2021 Santa Clarita Local Hazard Mitigation Plan

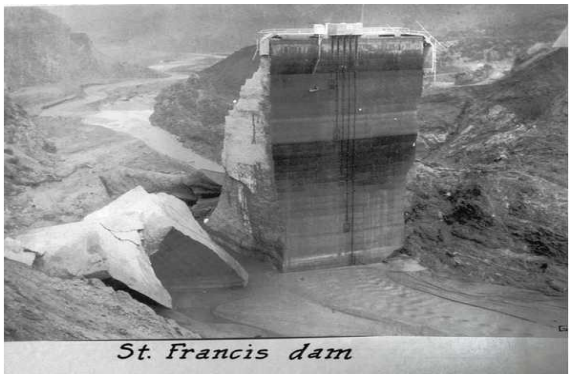

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

LIST OF APPENDICES

1.0 INTRODUCTION

Over the past several decades, natural and manmade disasters in the U.S. have led to increasing levels of fatalities, injuries, property damage, and interruption of business and government services. The impact on families and individuals can be significant and the impacts to local businesses can have severe regional economic effects. The time, money and effort required to respond to and recover from these disasters also divert public resources and attention from other important programs and problems.

The City of Santa Clarita recognizes the need to reduce the scale and impacts of hazards. The City's leadership understands that understanding the hazards facing Santa Clarita and planning for disasters is a long-term, cost effective way to reduce the impact of these hazards by mitigating their effects.

"Mitigation" is commonly defined as actions taken to reduce or eliminate the risk of hazards. Hazard mitigation focuses attention and resources on actions that will limit or eliminate long-term risks to human life or property from hazards. Hazard mitigation can reduce the cost of disasters to property owners and all levels of government. In addition, it can reduce injuries, protect critical community facilities, reduce exposure to liability, and minimize community disruption.

Federal and State legislation has provided funding for disaster preparedness, response, and recovery. However, history has demonstrated that it less expensive to mitigate against future disaster damage than to repeatedly repair damage in the aftermath. The impact of expected, yet often unpredictable natural and manmade events, can be reduced through mitigation planning. A mitigation plan states the aspirations and specific courses of action jurisdictions intend to follow to reduce vulnerability and exposure to future hazard events. Hazard mitigation strategies help to eliminate losses by limiting new exposures in identified hazard areas, diverting a hazard by reducing its impact, and developing an awareness of hazard area locations to plan responsibly for future development.

1.1 PLAN PURPOSE

The primary purpose of this Santa Clarita HMP is to document known hazards and identify potential community actions that can be implemented over the short- and long-term that will result in a reduction in risk and potential future losses citywide. This is be accomplished by assessing and analyzing hazards that affect the City of Santa Clarita, setting clear goals and objectives, identifying and implementing appropriate actions, and keeping the Plan current.

The Santa Clarita HMP is an integral part of a multi-faceted approach to minimizing personal injury and property damage from natural and manmade hazards. It is designed to complement other planning documents and regulatory authorities governing pre-disaster land use planning and post-disaster response and recovery. This Plan sets the tone for the implementation of hazard mitigation practices that will build a resilient and sustainable community.

This HMP was prepared in response to Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 (also known as Public Law 106-390) requires state and local governments to prepare mitigation plans to document their mitigation planning process, and identify hazards, potential losses, mitigation needs, goals, and strategies. This type of planning supplements the City's comprehensive land use planning and emergency management planning programs. This document is a federally mandated update to the City of Santa Clarita 2010 Hazard Mitigation Plan and ensures continuing eligibility for Hazard Mitigation Grant Program (HMGP) funding.

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

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

1.2 PLANNING APPROACH

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

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

1.3 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 are required to have General Plans and the implementing ordinances (Zoning Codes, etc.) that are required to comply with statewide land use planning legislation.

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

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

1.4 STATE AND FEDERAL PARTNERS IN HAZARD MITIGATION PLANNING

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

- California Office of Emergency Services (Cal OES) is responsible for disaster mitigation, preparedness, response, recovery, and the administration of federal funds after a major disaster declaration;
- Southern California Earthquake Center (SCEC) gathers information about earthquakes, integrates information on earthquake phenomena, and communicates this to end-users and the general public to increase earthquake awareness, reduce economic losses, and save lives.
- California Department of Forestry and Fire Protection (CAL FIRE) is responsible for all aspects of wildland fire protection on private and state properties, and administers forest practices regulations, including landslide mitigation, on non-federal lands.
- California Division of Mines and Geology (DMG) is responsible for geologic hazard characterization, public education, and the development of partnerships aimed at reducing risk.
- California Division of Water Resources (DWR) plans, designs, constructs, operates, and maintains the State Water Project; regulates dams; provides flood protection and assists in emergency management. It also educates the public, serves local water needs by providing technical assistance.

- Federal Emergency Management Agency (FEMA) provides hazard mitigation guidance, resource materials, and educational materials to support implementation of the capitalized DMA 2000.
- United States Census Bureau (USCB) provides demographic data on the populations affected by natural disasters.
- United States Department of Agriculture (USDA) provides data on matters pertaining to land management.

1.5 STATE AND FEDERAL GUIDELINES AND REQUIREMENTS FOR HAZARD MITIGATION PLANS

The following requirements for approval of a Hazard Mitigation Plan are needed to meet State and Federal Guidelines:

- Open public involvement, with public meetings that introduce the process and project requirements.
- The public must be afforded opportunities for involvement in the following: 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 nonprofits 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 OES and FEMA

1.6 ORGANIZATION OF THIS PLAN

The City of Santa Clarita 2021 Hazard Mitigation Plan has been organized to follow FEMA's Local Mitigation Plan Review Tool. The HMP structure includes the following sections:

Section 2 Planning Process - Provides a record of the public process and the methodology used in the development of this Plan. Section 2 identifies committee members and stakeholders and outlines their involvement and the public's participation. Section 2 also gives an overview of existing plans and reports and how they were incorporated into the HMP and outlines a plan update method and schedule.

Section 3 Community Profile - Presents the history, geography, demographics, and socioeconomics of the City of Santa Clarita. It serves as a tool to provide an historical perspective of natural, man-made, and technological hazards in the City. Section 3 also lists the city-owned and city-related critical facilities included in this plan.

Section 4 Hazard Identification and Risk Assessment - Provides information on hazard identification, vulnerability and risk associated with natural, man-made, and technological hazards in the City of Santa Clarita. Specific information and mitigation strategies for the top 10 hazards to the City of Santa Clarita are addressed in this Plan, listed in order of importance.

Section 5 Mitigation Strategy - Describes existing mitigation and how the mitigation strategies and action items were selected, prioritized, and reviewed. This section provides information on the process used to develop goals and action items, including a discussion of the financial analysis process used to determine the final list of strategies and action items included in this HMP.

Section 6 Plan Review, Evaluation and Implementation - Provides information on plan implementation, monitoring and evaluation.

Section 7 Plan Adoption – Explains plan adoption procedure.

2.0 PLANNING PROCESS

The planning process used to update the City of Santa Clarita's 2010 HMP followed the concepts and principles outlined in FEMA's Mitigation Guidance, as well as, FEMA's Comprehensive Preparedness Guide (CPG) 101. The City followed its traditional approach to developing policy documents, which included preparation of a First Draft Plan for internal review by the Hazard Mitigation Planning Committee (consisting of various City divisions), who served as the primary stakeholders. Next, following any necessary revisions, a Second Draft Plan was shared with secondary stakeholders (external agencies serving on the Steering Committee and general public) during the plan writing phase. The comments gathered from the secondary stakeholders were incorporated into a Third Draft Plan which was submitted to Cal OES and FEMA for review.

Following receipt of FEMA's "Approval Pending Adoption", the Final Draft Plan was posted per the City's standard practices in advance of the City Council meeting. Any questions or comments gathered in advance of the City Council meeting were incorporated into the City Council Staff Report. Following consideration and adoption by the City Council, proof of the Plan's adoption was forwarded to FEMA along with a request for final approval. The planning process and phases of work is shown in more detail below in Table 2 - 1: Planning Phases Timeline.

Table 2- 1: Planning Phases Timeline

Plan Writing Phase (First and Second Draft Plan	Plan Review Phase (Third Draft Plan)	Plan Adoption Phase (Final Draft Plan)	Plan Approval Phase (Final Plan)	Plan Implementation Phase
• Planning Committee Input - research, meetings, writing, review of First Draft Plan (February, 2020 through March, 2021) • Incorporate input from the Planning Committee into Second Draft Plan (April, 2021) • Invite general public and external agencies to comment and provide input on the Second Draft Plan (April 2 to April 22, 2021) • Incorporate input and comments into the Third Draft Plan (April, 2021 – no comments received)	• Third Draft Plan sent to Cal OES and FEMA for "Approval Pending Adoption" (April 21, 2021) • Address any mandated revisions identified by Cal OES and FEMA into Final Draft Plan (TBD)	• Post Final Draft Plan along with public notice of City Council meeting (TBD) • Present Final Draft Plan to the City Council (TBD) • City Council Adopted Plan (TBD) • Submit Proof of Adoption to FEMA with request for final approval (TBD)	• Receive FEMA final approval (TBD) • Incorporate FEMA approval into the Final Plan (TBD)	• Conduct annual Planning Team meetings (November, 2021) • Integrate mitigation action items into budget, CIP and other funding and strategic documents (1 to five years)

2.1 STAKEHOLDER INVOLVEMENT

The City of Santa Clarita's Hazard Mitigation Plan is the result of a collaborative effort in which the City of Santa Clarita staff worked with 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 a public survey was used to gather hazard risk and mitigation data. Due to the concerns posed by the Coronavirus Pandemic, it was not possible to hold public meetings for the outreach process, but the public survey was heavily promoted, and the survey feedback period was extended to allow as much public participation as possible during the pandemic. Additional data was obtained from various City departments and through research on specific hazard details.

A Hazard Mitigation Planning Committee comprised of City staff was tasked with leading the project to completion, and a project Steering Committee was comprised of partner agencies and organizations who provided guidance throughout the HMP update process. Below is a table showing the members of City staff who served on the Planning Team. The Chair of the Planning Team was Rebecca Bernstorff, Management Analyst for the City of Santa Clarita, and was passed to Jerrid McKenna, Interim Director of Neighborhood Services.

Table 2 – 2: Hazard Mitigation Planning Team (City Staff)

PLANNING TEAM MEMBERS	TITLE/POSITION
Jerrid McKenna	Interim Director of Neighborhood Services
Roya Hickman	Emergency Operations Analyst
Rebecca Bernstorff	Management Analyst
Raymond Abdel-Messih	Building & Safety, Assistant Building Official
John Caprarelli	Building & Safety, Building Official
Mike Marshall	Community Development, Assistant Planner II
Curtis Williams	Environmental Services, Administrator
Anthony Calderon	GIS, Technician
Andrew Allevato	GIS, IT Analyst
Matt Hults	Landscape Maintenance Specialist
Tyler Pledger	Recreation & Community Service, Management Analyst

Nelson Vasquez	Public Works, Administrator
Adam Lewis	Public Works, Associate Engineer
Terry Brice	Public Works, Associate Engineer
Archie Dornidon	Public Works, Engineer
Ervan Jaramilla	Public Works, Engineer
Corie Zamora	Transit, Administrative Analyst
Kevin Strauss	Communications Specialist
Susan Nelson	Neighborhood Services, Parks Manager

Shown below are the members of the Steering Committee, which included representatives from various partners and organizations in the local community.

Table 2 -3: Steering Committee Members

Steering Committee Team - Utilities	
Organization – Utility Company	**Name – Title**
Southern California Gas Company	Tony Tartaglia, Region Manager
Southern California Gas Company	Marisol Espinoza, Public Affairs Manager
Santa Clarita Valley Water	William Cooper, President
Santa Clarita Valley Water	Eunie Kang, Executive Assistant
Santa Clarita Valley Water	Mike Alvord, Director of Operations & Maintenance
Southern California Edison	Elizabeth Seelman, Local Affairs Region Manager
Southern California Edison	Chad Edison, Deputy Secretary for Transportation
LA County Sanitation Districts	Brian Louie, Assistant Department Head, Wastewater Management Department
LA County Sanitation Districts	Tim Pfeiffer, Environmental Health & Safety Supervisor
Steering Committee Team - School Districts and Higher Education	
Organization – School/District	**Name – Title**
William S. Hart Union High School District	Michael Otavka
William S. Hart Union High School District	Debbie Dunn, Executive Assistant

William S. Hart Union High School District	Mike Kuhlman, Superintendent
The Master's University	Bill Bolde, ED Community Relations
Sulphur Springs School District	Michele Gookins
Sulphur Springs School District	Dr. Catherine Kawaguchi, Superintendent
Sulphur Springs School District	Marie Carrillo, Executive Secretary
College of the Canyons	Eric Harnish, PIO
Saugus Union School District	Dr. Colleen Hawkins, Superintendent
Saugus Union School District	Pam Dall, Secretary to Superintendent
Castaic Union School District	Charmin Ortega, Assistant to Superintendent
Castaic Union School District	Steve Doyle, Superintendent
Cal Arts	Jesse Smith
Steering Committee Team - Outside (Non-City) Agencies	
Organization – Outside Govt. Agency	**Name – Title**
LA County Fire Department	Maria Grycan, Community Services Representative
LA County Fire Department	Anderson Mackey, Assistant Fire Chief
LA County Sheriff	Justin Diez, Santa Clarita Captain
LA County Department of Public Works	Steve Frasher, Community Engagement Liaison
California Highway Patrol	Josh Greengard, Public Information Officer
CalTrans District 7	Tiara Schmidt, Transportation Planner
CalTrans District 7	Gary T. Slater, Deputy District Director
CalTrans District 7	Robert Wong, Area Chief
Steering Committee Team – Non-Govt. Agencies	
Organization – Non-Govt. Agency	**Name – Title**
Building Industry Association of Southern CA	Christine Rangel, Senior Director of Government Affairs
Henry Mayo Newhall Hospital	Terry Stone
Henry Mayo Newhall Hospital	Nancy Robinson, Executive Assistant
National Weather Service	Eric Boldt, Warning Coordination Meteorologist
National Weather Service	Mark Jackson, Meteorologist-in-Charge

Santa Clarita Valley Chamber of Commerce	John Musella
Santa Clarita Valley Senior Center	Jennifer De Haven, Executive Assistant
Santa Clarita Valley Senior Center	Kevin Mac Donald, Executive Director
Santa Monica Mountains Conservancy	Paul Edelman, Deputy Director
Santa Monica Mountains Conservancy	Joe Edmiston, Executive Director
Santa Monica Mountains Conservancy	Rory Skei, Chief Deputy Director
SCV Economic Development Corporation	Sue Arellano, Business Assistance Manager
SCV Economic Development Corporation	Holly Schroder, President CEO
Valley Industrial Association Santa Clarita	Kathy Norris
The Sanctuary Church	Mike Logan

2.2 PUBLIC INVOLVEMENT

Public involvement is a critical element to the strategic planning processes. Public participation offers citizens the chance to voice their ideas, interests, and opinions.

