description of losses for each hazard. The committee discussed the General Zoning Use Map and decided it was valuable to include in the Plan to identify land uses and future land uses. Lisa Webber and Jason Smisko offered details on future developments in hazard areas and the process that must be followed. They provided sample projects to show how projects are developed in hazard areas.

Committee members discussed staff/personnel resources, legal and regulatory and fiscal capabilities. It was agreed that this information would fit in the community profile section of the Plan.

Committee decided that the workshop should focus on each hazard and the mitigation measures associated with it. Wendy will develop the power point and send out for review.

April 29, 2010 – Planning Meeting #5

Committee members discussed the materials that have been reviewed and provided input and information regarding the missing information. Revisions were made to various parts of the Plan to correct, update and augment the information. Committee members discussed the Hazardous Materials Section and information needed regarding the number of fixed site facilities and how to map this hazard. It was decided to map the transportation corridors as a potential hazard area and that a hazardous materials user GIS layer would need to be developed with subsequent revisions of the Plan.

The Public Survey has been completed. Committee discussed how to incorporate the information into the Plan. The survey did not export in a format that was usable for the Plan.

Public Works was working on identifying the hazards that may impact the critical bridges. This information should be available by the end of the day.

Donna – was going to contact LA County Fire Department Health Hazardous Materials Division to acquire information regarding hazardous materials users in the city.

Committee members discussed the second Public Workshop and the material that was to be presented: hazard mitigation measures and the powerpoint presentation. Some

information on the slides was revised to reflect current revisions to the Plan. Speakers were chosen for the presentation: Adele would open up the workshop and Donna and Wendy would tag team the rest of the meeting.

April 29, 2010 – Public Meeting #2

Adele Macpherson, Community Services Superintendent and Emergency Services Manager opened up the workshop and introduced committee members present. Adele presented the purpose of the workshop and described where the committee was in the process of updating the plan.

Donna Nuzzi, Emergency Services Supervisor, Provided an overview of the hazards of concern to Santa Clarita:

- Earthquake/Liquefaction/Dam Failure
- Wildfires
- Floods
- Landslides
- Severe Weather
- Hazardous Materials

Donna Nuzzi and Wendy Milligan, consultant with Terra Firma Enterprises presented the new mitigation goals and activities that were developed in the process of updating the City's Plan. Mitigation goals and activities were presented for each of the hazards of concern. Multi hazard goals and activities were also presented. These activities would lessen the risk for all of the hazards. Examples of the goals and activities were presented to assist participants to understand how these activities would lessen the risk. Questions from the audience were answered regarding the costs of the projects and the source of funding.

After the powerpoint presentation Donna again asked the audience if they had any questions or had additional mitigation ideas. Some members of the audience made comments on the importance of this Plan and the mitigation measures and were happy to be involved. Donna closed the meeting but did invite the audience to contact her if they had any other questions or additional ideas for mitigation measures.

May 6, 2010 -Planning Meeting #6

The committee discussed the final version of the Hazard Mitigation Plan. The Local Mitigation Plan Review Crosswalk was reviewed and sections in the Plan identified that satisfied the areas of the Crosswalk. The timeline was discussed again for the State Review, Resolution at the City and FEMA review.

May 25, 2010-City Council Resolution

The City of Santa Clarita council members adopt a resolution in support of the development of a Natural Hazard Mitigation Plan. Resolution and agenda report are referenced in Appendix D.

SECTION TWELVE – PLAN MAINTENANCE

The City of Santa Clarita is committed to implementing and maintaining the relevancy of this Hazard Mitigation Plan. The 2010 Hazard Mitigation Plan benefitted greatly from the work that was accomplished in 2004. The Planning Committee performed an intensive review of the 2004 Plan and augmented those areas in the Plan that needed more work, updated the information and developed new hazard mitigation goals and activities with input from the Steering Committee and the public. The foundation of this Plan was built on the 2004 Hazard Mitigation Plan. This Plan was approved by the State but not approved by FEMA.

In the future this plan and will be updated by the Hazard Mitigation core committee led by the Public Works Department. The Public Works Director will ensure that this Plan is updated as-needed as new data or information becomes available. Any substantive changes to the Plan will be brought to the City Council for consideration and formal adoption.

A timeline will be set to annually monitor and evaluate the Hazard Mitigation Plan. Ideally the Plan will be reviewed alongside other existing plans and programs within the Public Works Department. Every five years a plan revision will be produced. Included is the description on how the City will integrate public participation throughout the plan maintenance process. Additionally this section explains how the City of Santa Clarita proposes to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms such as the City General Plan, Emergency Operations Plan, Capital Improvement Projects, and Building and Safety Codes, and Fair Housing Plan.

Monitoring and Implementing the Plan

Plan Adoption

The City Council will be responsible for adopting the City of Santa Clarita Mitigation Plan. This governing body has the authority to promote sound public policy regarding hazards. Once the plan has been adopted, the City Emergency Manager will be responsible for submitting it to the State Hazard Mitigation Officer at the California Emergency Management Agency. California Emergency Management Agency 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, City of Santa Clarita will gain eligibility for Hazard Mitigation Grant Program funds.