The City used a variety of methods for public input into the planning process and to distribute hazard mitigation information, including the following:

- Media outlets such as local newspapers, English and Spanish; radio stations, the City of Santa Clarita website, and HMP survey flyers posted at public facilities
- Community Emergency Response Training (CERT) member announcements
- City-managed social media outlets including the City Briefs Blog, Facebook, YouTube, Twitter, Flickr, Snapchat, and Instagram
- Nixle Community Information Service eNotify – Email Notification System
- Santa Clarita Emergency Communications Team (SCECT) – Amateur radio volunteer
- Extended public survey period (due to cancellation of public gatherings following COVID 19 protocols) to identify community hazards, obtain ideas regarding hazard mitigation goals and actions for the plan, and to distribute current risk and mitigation information
- On-line hazard mitigation survey on the City's website

Public involvement ensures that the HMP and strategies reflect local community issues, concerns, and views. The Federal Emergency Management Agency requires public input during the development of mitigation plans. Due to COVID 19, public outreach was limited to a survey taken by phone, hard copy available at community centers, or online.

2.2.1 MEDIA ANNOUNCEMENTS

The following sample provides an example of media announcements related to hazards and mitigation planning. The press release was published or received airtime in both English and Spanish in the Santa Clarita Valley Signal, KHTS Radio, SCVNews.com, Hoy Los Angeles, Nueva Vida Radio Los Angeles, Spectrum News 1, Santa Clarita Magazine, San Fernando Valley Business Journal, LosAngelesLifeAndStyle.com. LA Parent, Inside SCV Magazine, Los Angeles Daily News, AV Press, KCET, LAist, ABC 7, CBS 2/KCAL 9, and Fox 11.

Figure 1 - Public Outreach: Press Release

FOR IMMEDIATE RELEASE **Contact: Kevin Strauss**
January 4, 2021 **(661) 255-4385**

CITY ENCOURAGES RESIDENTS TO TAKE public survey for 2021 local hazard mitigation plan update

City of Santa Clarita residents are encouraged to take part in the City's Local Hazard Mitigation Plan survey, which is available now through January 25. The City needs your help to plan ahead and reduce the potential impacts of natural and man-made disasters. Input from residents will help the City develop the 2021 Local Hazard Mitigation Plan (LHMP), a wide-ranging plan that identifies hazards affecting Santa Clarita and ways that the City can work independently and with other agencies to reduce damage to life and property.

Every five years, as part of a public process, the City evaluates what can be done through damage prevention. The City's LHMP Survey allows residents to weigh in on preparedness in the event of an emergency.

Taking the survey is easy and can be done from the safety of your own home using a computer or smartphone. To take the online survey, please visit **santa-clarita.com/LHMP.**

Paper copies of the survey are also available at several City facilities, including:

- City Hall, Suite 120; 23920 Valencia Boulevard
- Valencia Library; 23743 West Valencia Boulevard
- Canyon Country Library; 18601 Soledad Canyon Road
- Old Town Newhall Library; 24500 Main Street
- The Centre; 20880 Centre Pointe Parkway

For more information on the City's LHMP and the survey, please contact Emergency Operations Analyst Roya Hickman at (661)286-4093 or rhickman@santa-clarita.com.

2.2.2 SOCIAL MEDIA

The City of Santa Clarita utilizes multiple forms of social media to exchange information with the public. Methods of communication using social media outlets included the City Briefs Blog, Facebook, YouTube, Twitter, and Instagram. These methods provide a means for quickly promoting hazard mitigation and keeping the public up to date in the event of a major disaster.

2.2.3 CERT PROGRAM

The City of Santa Clarita works with the Los Angeles County Fire Department to manage its Community Emergency Response Training (CERT) Teams. In addition to adding to local emergency response capabilities, CERT provides the City with an opportunity to distribute and promote hazard mitigation actions via public volunteers.

2.2.4 2021 HAZARD MITIGATION SURVEY

In January 2021, the City of Santa Clarita posted and advertised a public survey with a response period of three weeks. The purpose of the survey was to provide the public with an opportunity to provide input into the 2021 HMP. The survey was used to gather current information from the community related to hazard risks, concerns, experiences, personal preparedness levels, and potential mitigation strategies. In total, the survey resulted in 524 individual responses, of which 144 respondents did not answer questions related to Hazard Mitigation and preparedness, leaving 380 responses to consider for the purposes of this Hazard Mitigation Plan. The results of the survey aided in the ranking of hazards as detailed in Section 6 of this HMP.

Figure 2 – Public Outreach: Hazard Mitigation Plan Survey

1. Zip Code _____ and Community Name or Location _____

2. Do you: ☐ Live or ☐ Work in Santa Clarita?3. If you live in Santa Clarita, do you: ☐ Own or ☐ Rent?

4. If you live in Santa Clarita, how many years? _____

5. If you have lived in Santa Clarita for 5 years or more, have you or someone in your household directly experienced a natural disaster such as an earthquake, severe windstorm, flood, wildfire, or other type of natural disaster while in Santa Clarita?

☐ Yes ☐ No (**IF NO, skip to question 7**)

6. **If "YES"**, which of these natural disasters have you or someone in your household experienced in the past five years? (**Please check all that apply**)

☐ Drought
☐ Severe Weather: Extreme Heat
☐ Severe Weather: Extreme Wind
☐ Flood
☐ Landslide/Mudslide
☐ Dam Failure
☐ Severe Storm/Rain
☐ Pandemic/Epidemic
☐ Earthquake
☐ Wildfire
☐ Other: _____

☐ Hazardous Materials Release
☐ Telecommunications (IT) Failure
☐ Civil Disturbance
☐ Terrorism
☐ Cyber Attack
☐ Energy Disruption: Gas/Electric Power
☐ Utility Failure: Water
☐ Climate Change
☐ Sinkholes
☐ Liquefaction
☐ Other: _____

7. What is the most effective way for you to receive information? (**Please check up to three**

Newspapers, Television, Radio:

☐ Newspaper stories/ads
☐ Television news/ads
☐ Radio News/ads

Internet:

☐ Email newsletters
☐ Online news outlets
☐ City web site
☐ Social media (e.g. Facebook, Twitter, Instagram, etc.)

Other Methods:

☐ Mail/Utility Bill
☐ Fire Department
☐ Fact sheet/Brochure
☐ Library
☐ Public workshops/Meetings
☐ College/University/Schools
☐ Outdoor advertisements (billboards, etc.)
☐ Other: _____

8. How concerned are you about the following hazards?

Natural Disaster	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	Not Concerned
Drought	☐	☐	☐	☐	☐
Severe Weather: Heat	☐	☐	☐	☐	☐
Severe Weather: Wind	☐	☐	☐	☐	☐
Flood	☐	☐	☐	☐	☐
Landslide/Mudslide	☐	☐	☐	☐	☐
Dam Failure	☐	☐	☐	☐	☐
Severe Storm/Rain	☐	☐	☐	☐	☐
Pandemic/Epidemic	☐	☐	☐	☐	☐
Earthquake	☐	☐	☐	☐	☐
Wildfire	☐	☐	☐	☐	☐
Hazardous Materials Release	☐	☐	☐	☐	☐
Telecommunications (IT) Failure	☐	☐	☐	☐	☐
Civil Disturbance	☐	☐	☐	☐	☐
Terrorism	☐	☐	☐	☐	☐
Cyber Attack	☐	☐	☐	☐	☐
Energy Disruption: Gas/Electric Power	☐	☐	☐	☐	☐
Utility Failure: Water	☐	☐	☐	☐	☐
Climate Change	☐	☐	☐	☐	☐
Sinkholes	☐	☒	☐	☐	☐
Liquefaction	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐

9. Planning ahead for responding to disasters can help lessen their impact. To help the City prioritize its disaster preparedness efforts, please tell us how important each of the following goals is to you.

Goal	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Protecting private property	☐	☐	☐	☐	☐
Protecting critical facilities (hospitals, fire stations, etc.)	☐	☐	☐	☐	☐
Preventing development in hazard areas	☐	☐	☐	☐	☐
Protecting natural environment	☐	☐	☐	☐	☐
Protecting historical/cultural landmarks/museums	☐	☐	☐	☐	☐
Promoting cooperation among public and private organizations, and citizens	☐	☐	☐	☐	☐
Protecting and reducing damage to utilities	☐	☐	☐	☐	☐
Strengthening emergency services (police, fire, ambulance)	☐	☐	☐	☐	☐
Protecting major employers	☐	☐	☐	☐	☐
Protecting small businesses	☐	☐	☐	☐	☐
Protecting K-12 schools	☐	☐	☐	☐	☐
Protecting Colleges/Universities	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐

10. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, how important is it to protect the following community assets?

Community Assets: Potential Disaster Impact	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Human: Loss of life and/or injuries	☐	☐	☐	☐	☐
Economic: Business closures and/or job losses	☐	☐	☐	☐	☐
Infrastructure: Damage or loss of bridges, utilities, schools, etc.	☐	☐	☐	☐	☐
Cultural Historic: Damage or loss of libraries, museums, fairgrounds, etc.	☐	☐	☐	☐	☐
Environmental: Damage or loss of forests, rangeland, waterways, etc.	☐	☐	☐	☐	☐
Governance: Ability to maintain order and/or provide public amenities and services	☐	☐	☐	☐	☐

11. What actions have you taken to prepare for your household from potential disasters? Check all that apply.

☐ Purchased homeowners/Renters insurance
☐ Purchased flood insurance
☐ Floodproofing (elevating furnace, water heaters, electric panels
☐ Installed retrofits such as high impact windows or doors to withstand high winds; fire resistant siding roofing or window screens, etc.
☐ Installed/maintained firebreaks around the home
☐ Attended meetings or received written information on natural disasters or emergency preparedness
☐ Talked with family members about what to do in case of a disaster or emergency
☐ Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster
☐ Prepared a "Disaster Supply Kit" (extra food, water, batteries, medications, first aid, etc.)

12. In order to help local government agencies prioritize the mitigation project types to reduce disruptions of services and to strengthen the community. Please let us know how you rank the following strategies to address pre- and post-disaster damage.

Strategy	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	☐	☐	☐	☐	☐
Replace inadequate or vulnerable bridges and causeways	☐	☐	☐	☐	☐
Install or improve protective structures, such as floodwalls or levees	☐	☐	☐	☐	☐
Government buys flood-prone properties and returns them to a natural condition	☐	☐	☐	☐	☐
Assist property owners with securing funding to mitigate impacts to their property caused by disasters	☐	☐	☐	☐	☐
Work on improving the damage resistance of utilities (electricity, communications, water/wastewater facilities, etc.	☐	☐	☐	☐	☐
Strengthen City codes, ordinances, and plans to require high risk management standards	☐	☐	☐	☐	☐
Provide better information about hazard risk and high-hazard areas	☐	☐	☐	☐	☐
Inform property owners of ways they can mitigate damage to their properties	☐	☐	☐	☐	☐

13. Please feel free to provide any additional comments:

2.3 CAPABILITIES ASSESSMENT – EXISTING PROCESSES AND PROGRAMS

This section identifies current capabilities (administrative, technical, legal and fiscal) available for implementing hazard mitigation activities within the City. Capabilities examined included the following:

- Administrative and Technical Capacity
- Fiscal Resources
- Existing Institutions, Plans, Policies, and Ordinances (Planning/Regulatory)
- Education and Outreach

The following Sections outline the city's capabilities in these areas. It should also be noted that the expansion of capabilities is addressed in the Mitigation Goals and Action Items tables in Section 5 (Mitigation Strategies) as follows:

- Administrative and Technical Capacity expansion addressed under Mitigation Goals: WF001, WF003, WF007, E002, ED001, ED002, ED004, D001, SW-EH001, MM-CA001, MM-CA003, MM-CA004, MM-CA005, MM-CA006, AND MH002
- Fiscal Resources capabilities expansion addressed under Mitigation Goals: E001 and WF002
- Planning/Regulatory capabilities expansion addressed under Mitigation Goals: WF006, E006, D002, SW-EW001, SW-EW003, P001, MM-CA002, MM-T003, MM-T004, HM002, L003, L004, L005, F003, AND MH003
- Education and Outreach capabilities expansion addressed under Mitigation Goals: WF004, WF005, E003, E004, E005, SW-EH002, SW-EH003, SW-EW002, SW-EW004, P002-01, MM-T002, HM001, L001, L002, and F002

2.3.1 ADMINISTRATIVE AND TECHNICAL CAPACITY

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 are shown in Table 2-4 below. Table 2-4 identifies City staff, personnel, and department resources available to implement the mitigation actions identified in the Multi-Hazard Mitigation Goals and Actions in each of the hazard sections.

Table 2 – 4: Santa Clarita Administrative and Technical Capabilities

Staff/Personnel Resources	Y/N	Department/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

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.

2.3.2 FISCAL RESOURCES

The following financial and budgetary tools available to the City of Santa Clarita for Hazard Mitigation Planning:

- Community Development Block Grants
- Capital Improvements Project Funding
- Authority to Levy Taxes for Specific Purposes
- Fees for Water

- Fees for Sewer/Industrial Waste
- Impact Fees for Homebuyers or Developers for New Developments/Homes
- Incur Debt through General Obligation Bonds
- Incur Debt through Special Tax and Revenue Bonds
- Incur Debt through Private Activity Bonds
- Withhold Spending in Hazard-Prone Areas
- Other Grants

2.3.3 EXISTING PLANS, POLICIES, AND ORDINANCES

The following are existing City plans, policies, and ordinances that affect the physical or built environment of the City:

- Zoning Ordinance
- Subdivision Ordinance or Regulations
- Building Code
- Special Purpose Ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)
- Site Plan Review Requirements
- General Plan
- Capital Improvements Plan
- Economic Development Element of General Plan
- Emergency Operations Plan
- Real Estate Disclosure Requirement

2.3.3.1 INCORPORATION INTO OTHER PLANNING MECHANISMS

The Santa Clarita 2020 Emergency operation Plan incorporates the existing Santa Clarita Hazard Mitigation Plan to address the city's hazard threats and to identify the city's existing hazard mitigation efforts. Additionally, Santa Clarita is currently working on an update to the Safety Element of the General Plan and will incorporate relevant information from the from the 2021 Santa Clarita Local Hazard Mitigation Plan to ensure consistency in planning for and mitigating hazards to the city.

2.3.4 EDUCATION AND OUTREACH

In addition to several regional, state, and federal programs that Santa Clarita participates in, the City has also implemented the following education and outreach programs to ensure the safety of residents:

- Fire Safety programs including Ready!Set!Go!, Emergency Preparedness Programs, and Santa Clarita CERT and SECURE Programs (see Sections 5.2.2.3, 5.2.2.4, and 5.2.2.5)

- Earthquake Safety Programs including Santa Clarita Emergency Management Program (see Section 5.3.8)
- Santa Clarita Drought Programs (see Section 5.5.2)
- Extreme Weather Programs including Santa Clarita Heat Emergency Plan, Severe Wind Emergency Response and Volunteer Weather Spotters, Hazardous Tree Mapping and Removal Program (see Sections 5.6.1, 5.6.2, and 5.6.4)
- Pandemic: Santa Clarita Safer Business Commitment-Shop Local Initiative (see Section 5.7.2.1)
- Santa Clarita Terrorism Mitigation Efforts (see Section 5.8.2.1)
- Hazardous Materials Release: programs include public outreach by Santa Clarita and include information on handling hazardous materials and how residents should respond in the event of a catastrophic release (see Section 5.9)
- Flood: Community Rating System (CRS) voluntary program for NFIP participating communities (see Section 5.11.1.3)

2.4 PUBLIC PARTICIPATION

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 are catalogued and made available at City Hall and on-line at www.santa-clarita.com. The existence and location of these copies is 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 HMP. In addition, copies of the HMP and any proposed changes will be posted on the City website. This web site also contains an e-mail address and phone number to which people can direct their comments and concerns.

3.0 COMMUNITY PROFILE

This Section of the Hazard Mitigation Plan discusses the planning area covered by this HMP, Santa Clarita's population characteristics, development trends, and critical facilities operated by the City and other agencies.

Detailed information on physical features such as topography, drainage, vegetation, etc., is provided in Section 4 of this Plan.

3.1 PLANNING AREA/BRIEF HISTORY OF SANTA CLARITA

The City of Santa Clarita has an area of 70.87[1] square miles and is located in northern Los Angeles County. Santa Clarita is situated approximately 1,200 to 1,400 feet above sea level and has a mild Southern California Mediterranean climate.

The terrain of the city consists mainly of Santa Clara River valley and surrounded by the Santa Susana and San Gabriel Mountain ranges.

3.1.1 PARKS LOCATED IN SANTA CLARITA

There are approximately 35 parks located in the city limits of Santa Clarita, 4 of which are owned and operated by the County of Los Angeles. Some of these parks contain community centers identified by the City as facilities critical to emergency operations, discussed in more detail under "Critical Facilities", but aside from the health benefits that park facilities provide for residents, the open space and terrain of parks can aid in watershed during severe storms, and can also be used for staging operations during other hazard events. The location of city parks can be found on Santa Clarita's interactive map: http://gis.santa-clarita.com/html5/MasterPUB.html.

3.1.2 BRIEF HISTORY OF SANTA CLARITA

- The area now known as Santa Clarita was first settled by the Tataviam Indians in approximately 450 AD.
- The Portola expedition of Spaniards settled in the area in August 1769 and named the river and surrounding valley after Saint Clare.
- Successful real estate and railroad businessman, Henry Mayo Newhall, settled in the area in the 1870's purchasing Rancho San Francisco and granting access to the Southern Pacific Company allowing for the first railroad connection between San Francisco and Los Angeles, and established the town, of Saugus named after his birthplace, and the town of Newhall established around the newly developed railroad.
- Gold was first discovered in California on March 9, 1842 in Santa Clarita by Jose Francisco de Gracia Lopez.

- In 1876 Charles Alexander Mentry began pumping oil from "Pico No. 4," which was the first successful oil well in the West and remains the oldest existing refinery in the world.
- On March 12, 1928, the St. Francis Dam failed and flooded the Santa Clarita Valley, killing approximately 450 people making it the second worst disaster in California history next to the 1906 San Francisco earthquake.
- Established in 1976, approximately 50% of the 700 acre Honor Rancho Natural Gas Storage Facility is located in the City of Santa Clarita, while the rest of the facility is located in Aliso Canyon.
- The City of Santa Clarita incorporated on December 15, 1987 as a General Law city with a Council-Manager form of government with five elected Council Members serving four year terms and an appointed City Manager and City Attorney.

3.1.3 HISTORIC RESOURCES

Although Santa Clarita did not incorporate until 1987, the area has a rich history and there are many structures of historic importance in the city. These structures are not considered critical to emergency operations, but the city is dedicated to preserving these structures and would seek to repair them to the greatest extent possible if damage is sustained in a hazard event. The following is a list and brief explanation of the significance of these structures:

- **Newhall Ice Company:** located at 22502-22510 5th Street, is significant for its association with commercial development in Santa Clarita. It was built in 1922 by Fred Lamkin as a warehouse and storage yard. Lamkin came to Newhall in 1917 and opened a garage facing San Fernando Road. Shortly after construction the warehouse was converted into an icehouse which is still in operation.

- **Sheriff Substation #6:** located at 24238 Main Street, it was built in 1926 as a sheriff substation. The Newhall Station housed a company of eight sheriff's deputies commanded by Captain Jeb Stewart, serving Soledad Township and the Newhall area for four decades. The Newhall Signal newspaper took over the building in 1968, using it as a "back shop" until they relocated in 1986.

- **Tom Mix Cottages #1 & #2:** located at 24247-24251. Tom Mix Cottage #1 was built in 1919 by Halsey W. Russell. Cottage #2 was built in 1922, forming a motor court catering to drivers on the old Ridge Route. The structures were used as lodging by people in the motion picture industry during local filming. Tom Mix used one cottage as a dressing room on several occasions.

- **Melody Ranch:** located at 24757 Oakcreek Avenue, the Ranch is a collection of authentic Western buildings developed in the 1920s as a film set by pioneer filmmakers Ernie Hickson and Trem Carr of Monogram Pictures. In the mid-1930s the buildings were moved to their current location. In 1952 it was purchased by actor Gene Autry. The property was used for many early television programs including Gunsmoke.

- **California Oil Company and Standard Oil House:** located at 24148 Pine Street and sometimes called "The Newhall Cottage", this residence was built in 1878 by California Star Oil Company as a guest house for visiting officials. In 1915 Standard Oil sold the property to longtime Pico Canyon employee Josh Woodbridge who lived there until his death in 1950.

- **Santa Clarita Courthouse:** located at 24307 Railroad Avenue, construction began in 1931 by the Newhall Masonic Building Company, Ltd. George Chapman of Van Nuys was hired to build this two-story structure, it opened in 1932. The County Courthouse occupied the ground floor and the Masonic Lodge the second floor. The County relocated the court to Valencia in 1968 and the first floor was renovated for office uses.

- **Old Newhall Jail:** located at 24522 Spruce Street, completed in 1906. Records from the Newhall Sheriff's Station (Substation #6) indicate that the jail housed an estimated 250 prisoners between January and October 1939 after which time it was no longer used. It served as the jail and constable's office until 1926 when the sheriff's substation was opened. The structure retains

the original barred windows and may also retain the cell doors.

- **American Legion Hall/American Theater Company:** located at 24527 Spruce Street, it was built in 1940 with a donation from William S. Hart, and designed by theater architect S. Charles Lee. He commissioned the theater building and donated the property to the American Legion Post to hold and administer. The Legion leased the property to the theater. It was the first movie house in the valley. The theater closed in 1965, and the American Legion Post 507 converted it to their meeting and entertainment center.

HERITAGE JUNCTION HISTORIC PARK: 24151 NEWHALL AVENUE

- **Callahan's Schoolhouse:** built in 1927 to resemble a one-room schoolhouse as part of Mission Village, Robert E. Callahan's 1920s western town and amusement area in Santa Monica. It was relocated to Mint Canyon (Saugus) when the freeway was built in 1963 and renamed Callahan's Old West. In 1987 it was donated by Callahan's widow Marion and relocated to Heritage Junction Historic Park in William S. Hart Park.

- **Edison House:** built in 1919 as part of a group of houses provided for Edison workers assigned to the Saugus substation. After years of use by Edison employees the structures were acquired by the Newhall Land & Farming Company which demolished six of the cottages. This structure was in the best condition and preserved. In 1989 it was relocated to Heritage Junction Historic Park in William S. Hart Park.

- **Kingsbury House:** built in 1878 at 8th Street and San Fernando Road. In 1883 this residence was occupied by Lyman Stewart, a founder of the Union Oil Company. In 1911 it was moved to Walnut Street near Market. In 1987 it was relocated to Heritage Junction Historic Park in William S. Hart Park and decorated in historic style by the Questers.

- **Mitchell Adobe Schoolhouse:** built in the 1860s by Colonel Thomas Mitchell, officer of the Mexican-American War, in Sulphur Springs, this adobe building served as the family home. One room was used as a schoolhouse for the local children, making it the first school in the area and home of the second oldest school district in Los Angeles County. In 1986 the adobe was dismantled and rebuilt in Heritage Junction Historic Park in William S. Hart Park.

- **Newhall Ranch House:** built in 1861 as the headquarters of Rancho San Francisco. After 1875, the Ranch was owned by Henry Mayo Newhall and administered by his son George. The ranch house was originally located within sight of the Estancia de San Francisco Xavier (now Six Flags Magic Mountain property); it was enlarged in 1891/1893. In 1990 it was relocated to Heritage Junction Historic Park in William S. Hart Park.

- **Pardee House:** built c. 1890 as a Good Templar's Lodge and originally located on Pine Street, in 1893 the building was moved to 629 E. Walnut Street — the "triangle" of Newhall Avenue, Market and Walnut streets by Ed Pardee, who enlarged it and used it as his home. In 1946 Ed Pardee's daughter, Pearl Russell, sold the house to the Pacific Telephone Co. (later Pacific Bell). In 1992 Pacific Bell donated the historic home to the Santa Clarita Valley Historical Society, which moved it to Heritage Junction Historic Park.

- **Ramona Chapel:** built in 1926 to resemble the chapel at Rancho Camulos made famous in Helen Hunt Jackson's novel Ramona. It was originally built as part of Mission Village, in Santa Monica. The Chapel was designed by noted composer Carrie Jacobs Bond. The interior wall paintings are by Frank Tinney Johnson, and the altar is said to be over 200 years old. The wooden pews date back to 1858. In 1987 it was donated by Callahan's widow Marion and relocated to Heritage Junction Historic Park in William S. Hart Park.

3.2 POPULATION AND DEVELOPMENT TRENDS

3.2.1 POPULATION AND DEMOGRAPHICS

Santa Clarita is the third-largest City in Los Angeles County, with 212,979 residents (in 2019). Consequently, Santa Clarita plays an important role in Los Angeles County based on its size.

The population of Santa Clarita is 47.5% white, not Hispanic or Latino, and 33.5% Hispanic. By comparison, Los Angeles County as a whole is 26.1% white, not Hispanic or Latino, and 48.6% Hispanic.

As of 2018 there were 67,583 households in Santa Clarita, with an average household size of 3.07.

Approximately 31% of Santa Clarita's population speaks a language other than English at home, which is higher than the national rates, but lower than the state and county rates. Spanish is the predominant language, other than English, spoken by the residents of Santa Clarita.