Coordinating Body

A City of Santa Clarita Hazard Mitigation Planning Committee will be responsible for coordinating implementation of plan action items and undertaking the formal review process. The Public Works Director, under the direction of the City Council will include representatives from city agencies, including, but not limited to, the current Hazard Mitigation Core Committee members. The city has formed a Hazard Mitigation Steering

Committee that consists of members from local agencies, organizations, and citizens, and includes the following:

- The City of Santa Clarita, Department of Administrative Services
- The City of Santa Clarita, Office of the City Manager
- The City of Santa Clarita, Department of Public Works
- The City of Santa Clarita Department of Parks, Recreation and Community Services
- The City of Santa Clarita Department of Community Development
- The Los Angeles County Sheriff's Department
- The Los Angeles County Fire Department
- The Los Angeles County Department of Public Works
- The Sanitation Districts of Los Angeles County
- Saugus Union School District
- Newhall School District
- Sulphur Springs School District
- William S. Hart School District
- Castaic School District
- The Gas Company
- Southern California Edison
- Henry Mayo Newhall Memorial Hospital
- National Weather Service
- Santa Clarita Senior Center
- California Highway Patrol
- California Department of Transportation (Cal-Trans)
- Castaic Lake Water Agency
- Santa Monica Mountains Conservancy
- Building Industry Association of Southern California
- Santa Clarita Valley Chamber of Commerce

The Public Works Director will engage other relevant organizations, and agencies to be relevant to the Plan's ongoing goals and objective activities.

The Hazard Mitigation Steering Committee will meet annually. The meetings will provide an outlet to discuss, review and revise the action items. These meetings will also support the ongoing partnerships that are important to the mitigations Plan's sustainability.

Convener

The City Council will adopt the City of Santa Clarita Hazard Mitigation Plan, and the Hazard Mitigation Steering Committee will take responsibility for plan implementation. The Public Works Director will serve as a convener to facilitate the Hazard Mitigation Steering Committee meetings, and will assign tasks such as updating and presenting the Plan to the

members of the committee. Plan implementation and evaluation will be a shared responsibility among all of the Hazard Mitigation Steering Committee members.

Implementation through Existing Programs

City of Santa Clarita addresses statewide planning goals and legislative requirements through its General Plan, Fair Housing Plan, 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. The City of Santa Clarita will have the opportunity to implement recommended mitigation action items through existing programs and procedures.

The City of Santa Clarita Public Works Department's Building and Safety Division is responsible for administering the Building & Safety Codes. In addition, the Hazard Mitigation Steering Committee will work with relevant agencies at the county and state levels to review, develop and ensure Building & Safety Codes that are adequate to mitigate or prevent damage by natural hazards.

The goals and action items in the mitigation plan may be achieved through activities recommended in the City's Capital Improvement Projects (CIP). Various city departments develop CIP plans, and review them on an annual basis. Upon annual review of the CIPs, the Hazard Mitigation Steering Committee will work with the city departments to identify areas that the hazard mitigation plan action items are consistent with CIP planning goals and integrate them where appropriate.

Within six months of formal approval of the mitigation plan, the recommendations documented will be incorporated into the process of existing planning mechanisms at the city level. 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.

Analysis of Mitigation Projects

The Hazard Mitigation Planning Committee prioritized the potential mitigation activities for each hazard of concern and ranked each as either "high," "medium," or "low" priority. The Plan goals including Protect Life and Property, Promote Public Awareness, Augment Emergency Services, Enhance Natural Systems, and Encourage Partnerships and Implementation were considered during each phase of the mitigation planning process. As the mitigation action items were developed, the Planning Committee identified which plan goals were addressed by each action item and then ranked the Plan goals to determine the priorities for the City of Santa Clarita. Each goal was given a score of one point to five points, with five points going to the highest priority. The prioritized plan goals are as follows:

- 5 Points: Protect Life and Property
- 4 Points: Enhance Natural Systems

- 3 Points: Augment Emergency Services
- 2 Points: Partnerships and Implementation
- 1 Point: Public Awareness

The points for the plan goals were then totaled for each action item. The following scores reflect the High, Moderate and Low rating:

0-5	Low/None
5-10	Moderate
10-15	High

In addition, each mitigation activity was evaluated qualitatively to further refine the prioritization of the mitigation activities. The STAPLEE method was used using the social, technical, administrative, political, legal, economic, and environmental (STAPLEE) opportunities and constraints of implementation. Each of these evaluation criteria is summarized below. The evaluation criteria are described in terms of situations that present opportunities for implementation success:

- **Social criteria:** The public must support the overall implementation strategy and specific mitigation activities; therefore, community acceptance of the proposed mitigation activities must be considered.
- **Technical criteria:** Such factors as technical feasibility of the proposed mitigation activity to reduce losses in the long term, with minimal secondary impact, must be considered.
- **Administrative criteria:** Anticipated staffing, funding, and maintenance for each mitigation activity must be considered.
- **Political criteria:** The political leadership of the communities must support the overall implementation strategy and specific mitigation activities; therefore, decision-maker acceptance of the proposed mitigation activities must be considered.
- **Legal criteria:** Whether the communities have legal authority to implement the proposed mitigation activities must be considered.
- **Economic criteria:** Budget constraints must be considered.
- **Environmental criteria:** Environmental impacts caused by implementing specific mitigation activities must be considered.