Table 3 - 1: Santa Clarita/Los Angeles County Demographics

Racial/Ethnic Group	Santa Clarita	Los Angeles County
Total Population	212,979	10,2039,107
White (alone)	70.1%	70.8%
Hispanic or Latino	33.5%	48.6%
Asian (alone)	11.1%	15.4%
Black/ African American (alone)	4.0%	9.0%
American Indian/Alaska Native (alone)	0.8%	1.4%
Native Hawaiian/Pacific Islander (alone)	0.1%	0.4%
Two or More Races	6.7%	3.1%
White, not Hispanic or Latino	47.5%	26.1%

Table 3 - 2: Population Characteristics for Santa Clarita, Los Angeles County, California, and the United States

Population Characteristics	Santa Clarita city, California	Los Angeles County, California	California	United States
Population estimates, July 1, 2019, (V2019)	212,979	10,039,107	39,512,223	328,239,523
Households, 2014-2018	67,583	3,306,109	12,965,435	119,730,128
Persons per household, 2014-2018	3.07	3.00	2.96	2.63

Persons without health insurance, under age 65 years, percent	7.5%	10.2%	8.3%	10.0%
Bachelor's degree or higher, percent of persons age 25 years+, 2014-2018	35.5%	31.8%	33.3%	31.5%
Median household income (in 2018 dollars), 2014-2018	$94,282	$64,251	$71,228	$60,293
Persons in poverty, percent	8.6%	14.2%	12.8%	11.8%
Households with a computer, percent, 2014-2018	95.1%	90.4%	91.7%	88.8%
Language other than English spoken at home, percent of persons age 5 years+, 2014-2018	31.0%	56.6%	44.1%	21.5%

3.2.2 POPULATION STRENGTHS AND VULNERABILITIES

According to the United States Census Bureau, Santa Clarita's population is relatively young, healthy, well-educated, with low rates of people living in poverty or experiencing homelessness. The median age is 36.9 years old. Approximately 90.5 % of the population has graduated High School, and approximately 35.5% has a bachelor's degree or higher. The median household income is $94,282, which is higher than the County and State average. Furthermore, approximately 68% of households in Santa Clarita are owner-occupied, which is higher than the County, State, and National rates of homeownership.

Although a majority of Santa Clarita's population exhibits a high standard of living with access to resources, the community also has segments of the population that would be vulnerable to the impacts of a major hazard event. It's estimated that 6.8% of residents under the age of 65 are living with a disability, and 7.5% of residents under the age of 65 do not have health insurance. Also, approximately 8.6% of the Santa Clarita's residents are living in poverty and as of June 2019, the City of Santa Clarita identified 256 people experiencing homelessness within the City.

The City of Santa Clarita also participates in the Community Rating System (CRS), a voluntary system of the National Flood Insurance Program (NFIP). Participation in the CRS has resulted in significant reductions in flood insurance rates, which increases the likelihood that residents will obtain flood insurance.

A variety of factors in Santa Clarita--higher than average median income, college education, and flood insurance; lower than average rate of disabilities, poverty, and homelessness—combine to mean that the severity of impacts or length of time that residents may be impacted by a hazard event may be reduced.

City populations with disabilities, living in poverty, lacking insurance, experiencing homelessness, the elderly, and non-English speakers may require more government assistance following a major hazard event, which may be addressed through the Community Development Block Grant Disaster Recovery Program established to aid the recovery efforts of communities, particularly in low-income areas, following a federally declared disaster, and use a formula for determining recovery needs unmet by other federal relief programs.

3.2.3 POPULATION GROWTH

According to the Southern California Association of Governments (SCAG), the population of Santa Clarita increased by 59,000 from 151,088 to 210,089 in the eighteen-year period from 2000 to 2018, mostly as the result of annexations (which added residential areas to the incorporated city limits). Annexations since 2012, for instance, are estimated to have increased the city's population by 44,000-47,000 persons who were already living in the annexed areas.

Including the addition of residents through annexations, the city's population growth rate was more than 4% higher than the Los Angeles County growth rate and more than 3% higher than the State's growth rate (State Department of Finance Population and Housing Estimates). Excluding annexations, the city likely grew at a rate similar to other local communities.

3.2.3.1 ANNEXATIONS

Since incorporation in 1987, approximately 40 communities adjacent to the City have been annexed into Santa Clarita, adding a total of 31.1 square miles into the City. More than half of this area--18.2 square miles—has been annexed since 2012. The map and table below show the areas that have been annexed into the Santa Clarita since 2012.

3.2.3.2 HAZARD VULNERABILITY DUE TO POPULATION GROWTH

As the population increases, so does development in the urban/wildland interface, increasing threats to life and property, utilities and critical infrastructure. The City can mitigate the increased threat by implementing strong development requirements and restrictions, particularly in hazard prone areas. The existing mitigation strategies and mitigation tables in Section 5 address many of the regulations the City has used to reduce the threats created by local hazards, as well as proposed actions to further increase protections.

Map 1: Recent Annexation Areas (since 2012)

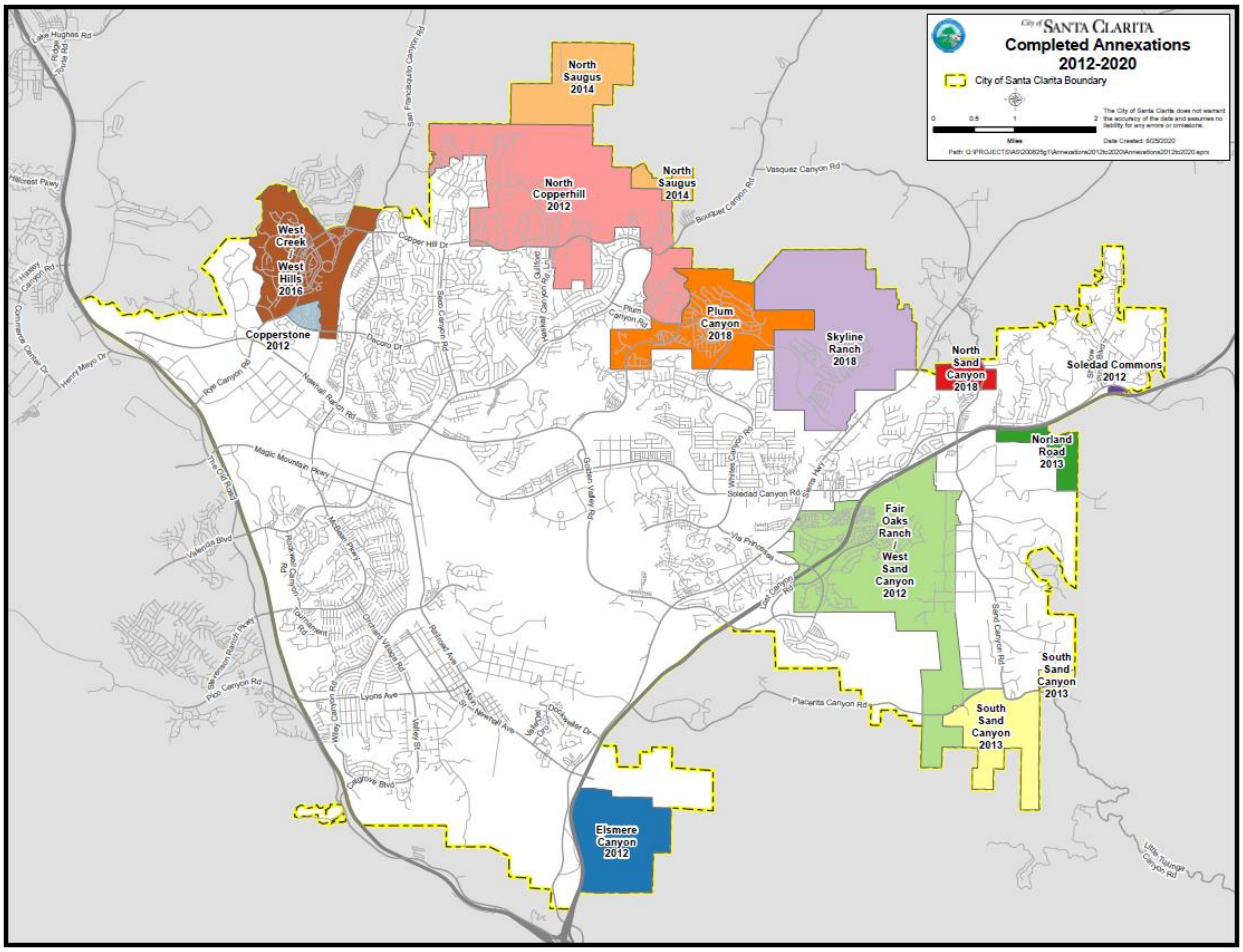


Table 3 - 3: Annexations (Since 2012)

Name of Annexation Area	**Date Annexed**	**Size** (rounded to the nearest whole acre)	**Description of Annexation Area**
Soledad Commons	June 14, 2012	8 acres	Site of 60,000 square foot commercial development.
Elsmere Canyon	June 14, 2012	807 acres	Open space annexation.
Copperstone	June 14, 2012	69 acres	Site for 428 homes and approximately 1,284 residents.
Fair Oaks Ranch / West Sand Canyon	September 11, 2012	2,436 acres	Site for 14,895 residents and existing 6,625 residential units. In addition, a City-

			approved project totaling 1,110 residents and up to 950,000 square feet for commercial uses.
North Copperhill	November 29, 2012	2,475 acres	Site for 9,543 residents and 3,305 residential units.
South Sand Canyon	April 10, 2013	692 acres	Site for 40 residents and two filming ranches totaling 540 acres.
Norland Road	August 15, 2013	203 acres	Open space annexation, pending 40-unit residential development.
North Saugus	October 14, 2014	824 acres	Open space annexation, site for three filming areas.
West Creek/West Hills	November 15, 2016	1,017 acres	Site of 579 units to be built with 2,300 single and multi-family homes.
North Sand Canyon/Plum Canyon/ Skyline Ranch	November 15, 2018	3,118 acres	Site will include 1,220 single family lots, 25 open space lots, 10 park lots and more.

3.2.3.3 *MAJOR DEVELOPMENT PROJECTS UNDER CONSTRUCTION IN SANTA CLARITA*

Several large scale projects have received planning entitlements, and have pulled the requisite grading, building, and other applicable permits. The projects include approximately 2,000 mixed residential units, approximately 980,000 square feet of commercial/retail space, approximately 4.6 million square feet of business park/industrial space, several hotels adding several hundred rooms and other amenities for temporary lodging, a YMCA Fitness Center and Senior Living Facility, approximately 140,000 square feet of office space, recreation centers, public park, and trailheads, and approximately 900 acres of Open Space.

3.2.3.4 *MAJOR DEVELOPMENT PROJECTS AWAITING CONSTRUCTION*

Three major projects have received planning entitlements, but are not yet under construction:

- The Master's University Master Plan, which will include 42 residential units, dedicated open space, and 240,000 square feet of new college buildings (chapel, dorm, and classrooms) to accommodate an increase of 600 students,
- A hotel project that will include 134 rooms, and

- A 4,000 square-foot restaurant pad and a mixed use development project that will include 580 residential units, an assisted living facility, and a 140,000 square-foot commercial center.

3.2.3.5 *DEVELOPMENT PROJECTS UNDER REVIEW*

Eight major projects have been formally submitted by the project applicants to the city, and are currently undergoing the discretionary review process. The projects will include a total of approximately 2,106 mixed residential units, 37 acres of open space, a 17 acre park, several trails, a 384 room hotel and wedding venue, and a 680,000 square foot commercial center.

3.2.4 TOP LOCAL AREA EMPLOYERS

The following table details the top ten largest employers in the Santa Clarita Valley i.e., Santa Clarita and adjacent communities (Santa Clarita Community Development Corporation – 2019 Economic Outlook).

Table 3 - 4: Santa Clarita Top 10 Employers

Rank	Company	Number of Employees
1	Six Flags Magic Mountain	3,200
2	Princess Cruises	2,177
3	College of the Canyons	*2,115*
4	Henry Mayo Newhall Hospital	*1,982*
5	William S. Hart Union School District	*1,923*
6	Saugus Union School District	*1,612*
7	U.S. Postal Service	*1,010*
8	Boston Scientific	*900*
9	City of Santa Clarita	*879*
10	Newhall School District	*785*

Mitigation activities are needed at the business level to ensure safety and welfare of workers and limit damage to industrial infrastructure. Employees at the industrial and business centers in Santa Clarita for the most part commute into Santa Clarita from surrounding areas, creating a dependency on roads, communications, accessibility, and emergency plans to reunite people with their families.

Before a natural hazard event, small to large businesses can develop strategies to prepare for natural hazards, respond efficiently, and prevent loss of life and property. When area employers are impacted during a hazard event, the city's residents will be impacted as well as the economic health of the city. The top two area employers, Six Flags Magic Mountain, and Princess Cruises are both entertainment/recreation industries that have been severely impacted by the 2020 COVID-19 pandemic, affecting City revenues and placing area residents in need of economic assistance.

3.3 CRITICAL FACILITIES

3.3.1 CAPITAL IMPROVEMENT PROJECTS IN SANTA CLARITA

Capital Improvement Projects include such things as roadways, public-rights-of-way, storm drains, curbs, gutters, sidewalks, and public access ramps, traffic signals, and city-owned and operated public safety facilities, recreation facilities, community centers, and parks and trail systems. City infrastructure and publicly owned facilities are critical to the city's emergency response needs. Roadway infrastructure will need to be upgraded and maintained on a regular basis to ensure that emergency responders have adequate access to locations impacted in a hazard event. Stormwater facilities are necessary to prevent and reduce the hazards caused by severe storms and flooding. City administration and public safety facilities are critical for emergency response coordination activities. Recreation facilities and community centers are often used as temporary triage centers and emergency shelters following significant hazard events.

Capital improvement projects consist of regular infrastructure maintenance, but also include the construction of new facilities such as the Santa Clarita Valley Sheriff's Station, which includes a 46,552 square foot main station building and detention facility, along with a 4,165 square foot vehicle maintenance facility, a communications tower and a helipad expected to open in 2021, and the Canyon Country Community Center which will include recreation and fitness rooms, a demonstration kitchen (for teaching), and flexible outdoor spaces for events, and play area. The final construction phase is expected to begin in the summer of 2020.

3.3.2 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.

3.3.2.1 CITY OPERATED CRITICAL FACILITIES

The following is a comprehensive listing of all City-owned and operated critical facilities identified as "critical" by City staff and stakeholders (potential hazard impacts to these facilities and estimated monetary value will be analyzed in Section 4):

- Santa Clarita City Hall
- George A. Caravalho Santa Clarita Sports Complex Gymnasium
- City of Santa Clarita's The Centre
- Public Works Corporate Yard (W. Ave. Stanford)

- Santa Clarita Aquatics Center
- Newhall Community Center
- Canyon Country Community Center
- Central Park – Maintenance building, offices and fitness center
- Santa Clarita Transit Maintenance Facility
- Metrolink Stations: Santa Clarita, Via Princessa, and Newhall
- Valencia Public Library
- Old Town Newhall Library
- Canyon Country Jo Anne Darcy Library
- The Cube Santa Clarita

3.3.2.2 BRIDGE INVENTORY - SANTA CLARITA PUBLIC WORKS DEPARTMENT AS RESPONSIBLE AGENCY

The following is a list of bridges identified as critical infrastructure that are under the City's jurisdictional authority (potential hazard impacts to these facilities and estimated monetary value will be analyzed in Section 4):

Bridge No. 53C1522 – Avenida Rotella	Bridge No. 53C1937 – Grandview Drive I
Bridge No. 53C1521 – Avenida Rondel	Bridge No. 53C1940 – Fairview Drive
Bridge No. 2027 – Avenida Escalera	Bridge No. 53C1939 – Hillsborough Parkway I
Bridge No. 53C0838 – Orchard Village Road	Bridge No. 53C1938 – Hillsborough Parkway II
Bridge No. 2242 – Avenida Navarre	Bridge No. 53C2168 – Grandview Parkway II
Bridge No. 53C2312 – Alta Madera Drive	Bridge No. 53C1941 – Decoro Drive
Bridge No. 53C2357 – John Russell Drive	Bridge No. 53C2089 – Grandview Drive III
Bridge No. 53C2311 – Carrizo Drive	Bridge No. 53C2103 – McBean Parkway (Northbridge)
Bridge No. 53C2348 – El Paseo Drive	Bridge No. 53C2084 – Newhall Ranch Road
Bridge No. 53C2349 – Del Monte Drive	Bridge No. 53C2085 – McBean Parkway (Bridgeport)
Bridge No. 53C2375 – McBean Parkway (Summit)	Bridge No. 53C2090 – McBean Parkway (Sunset Hills)
Bridge No. 53C1935 – Arroyo Park Drive	Bridge No. 53C2087 – Copper Hill Drive (Northpark)
Bridge No. 53C2313 – Goldcrest Drive	Bridge No. 53C2281 – Decoro Drive (Valencia H.S.)
Bridge No. 53C1837 – Del Monte (Goldcrest)	Bridge No. 0 – Copper Hill Drive (Westcreek /West Hills)
Bridge No. 53C2002 – Valencia Boulevard	Bridge No. 0 – Soledad Canyon Road (Villa Metro)
Bridge No. 53C2088 – McBean Parkway (Bus Station)	Bridge No. 0 – Sierra Highway (Golden Valley Road)
Bridge No. 53C2315 – Magic Mountain Parkway (Mall)	Bridge No. 0 – Copper Hill Drive (Calex/Canterbury)
Bridge No. 53C2001 – Creekside Road	Bridge No. 3548 – Tourney Road (TPC)

Street Bridges

Bridge No. 3828 – Lost Canyon Rd (SPRR/Metrolink)
Bridge No. 53C0296 – Sierra Hwy (Mint CW)
Bridge No. 53C0378 – Bouquet Canyon Rd (SCR - BJ)
Bridge No. 53C0379 – Bouquet Canyon Rd (BCCr - SR)
Bridge No. 53C0380 – Bouquet Canyon Rd (BCCr - Benz Rd)
Bridge No. 53C0469 – Soledad Canyon Rd (SCR)
Bridge No. 53C0478 – Bouquet Canyon Rd (BCCr - Alamagordo)
Bridge No. 53C0479 – Bouquet Canyon Rd (Plum CCh)
Bridge No. 53C0554 – Soledad Canyon Rd (Mint CCh)
BridgeSt No. 53C0826 – Wiley Canyon Rd (Pico CCh)
Bridge No. 53C0840 – Orchard Village Rd (SCR)
Bridge No. 53C0855 – Wiley Canyon Rd (SCR)
Bridge No. 53C0988 – Adon Ave (Mint CW)
Bridge No. 53C0992 – Sand Canyon Rd (SCR)
Bridge No. 53C1024 – Lost Canyon Rd (Santa CW)
Bridge No. 53C1028 – Sand Canyon Rd (Iron CCr)
Bridge No. 53C1434 – Placerita Canyon Rd (Sand CW)
Bridge No. 53C1488L – Valencia Blvd N. (SCR)
Bridge No. 53C1488R – Valencia Blvd S. (SCR)
Bridge No. 53C1490 – Urbandale Ave (BCCr)
Bridge No. 53C1492 – Clearlake Dr (Unnamed Wash)
Bridge No. 53C1528 – Garzota Dr (Dry CC)
Bridge No. 53C1529 – Decoro Dr (Dry CC)
Bridge No. 53C1533 – Begonias Ln (Private Drain 771)
Bridge No. 53C1544 – 15th St (Newhall Creek)
Bridge No. 53C1548 – Centurion Wy (BCCr)
Bridge No. 53C1550 – Pamplico Dr (Dry CC)
Bridge No. 53C1554 – Tournament Rd (Pico CC)
Bridge No. 53C1586 – Tupelo Dr (Dry CC)
Bridge No. 53C1621 – Benz Rd (BCCr/Private Drain 3250)
Bridge No. 53C1625 – 14th St (Newhall Creek)
Bridge No. 53C1681 – Ridgegrove Dr (Haskell CC)
Bridge No. 53C1728 – Rodgers Dr (Plum CC)
Bridge No. 53C1776 – Sierra Hwy (Solemint SPTCO)
Bridge No. 53C1777L – Sierra Hwy S. (SCR)
Bridge No. 53C1777R – Sierra Hwy N. (SCR)
Bridge No. 53C1799 – Scherzinger Ln (Mint CW)
Bridge No. 53C1807 – Everett Dr (SCR)
Bridge No. 53C1836 – Newhall Ranch Rd (Bouquet CC)
Bridge No. 53C1840 – McBean Pkwy (Santa Clara River)
Bridge No. 53C1860 – Haskell Canyon Rd (Bouquet CC)
Bridge No. 53C1936 – Valle Del Oro (Newhall Creek)
Bridge No. 53C1993 – Golden Valley Rd (Soledad Cyn Rd/SPRR)
Bridge No. 53C1999 – Whites Canyon Rd (SCR)
Bridge No. 53C2000 – Whites Canyon Rd (SPRR)
Bridge No. 53C2086 – Avenue Scott (SFCC)
Bridge No. 53C2096 – Avenue Crocker (Unnamed Wash)
Bridge No. 53C2097 – Avenue Stanford (Unnamed Wash)
Bridge No. 53C2164 – Newhall Ranch Rd (SFCr)
Bridge No. 53C2165 – Atwood Blvd (SCR)
Bridge No. 53C2166 – De Wolfe Rd (SCR)
Bridge No. 53C2167 – Decoro Dr (SFCr)
Bridge No. 53C2170 – Copper Hill Dr (SFCr)
Bridge No. 53C2209 – Copper Hill Dr (Haskell CC)
Bridge No. 53C2222 – Via Princessa (Unnamed Wash)
Bridge No. 53C2316 – Magic Mountain Pkwy (SCR)
Bridge No. 53C2317 – Via Princessa (SCR)
Bridge No. 53C2318 – Railroad Ave (Placerita Creek)
Bridge No. 53C2319 – Railroad Ave (Newhall Creek)
Bridge No. 53C2320 – Newhall Ave (Elsmere Creek)
Bridge No. 4009 – Golden Valley Rd N. (SCR)
Bridge No. 4022 – Golden Valley Rd S. (SCR)
Bridge No. 3961 – Banyan Pl (Private Drain 1954)
Bridge No. 3962 – Boxwood Ln (Private Drain 1954)
Bridge No. 3875 – Camp Plenty Rd (Private Drain 43)
Bridge No. 3105 – Esterbrook Ave (Private Drain 266)

Pedestrian Bridges over and under City streets

Street Bridge Under Railroad Jurisdiction

Bridge No. 53C1409 Sand Canyon Road under SPRR/UPRR

3.3.2.3 BRIDGE INVENTORY – CALTRANS DISTRICT 7 AS RESPONSIBLE AGENCY

Bridge No. 53_0687L/R – Interstate–5 over Santa Clara River
Bridge No. 53_0688 – Interstate–5 over Santa Clara OH
Bridge No. 53_1539 – Oak Spring Canyon Road over State Route–14
Bridge No. 53_1621 – Lost Canyon Road under State Route–14
Bridge No. 53_1626 – Interstate–5/State Route–126 Separation OC/UC
Bridge No. 53_1688 – Rye Canyon Road under Interstate–5
Bridge No. 53_1783 – Pico Canyon Road/Lyons Avenue over Interstate–5
Bridge No. 53_1729L/R – Calgrove Boulevard under Interstate–5
Bridge No. 53_1936 – Sierra Highway under State Route–14
Bridge No. 53_2027 – Jakes Way under State Route–14
Bridge No. 53_2029 – Humphreys OC under State Route–14

Bridge No. 53_2057 – McBean Parkway over Interstate–5
Bridge No. 53_2066 – Golden Valley Road over State Route–14
Bridge No. 53_2070 – Newhall Avenue under State Route–14
Bridge No. 53_2076 – Placerita Canyon Road under State Route–14
Bridge No. 53_2096 – Los Pinetos Road under State Route–14
Bridge No. 53_2146 – LA Aqueduct under State Route–14
Bridge No. 53_2166 – Via Princessa under State Route–14
Bridge No. 53_2167 – Canyon Park Boulevard under State Route–14
Bridge No. 53_2161 – State Route–14 over Elsmere Creek
Bridge No. 53_2171 – Cedar Valley Way under State Route–14
Bridge No. 53_2779 – Newhall Ranch Road over State Route–126
Bridge No. 53_2788 – State Route–126 over Newhall Creek
Bridge No. 53_2816 – Sand Canyon Road over State Route–14
Bridge No. 53_2927 – Valencia Boulevard over Interstate–5
Bridge No. 53_2928 – Magic Mountain Parkway under Interstate–5

3.3.2.4 - CRITICAL FACILITIES UNDER COUNTY, STATE, OR REGIONAL AUTHORITY

The following facilities are responsible for services to Santa Clarita residents that are not under the city's jurisdictional authority, but are crucial to the health, safety, ad welfare of the general public and work in close coordination with City Administration:

Fire and Law Enforcement Facilities - Since Santa Clarita is a contract city with the County of Los Angeles Fire Department and the Los Angeles County Sheriff, those station facilities are under the County of Los Angeles' jurisdictional authority. Sanitation districts critical facilities also belong to the County of Los Angeles.

Water Facilities - The water provided in 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 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.

Energy Facilities - Southern California Edison (SCE) is the main electric provider for Santa Clarita and is responsible for maintaining its substations and the electric power grid in the area. Similarly, the Southern California Gas (SCG) Company is responsible for supplying natural gas to the City and its residents.

School Facilities - The four school districts within the City: Acton/Agua Dulce Unified School District, Castaic Union School District, Newhall School District, Saugus Union School District, Sulphur Springs School District, and the William S. Hart School District.

Wastewater Facilities - Wastewater treatment is provided by the Santa Clarita Valley Sanitation District, a special district serving the City of Santa Clarita and unincorporated Los Angeles County. The wastewater treatment plants are operated by the Los Angeles County Sanitation Districts under the Amended Joint Administration Agreement.