Ideally, the costs and benefits associated with each mitigation activity should be further developed. Given federal funding, the Hazard Mitigation Planning Committee will use a FEMA-approved benefit/cost analysis approach to further prioritize mitigation action items.

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

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

Evaluating and Updating the Plan

Formal Review Process

The City of Santa Clarita Hazard Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development, land use, or programs that may affect mitigation priorities. The evaluation process includes a firm schedule and time line, and identifies the local agencies and organizations participating in plan evaluation. The convener or designee 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.

The committee will review the goals and action items to determine their relevance to changing situations in the city, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The 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 coordinating organizations responsible for the various action items will report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised.

The convener will assign the duty of updating the plan to one or more of the committee members. The designated committee members will have four months to make appropriate changes to the Plan before submitting it to the Hazard Steering Committee members, and presenting it to the City Council. The Hazard Mitigation Steering Committee will also notify all holders of the city plan when changes have been made. Every five years the updated plan will be submitted to the State Hazard Mitigation Officer and the Federal Emergency Management Agency for review.

Continued Public Involvement

City of Santa Clarita is committed to involving the public directly in review and updates of the Hazard Mitigation Plan. The Hazard Mitigation Committee members are responsible for the annual review and update of the plan.

The public will also have the opportunity to provide feedback about the Plan. Copies of the Plan will be catalogued and kept with the appropriate department and agencies in the city. The existence and location of these copies will be publicized on the City's website. In

addition, copies of the plan and any proposed changes will be posted on the city website. This site will also contain an email address and phone number to which people can direct their comments and concerns.

A public meeting 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 for which they can express its concerns, opinions, or ideas about the Plan. The City Public Works Director in coordination with the Hazard Mitigation Steering Committee will be responsible for using city resources to publicize the annual public meetings and maintain public involvement through the public access channel, web page, and **newspapers**.

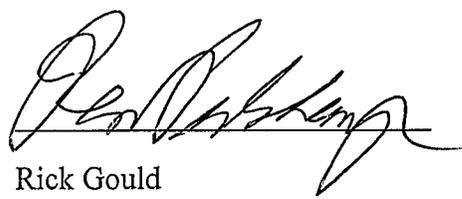
Agenda Item: 7

**CITY OF SANTA CLARITA
AGENDA REPORT**

CONSENT CALENDAR

City Manager Approval:

Item to be presented by:



Rick Gould

DATE: May 25, 2010

SUBJECT: REVISED HAZARD MITIGATION PLAN IN ACCORDANCE
WITH THE FEDERAL DISASTER MITIGATION ACT OF 2000
(PUBLIC LAW 106-390)

DEPARTMENT: Parks, Recreation, and Community Services

RECOMMENDED ACTION

City Council approve the revised City of Santa Clarita Hazard Mitigation Plan in accordance with the Federal Disaster Mitigation Act of 2000.

BACKGROUND

In October 2000, the President signed and enacted the Federal Disaster Mitigation Act of 2000 (Public Law 106-390). The City of Santa Clarita Natural Hazard Mitigation Action Plan (Plan) is a document containing resources and information to assist City residents, public and private sector organizations, and others who are interested in planning for the occurrence of natural hazards. The plan provides a list of activities that may assist the City of Santa Clarita in reducing risk and preventing loss from future natural hazard events. The action items address multi-hazard issues, as well as activities for earthquakes, floods, hazardous materials, landslides and earth movement, severe weather, and wildfires.

The Federal Disaster Mitigation Act of 2000 requires that all local agencies have a local Natural Hazard Mitigation Plan. This plan must be adopted by the governing body for the agency to be eligible for pre- and post-disaster federal funding.

The City's Hazard Mitigation Plan was adopted and approved in October 2004. The local mitigation plan process places emphasis on reducing risks and ensuing effects from natural and manmade hazards through pre-event risk identification, assessment, and mitigation.

APPROVED

7-1

The City recently engaged in the planning process to revise the plan according to compliancy standards set forth by the Federal Emergency Management Administration (FEMA). The plan has been sent the State of California California Emergency Management Agency (Cal EMA) for approval, and is ready for City Council approval. Submission to FEMA will follow, pending City Council approval.

ALTERNATIVE ACTIONS

Other direction as determined by City Council.

FISCAL IMPACT

None by this action.

ATTACHMENTS

Hazard Mitigation Plan 2010 - Entire Plan available in the City Clerk's Reading File
Hazard Mitigation Plan 2010 - Appendices available in the City Clerk's Reading File