Table 3 - 5: City Owned & Non-City Owned Facilities

Name of Facility	Wildfire	Drought	Earthquake	Hazardous Materials	Landslides	Severe Weather	Cyber Attack	Energy Disruption	Terrorism	Flood	Pandemics	Value of Property (City-owned only)
City Owned Facilities												
Santa Clarita City Hall	X		X				X	X	X	X	X	$19,908,685

George A. Caravalho Santa Clarita Sports Complex/Gymnasium	X	X	X			X		X	X	X	X	$6,042,355
City of Santa Clarita The Centre	X	X	X			X		X	X	X	X	$4,088,460
Public Works Corporate Yard	X	X	X	X		X		X	X	X	X	$7,795,774
Santa Clarita Aquatics Center	X	X	X			X		X	X	X	X	$5,526,358
Newhall Community Center	X	X	X			X		X	X	X	X	$4,506,031
Central Park Maintenance Building	X		X	X			X	X	X	X	X	$779,863
Santa Clarita Transit Maintenance Facility	X		X	X			X	X	X	X	X	$5,086,835
Metrolink Station-Santa Clarita	X		X	X			X	X	X	X	X	$2,036,988
Metrolink Station-Via Princessa	X		X	X			X	X	X	X	X	$1,892,063
Metrolink Station-Newhall	X		X	X			X	X	X	X	X	$241,379
Non-City Owned Facilities												
Henry Mayo Newhall Hospital	X		X	X		X	X	X	X	X	X	
LA County Fire Stations	X		X	X		X	X	X	X	X	X	
LA County Sheriff's Station	X		X	X		X	X	X	X	X	X	
Golden Valley High School	X		X			X		X	X	X	X	
Canyon High School	X		X			X		X	X	X	X	
Saugus High School	X		X			X		X	X	X	X	
Hart High School	X		X			X		X	X	X	X	
Bowman High School	X		X			X		X	X	X	X	
Valencia High School	X		X			X		X	X	X	X	
College of the Canyons	X		X			X	X	X	X	X	X	
California Institute of the Arts	X		X			X	X	X	X	X	X	
The Master's University	X		X			X	X	X	X	X	X	
Valencia Water Reclamation Plant	X		X	X		X	X	X	X	X	X	
Saugus Reclamation Plant	X		X	X		X	X	X	X	X	X	

4.0 HAZARD IDENTIFICATION AND RISK ASSESSMENT

This section of the Hazard Mitigation Plan describes the hazards (manmade and natural) that affect Santa Clarita, and examines the risks to the city associated with each. The following hazards are discussed, listed in order of their potential to affect Santa Clarita:

1. Wildfire
2. Earthquake
3. Energy Disruption
4. Drought
5. Severe Weather: Extreme Heat & Extreme Wind
6. Pandemic
7. Man-Made Hazards: Cyber Attack, and Terrorism
8. Hazardous Material Release
9. Landslide/Mudslide/Subsidence
10. Flood

Hazard identification consists of (1) defining the study area in terms of scale and coverage; and (2) collecting and compiling a list of prevalent hazards in the study area to help narrow the focus of the analysis. 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 the City's population, infrastructure, and environment has historically been vulnerable to each specific hazard. The **Calculated Priority Risk Index** (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: probability, severity/magnitude, warning time, and duration, and then calculating an index value based on a weighting scheme of 45% for probability, 30% for severity/magnitude, 15% for warning time, and 10% for duration. 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. A score of 4 is characterized as Severe; scores of 3.00 to 3.99 are characterized as High; scores of 2.00 to 2.99 are characterized as Moderate; and scores of 1.00 to 1.99 are characterized as Low using the CPRI rating system.

Table 4 - 1: Summary of CPRI Categories and Risk Levels

Category	Level ID	Degree of Risk – Description	Value	Weighting Factor
Probability	Unlikely	• Extremely rare with no documented history of occurrences or events. • Annual probability of less than 0.001.	1	45%

	Possible	• Rare occurrences with at least one documented or anecdotal historic event. • Annual probability that is between 0.01 and 0.001.	2	
	Likely	• Occasional occurrences with at least two or more documented historic events. • Annual probability that is between 0.1 and 0.01.	3	
	Highly Likely	• Frequent events with well-documented history of occurrence. • Annual probability that is greater than 0.1.	4	
Severity/ Magnitude	Negligible	• Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). • Injuries or illnesses are treatable with first aid and there are no deaths. • Negligible quality of life lost. • Shut down of critical facilities for less than 24 hours.	1	30%
	Limited	• Slight property damages (greater than 5 % 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. • Shutdown of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	• 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. • Shutdown of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	• Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). • Injuries or 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	N/A, self-explanatory.	4	15%
	6 to 12 hours		3	

	12 to 24 hours		2	
	More than 24 hours		1	
Duration	More than 1 week	N/A, self-explanatory.	4	10%
	Less than 1 week		3	
	Less than 24 hours		2	
	Less than 6 hours		1	

4.1 WILDFIRE

The City of Santa Clarita is susceptible to wildland fires due to hilly terrain, dry weather conditions, and the generally flammable vegetation that covers much of the terrain. According to the Fire Department, 80 to 90 percent of the planning area is located in a Very High Fire Hazard Severity Zone, which is the highest classification for areas subject to wildfires. Areas subject to wildland fire danger include portions of Newhall and Canyon Country, Sand Canyon, Pico Canyon, Placerita Canyon, Hasley Canyon, White's Canyon, Bouquet Canyon, and all areas along the interface between urban development and natural vegetation in hillside areas.

A variety of natural factors combine in Santa Clarita to create a high potential for wildfires and resulting damage to life and property. 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.

The following factors that expose the Santa Clarita community to wildfire events are examined in this section:

- Fuel
- Topography
- Weather
- Drought
- Growth and Development in the Wildland Urban Interface

4.1.1 WILDFIRE FACTOR: FUEL

Fuel is the material that feeds a fire and 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.

The hills of Santa Clarita are covered with highly flammable plant communities consisting of variable mixtures of woody shrubs and herbaceous species, such as chaparral and sage vegetation, which allow fires to spread easily on hillsides and in canyons.

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. Many species of chaparral have adapted to frequent fires; the plants' reproductive strategies rely on fire to trigger the germination of dormant seeds.

4.1.2 WILDFIRE FACTOR: TOPOGRAPHY

Santa Clarita is surrounded by the Santa Susana Mountains to the south and west, the San Gabriel Mountains to the southeast, and the Sierra Pelona Mountains to the north, all of which are part of the Transverse Ranges. Smaller hills and ridgelines bisect the valley floor, which contains the drainage courses of the Santa Clara River and its tributaries. About 45 percent of the planning area (168,345 acres) contains land with slopes greater than 10 percent, and 7,866 acres of land contain slopes of 25 percent or greater.

Santa Clarita's mountainous topography influences the hazard from fire in following ways: 1) canyons tend to direct airflow, creating wind patterns that speed the spread of embers and fires, 2) fires tend to move faster on hillsides than over flat ground, and 3) steep terrain makes it more difficult for fire crews to establish fire lines and fight fires. Gulches and Canyons can funnel air and act as chimneys, which intensifies fire behavior and causes the fire to spread faster. Solar heating of dry, south facing slopes produce up slope drafts that can complicate fire behavior. Steep slopes also increase fire severity: if the percentage of an uphill slope doubles, the rate of wildfire spread will likely double.

4.1.3 WILDFIRE FACTOR: WEATHER

Weather patterns combined with geographic features can create a favorable climate for wildfire activity. Areas where annual precipitation is less than 30 inches are extremely fire susceptible. High-risk areas such as Santa Clarita Valley generally have a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. The "Santa Ana" winds, which are heated by compression as they flow down to Southern California from Utah create a particularly high risk, as they can rapidly spread what might otherwise be a small fire. Wind has been the predominant factor in recent wildfires that have resulted in the largest losses of structures and human lives.

4.1.4 WILDFIRE FACTOR: CLIMATE CHANGE

Recent concerns about the effects of climate change, particularly drought effects, 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. With periods of drought the fuel moisture drops significantly adding to increased fire danger. Whereas usually we expect low moisture content in the fuels during summer months, with drought conditions, the fuels reach these same low numbers earlier in the year, prolonging the high fire danger period. Although, not currently experiencing drought conditions, cycles of drought are a common cyclical feature of the Southern California climate, and climate change has increased the frequency and length of drought cycles making all communities in the region susceptible to extreme wildfire events, particularly communities like Santa Clarita that are located within hilly chaparral covered areas.

4.1.5 WILDFIRE FACTOR: GROWTH AND DEVELOPMENT IN THE WILDLAND URBAN INTERFACE

The wildland urban interface is defined as an area where human made structures, including power lines and other utility structures, are located within or adjacent to areas prone to wildfire events. The hills and mountainous areas of Santa Clarita 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 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.

Furthermore, owners often prefer homes that are private, have scenic views, are nestled in vegetation and use natural materials. Private homes may be far from public roads, or hidden behind a narrow, curving driveway. These conditions, while desirable to many homeowners, make evacuation and firefighting difficult. Mountain ridges offer scenic views but 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. Finally, many human activities increase the incidence of fire ignition and potential damage.

4.1.5.1 DESIGNATED HAZARD AREAS

Wildfire hazard areas are commonly identified in regions of the wildland/urban interface. 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, which are used in identification rating systems.

The following table illustrates the 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. The scores from each category are totaled for a potential score of 4 -12, with a score of 4 demonstrating the safest conditions.

Table 4 - 2: Wildfire Hazard Identification Rating System

Category	Indicator	Rating
Roads and Signage	Steep; narrow; poorly signed	3
	One or two of the above	2
	Meets all requirements (not steep, narrow, or poorly signed)	1
Water Supply	None, except domestic	3
	Hydrant, tank, of pool over 500 feet away	2
	Hydrant, tank, or pool within 500 feet	1
Location of the	Top of steep slope with brush/grass below	3

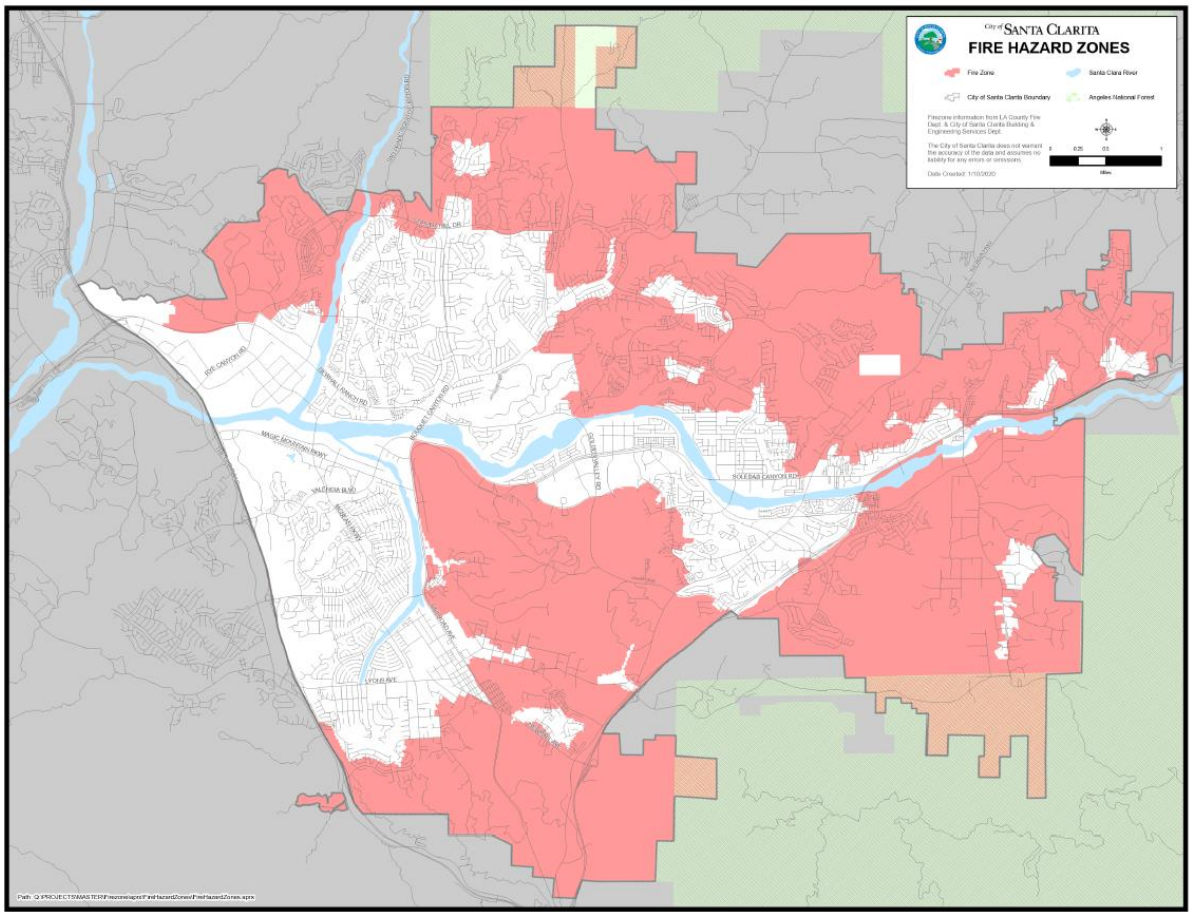
Structure	Mid-slope with clearance	2
	Level, surrounded by lawn; or watered groundcover	1
Exterior Construction	Combustible roofing, open eaves, combustible siding	3
	One or two of the above	2
	Non-combustible roof, boxed eaves, non-combustible siding	1

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
- 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 Department, and the City's GIS data to create the Fire Zones Map (below). The Fire Zones Map depicts the Very High Fire Hazard Severity Zones within and surrounding the City (see Appendix D: Maps - Fire Zone Map for an expanded view).

Map 2: Santa Clarita Fire Hazard Zones



4.1.6 SOUTHERN CALIFORNIA WILDFIRE HISTORY

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.

4.1.6.1 TOP 20 MOST DESTRUCTIVE CALIFORNIA WILDFIRES

The table below summarizes the Top 20 Wildfires in California. Summaries of the significant wildfires that have impacted the Santa Clarita area are provided in the following subsections.

Table 4 – 3: Top 20 Most Destructive California Wildfires

FIRE NAME *(CAUSE)*	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
CAMP FIRE *(Powerlines)*	November 2018	Butte County	153,336	**18,804**	*85*
TUBBS *(Electrical)*	October 2017	Napa & Sonoma	36,807	**5,636**	22
TUNNEL - Oakland Hills *(Rekindle)*	October 1991	Alameda	1,600	**2,900**	25
CEDAR *(Human Related)*	October 2003	San Diego	273,246	**2,820**	15
NORTH COMPLEX *(Under Investigation)*	August 2020	Butte, Plumas & Yuba	318,930	**2,352**	15
VALLEY *(Electrical)*	September 2015	Lake, Napa & Sonoma	76,067	**1,955**	4
WITCH *(Powerlines)*	October 2007	San Diego	197,990	**1,650**	2
WOOLSEY *(Under Investigation)*	November 2018	Ventura	96,949	**1,643**	3
CARR *(Human Related)*	July 2018	Shasta County, Trinity County	229,651	**1,614**	8
GLASS *(Under Investigation)*	September 2020	Napa & Sonoma	67,484	**1,545**	0
LNU LIGHTNING COMPLEX *(Under Investigation)*	August 2020	Lake, Napa, Sonoma, Yolo & Solano	363,220	**1,491**	6
CZU LIGHTNING COMPLEX *(Lightning)*	August 2020	Santa Cruz & San Mateo	86,509	**1,490**	1
NUNS *(Powerline)*	October 2017	Sonoma	54,382	**1,355**	3
THOMAS *(Powerline)*	December 2017	Ventura & Santa Barbara	281,893	**1,063**	2
OLD *(Human Related)*	October 2003	San Bernardino	91,281	**1,003**	6
JONES *(Undetermined)*	October 1999	Shasta	26,200	**954**	1
AUGUST COMPLEX *(Under Investigation*	September 2015	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake & Colusa	1,021,476	**923**	1
BUTTE *(Powerlines)*	September 2015	Amador & Calaveras	70,868	**921**	2
CREEK *(Under Investigation)*	September 2020	Fresno & Madera	330,899	**856**	0
ATLAS *(Powerline)*	October 2017	Napa & Solano	51,624	**783**	6

* "Structures" include homes, outbuildings (barns, garages, sheds, etc.) and commercial properties destroyed.
**This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.

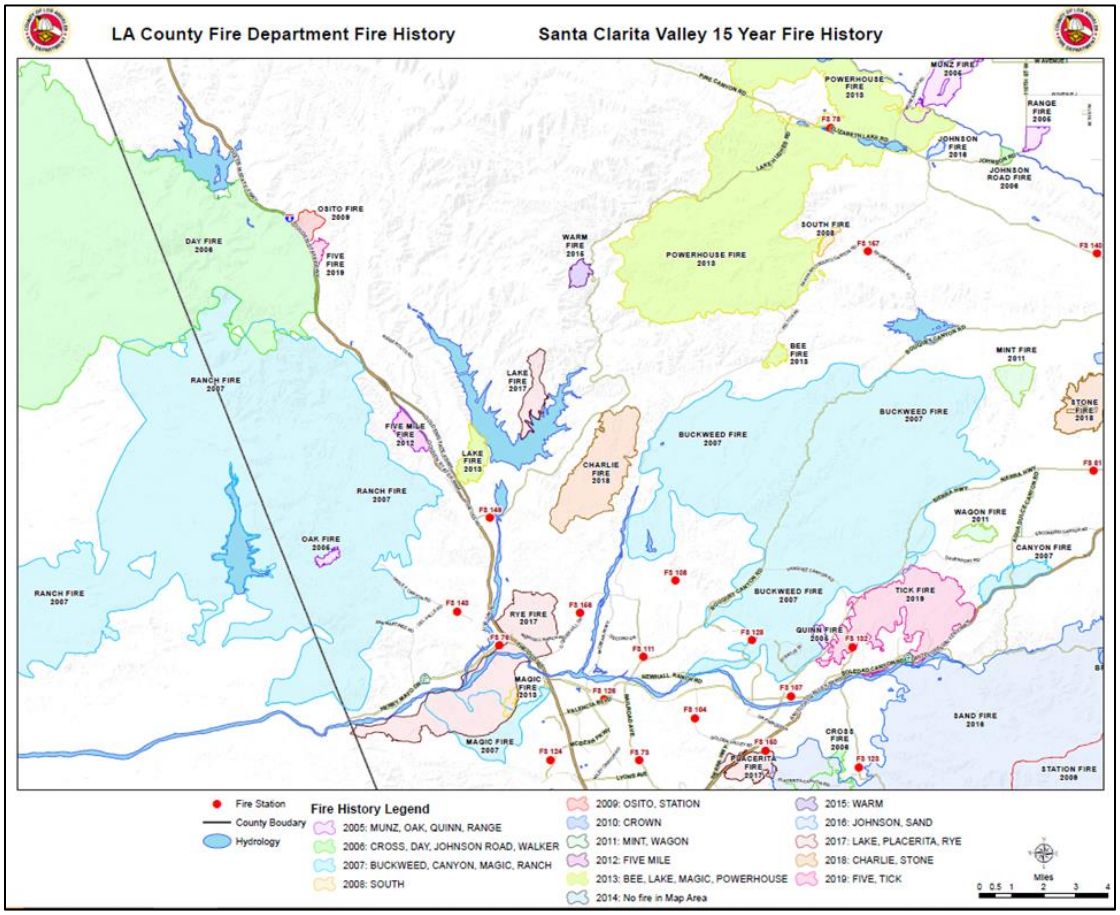
4.1.6.2 SANTA CLARITA FIRES

The table below summarizes significant fires that have occurred in the Santa Clarita area since 2003.

Table 4 - 4: Significant Fires in or near Santa Clarita

NAME	DATE	ACRES	STRUCTURES LOST	INJURIES/ DEATHS
TICK	October 2019	4,615	22	3 injuries
POWERHOUSE	May – June 2013	30,274	58	10 injuries
STATION	August – October 2009	160,557	209	134 injuries 2 deaths
RANCH	October 2007	58,401	10	8 injuries
BUCKWEED	October 2007	38,356	63	1 injury
MAGIC	October 2007	2,284	0	0
VERDALE	October 2003	8,650	1	0
SIMI	October – November 2003	108,204	315	0

Map 3: Santa Clarita Valley 15 Year Fire History



4.1.7 WILDFIRE PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 – 5: Wildfire CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	4 x 0.45 = 1.8	Highly Likely	**Severe**
Magnitude/Severity	2 x 0.3 = 0.6	Limited	✓ **High**
Warning Time	4 x 0.15 = 0.9	6 to 12 hours	**Moderate**
Duration	3 x 0.1 = 0.3	Less than 1 week	**Low**
CPRI Rating	**3.30**	**High**	

According to the Los Angeles County Fire Department (LACoFD) and CAL FIRE (CAL FIRE, 2012), approximately 80 to 90 percent of the Santa Clarita Valley is in a Very High Fire Hazard Severity Zone (VHFHSZ) which is the department's highest classification for areas prone to wildfires. The probability of future wildfire events in Santa Clarita is very high. The CPRI rating for Wildfire is 3.30 or "High Level of Risk" with a score of 4 or "Highly Likely" for Probability, due to the documented regular occurrence of wildfires in Southern California. Magnitude/Severity has a score of 2 or "Limited" because the majority of wildfires are contained relatively quickly and do not cause severe damage to critical facilities or result in injury or death. Warning Time carries a score of 4 or "6 to 12 hours" because of the spontaneous nature of wildfires. Duration is given a score of 3 or "Less Than 1 Week" because a wildfire will usually take several hours to several days to contain, except in the most severe cases. Climate Change continues to increase the probability, magnitude, and duration of Wildfires, which may eventually increase the CPRI rating to "Severe."

4.1.7.1 WILDFIRE POTENTIAL DAMAGE

The City's Technology Services Division, GIS Group used the LACoFD's Fire Zone data and the city's own building records 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. The following table identifies the number of structures by type in the city's VHFHSZ and the valuation of those structures.

Table 4 - 6: VHFHSZ Potential Building Count and Valuation by General Occupancy

Occupancy Type	Number of Buildings in Very High Fire Hazard Severity Zones	Valuation of Buildings in Very High Fire Hazard Severity Zones
Commercial	281	$302,653,395
Industrial	364	$529,669,663
Mixed Use	268	$79,358,279
Residential	19,002	$9,402,193,457
Specific Plan	2,098	$1,185,661,034
Open Space	213	$51,197,434
Other (Public/Institutional)	367	$30,058,013
TOTAL	**22,593**	**$11,580,791,275**
The number of buildings is less than the actual number of buildings. This is because some of the buildings are not within the parcels layer that should be. *22,586 < 22, 592 (buildings from building layer).*		

4.2 EARTHQUAKE

Earthquakes are defined by geologists as "sudden slips on a fault and the ground shaking and radiated seismic energy caused by a slip, or by volcanic or magmatic activity, and other sudden stress changes in the earth." Residents of places like Santa Clarita which are subject to earthquakes may define them simply as terrifying, unpredictable catastrophes that can in mere moments destroy homes and lives, change the landscape, and result in long-term impacts to lives and livelihoods.

Map 4: San Andreas Fault "Big Bend"

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.

4.2.1 - EARTHQUAKE FAULTS

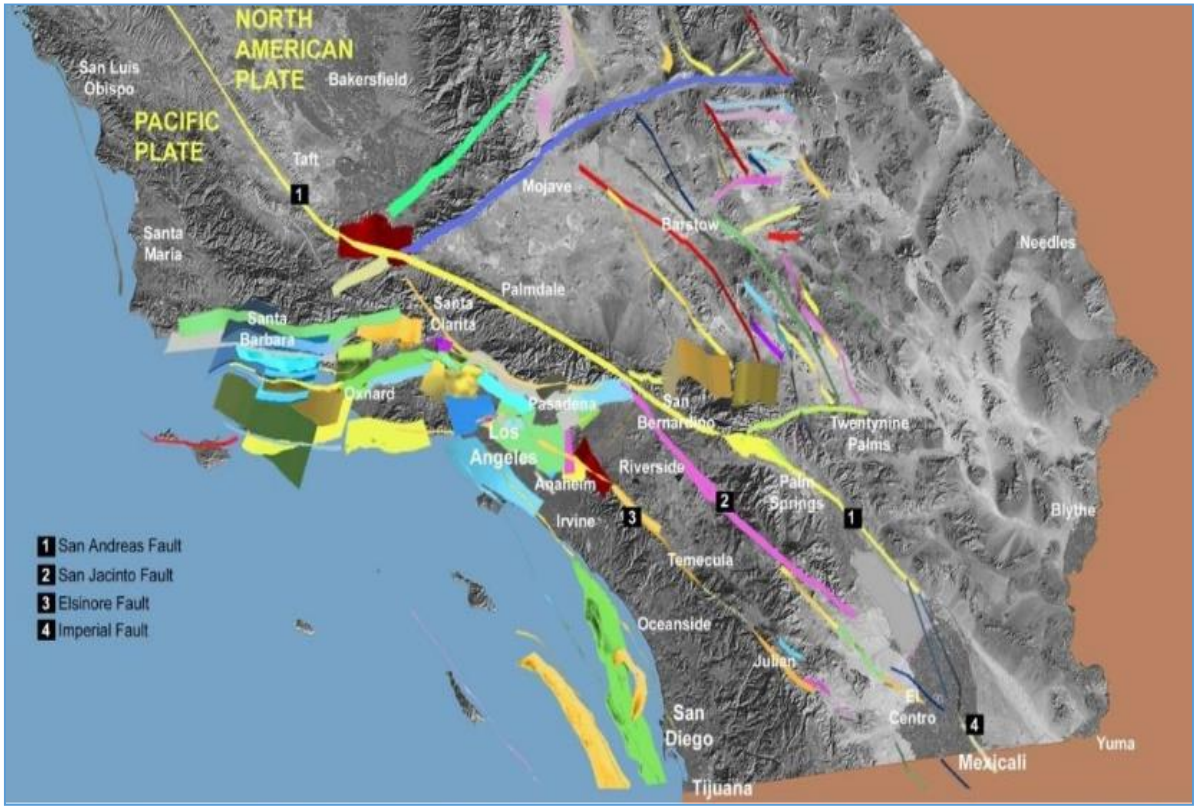
Earthquakes occur at the boundaries of the Earth's tectonic plates as they move relative to one another. The tectonic boundary between the Pacific Plate and the North American Plate in California is along the San Andreas Fault, where the plates are sliding horizontally past one another.

The risk of earthquakes in Southern California is exacerbated by the fact that the two plates are inhibited in their motion by what is known as the "Big Bend" (USGS, n.d.). In this section of the San Andreas, the fault curves to the west then curves back to the north. This creates a barrier to simple lateral motion. This bend is a convergent (restraining) bend, creating a localized collision of tectonic

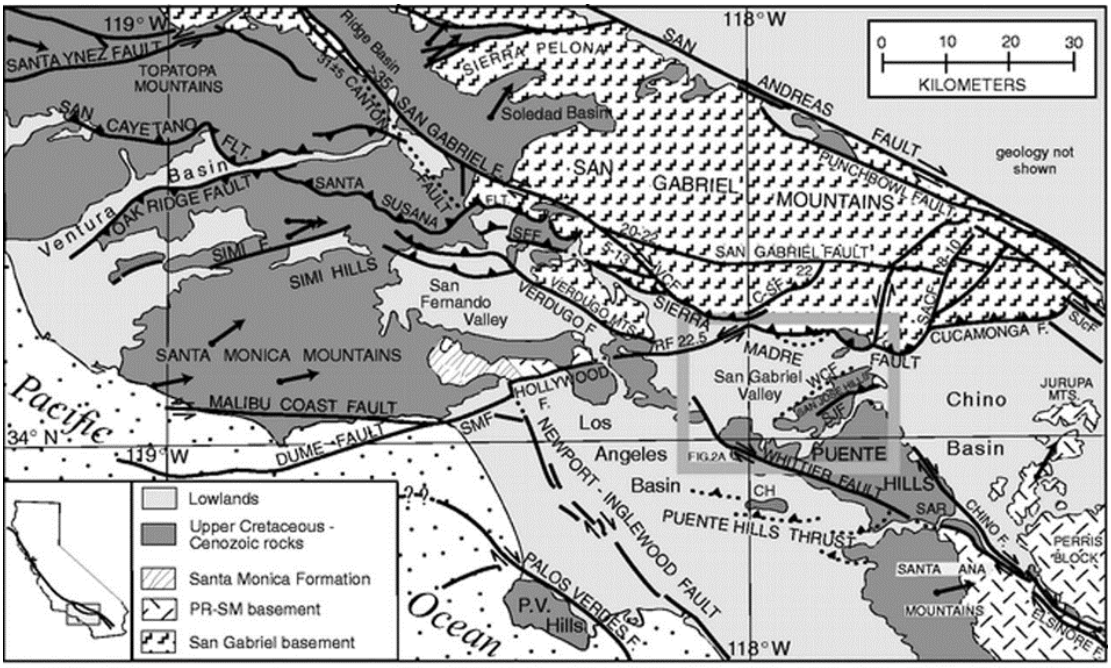
plates, generating a tremendous amount of compression stress. To release this stress, additional faults have formed over time. The "Big Bend" of the San Andreas Fault is thought to be responsible for much of the complexity of faulting in Southern California.

The map below depicts several parallel faults to the San Andreas Fault (SCEC, 2011). These four faults: the San Andreas Fault (already mentioned), the San Jacinto Fault, the Elsinore Fault, and the Imperial Fault are considered to be responsible for approximately half of the significant earthquakes in the region.

Map 5: San Andreas and Other Major Faults – SCEC



Map 6: Southern California Fault Map



Santa Clarita lies within the Transverse Ranges Geomorphic Province, an area that is traversed or near a number of known active earthquake faults. Large known faults in or near the Transverse Ranges Geomorphic Province include the San Andreas, Oak Ridge, Holder, San Fernando, Santa Susana, Red Mountain, Garlock, Newport-Inglewood, and Malibu Coast Faults. The table below provides a summary of major fault in the area (source: Southern California Earthquake Data Center and the Department of Conservation Division of Mines and Geology).

Table 4 - 7: Major Faults in the Santa Clarita Area

FAULT NAME	LOCATION AND SEISMICITY
Holser Fault	The Holser Fault trends along the northern border of the Santa Clarita River Valley, but 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. 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.
Oak Ridge Fault	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. The magnitude 6.7 Northridge Earthquake (1994) was thought to have occurred along the eastern end of the Oak Ridge Fault. The interval between major ruptures on this fault is unknown.

San Andreas Fault	The San Andreas Fault 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 Andreas Fault. The Fault can produce a moment magnitude of 8-8.5 magnitude. Geologists estimate the recurrence interval of a major quake along this fault to be 130-140 years.
San Fernando Fault	The San Fernando Fault is located six miles south of the City. The Fault is modeled as being able to generate a maximum moment magnitude of 6.7. It's estimated that this fault will experience a major rupture approximately every 200 years.
San Gabriel Fault	The San Gabriel Fault Zone is primarily right-lateral strike-slip with an estimated magnitude of 7.2 and approximately 140 km long. Intervals between major ruptures on this fault is unknown.
Santa Susana Fault	The Santa Susana Fault is an active Fault located one mile south of the City and extends from the northern edge of Simi Valley through the northern end of the San Fernando Valley. This Fault has a length of roughly 16 miles and an estimated maximum moment magnitude of 6.6. The intervals between major ruptures on this fault is uncertain.
Sierra Madre Fault	The Sierra Madre Fault is approximately 55 km long with a probable moment magnitude of 6.0-7.0 and located southeast of Santa Clarita. The interval between major ruptures on this fault is estimated at several thousand years.

4.2.2 EARTHQUAKE IMPACTS AND FAILURES

Earthquakes can have an extensive and devastating impact on the community, structures, and the economy. The following section summarizes key vulnerabilities for the City of Santa Clarita.

- **Ground Failure:** Fissuring, settlement, and permanent horizontal and vertical shifting of the ground often accompany large earthquakes, and can significantly increase damage and under certain circumstances can be the dominant cause of damage.
- **Fault Rupture:** The sliding movement of earth on either side of a fault is called fault rupture, and begins below the ground surface at the earthquake hypocenter, typically between three and ten miles below the ground surface. 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.
- **Liquefaction:** This phenomenon turns the soil into a fluid, when ground shaking occurs, causing it to lose the ability to support buildings and other structures. Areas in Santa Clarita susceptible to liquefaction include places where sandy sediments have been deposited by the Santa Clara River.

Several types of damaging ground failures can occur due to liquefaction, including lateral spreading, ground settlement, and sinkholes.

- **Landslides:** Landslides are the result of the down-slope movement of unstable hillside materials under the influence of weathering and gravity over time, and can be triggered by heavy rainfall, excavation of weak slopes, and earthquake shaking, among other factors (see SECTION 4.5 Landslide/Mudslide/Subsidence for additional details on landslide and subsidence risks).
- **Dam Failure:** 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. Earthquakes can undermine the structure of dams and cause breaches or complete failures. There are two dams very near the City of Santa Clarita: the Bouquet Canyon Dam and the Castaic Dam. Both are located in the unincorporated area but, if a failure were to occur, areas of the City of Santa Clarita would be severely impacted (see SECTION 4.8 Flood for additional details on Flood and Dam risks).
- **Fires:** Fire following an earthquake can have devastating consequences, and can be a significant problem in urban areas of southern California. The 2008 U.S. Geological Survey, California Department of Conservation and California Geological Survey's 7.8 ShakeOut Scenario doubles the fatalities and economic losses, (Jones, 2008) which estimates that approximately 1,600 ignitions may occur as a result of downed power lines and broken gas mains, that will require the response of a fire engine (see SECTION 4.1 Wildfire for additional details on fire risks).
- **Utility Failure / Energy Disruption:** 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. The Santa Clarita, Saugus, Pardee, and Sylmar substations would shut down due to damage caused by liquefaction and intense ground shaking (see SECTION 4.7.4 Energy Disruption for additional data on utility risks).
- **Pipeline Failure:** Fault rupture could sever the pipelines carrying natural gas and crude oil supplies that cross the fault near Tejon Pass. These lines will be shut off automatically. More damage could occur to those pipes crossing Castaic Creek and the Santa Clara River. The petroleum producing area parallel to the Santa Clara River between Newhall and Saugus may incur some damage, which could have minor effects on the industry (see SECTION 4.4 Hazardous Materials Release and SECTION 4.7.4 Energy Disruption for additional details on pipeline risks).
- **Lifeline Infrastructure (Communication and Energy Networks and Pipelines):** Lifelines are the connections between communities and outside services. They include water, waste water, electrical delivery systems, 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. Lifelines need to be usable after earthquakes to allow for recovery and rebuilding efforts as well as to relay important information to the public.

- **Transportation Infrastructure:** 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. Residents in the City of Santa Clarita commute frequently by automobiles and public transportation such as buses and light rail (Metrolink). An earthquake can greatly damage bridges and roads, hampering emergency response efforts and the normal movement of people and goods.
- **Debris:** Debris removal is a key support requirement for the clean-up of 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. Note: In a major disaster that includes implementation of the National Response Plan, one of the primary missions of the U.S. Army Corps of Engineers (USACE) is debris removal. Consequently if such an event occurs, the City of Santa Clarita will need to work closely with USACE.
- **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 repair damages is great. Though structures built before 1993 (when building codes related to seismic safety were improved) are at greatest risk, all buildings are at risk to some extent. Critical facilities including police stations, fire stations, hospitals, shelters, and other sites provide important services to the community. These facilities and their services need to be functional after an earthquake event.
- **Businesses and the Economy:** 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 events can create economic loss that presents a burden to large and small shop owners who may have difficulty recovering their businesses.
- **Death and Injury:** Death and injury can occur both inside and outside of buildings due to collapsed buildings falling equipment, furniture, debris, and structural materials. Downed power lines and broken water and gas lines can also endanger human life.
- **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.

4.2.3 EARTHQUAKE HISTORY

The table below provides examples of significant earthquakes of 5.0 Magnitude or greater in Southern California (sources: Southern California Earthquake Data Center and USGS).

The Northridge Earthquake of 1994 was the most impactful earthquake to Santa Clarita in recent memory, and is highlighted after the table.

Table 4 - 8: Significant Earthquakes ≤ 5.5 in Southern California

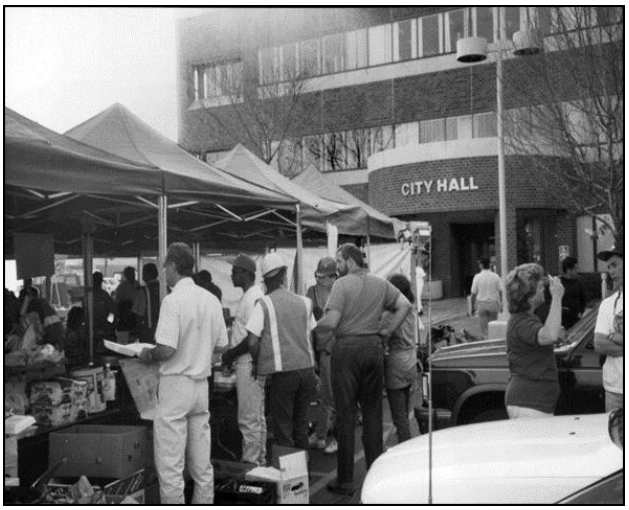
LOCATION/NAME	DATE	MAGNITUDE
Big Bear Earthquake	June 28, 1992	6.4
Borrego Mountain Earthquake	April 8, 1968	6.5
Desert Hot Springs Earthquake	December 4, 1948	6.0
El Mayor-Cucapa Earthquake	April 4, 2010	7.2
Elsinore Earthquake	May 15, 1910	6.0
Fish Creek Mountains Earthquake	October 21, 1942	6.6
Hector Mine Earthquake	October 16, 1999	7.1
1940 - Imperial Valley Earthquake	May 18, 1940	6.9
1979 – Imperial Valley Earthquake	October 15, 1979	6.4
Joshua Tree Earthquake	April 22, 1992	6.1
Kern County Earthquake	July 21, 1952	7.5
Kern County Earthquake	August 22, 1952	5.8
Landers Earthquake	June 28, 1992	7.3
Lompoc Earthquake	November 24, 1927	7.1
Long Beach Earthquake	March 10, 1933	6.4
Manix Earthquake	April 10, 1947	6.5
Mojave Earthquake	July 11, 1992	5.7
North Palm Springs Earthquake	July 8, 1986	5.6
Northridge Earthquake	January 17, 1994	6.7
North San Jacinto Fault Earthquake	July 22, 1923	6.3
Parkfield Earthquake	June 27, 1966	6.0
Ridgecrest Mainshock	September 20, 1995	5.8
2019 – Ridgecrest Earthquake	July 5, 2019	7.1
San Fernando Earthquake	January 9, 1991	6.6
San Jacinto Earthquake	April 21, 1918	6.8
1941 - Santa Barbara Earthquake	June 30, 1941	5.5
Sierra Madre Earthquake	June 28, 1991	5.8

White Wash Earthquake	February 25, 1980	5.5
Whittier Narrows Earthquake	October 1, 1987	5.9

4.2.3.1 NORTHRIDGE EARTHQUAKE IMPACT ON SANTA CLARITA

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. The main shock was followed by thousands of aftershocks causing additional damage to affected structures. In the greater Los Angeles Basin, it has been estimated that approximately 1,600 buildings were "red-tagged" as unsafe to enter. Among those buildings was the Santa Clarita City Hall, forcing emergency operations to be conducted from a temporary shelter in the parking lot. Another 7,300 buildings were "yellow tagged" and restricted to limited entry.

Figure 3: Santa Clarita City Hall Temporary Shelter



In the area of the Los Angeles Basin impacted by the Northridge Earthquake, 60 people were killed, more than 7,000 injured, and 20,000 were left homeless - no deaths were recorded in Santa Clarita. 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. It has been estimated that the cost of the earthquake exceeded $20 billion in losses (USGS).

Figure 4: Freeway Collapsed Interchange

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. Specifically, the Antelope Valley Freeway (State Route 14) - Golden State Freeway (I-5) interchange collapsed. 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 hazardous materials spills. The total disaster reimbursement to the City of Santa Clarita for the Northridge Earthquake was approximately $27 million dollars.

4.2.4 EARTHQUAKE PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 9: Earthquake CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	3 x 0.45 = 1.35	Likely	**Severe**
Magnitude/Severity	3 x 0.3 = 0.9	Critical	**High**
Warning Time	4 x 0.15 = 0.6	Less than 6 hours	✓ **Moderate**
Duration	1 x 0.1 = 0.1	Less than 6 hours	**Low**
CPRI Rating	**2.95**	**Moderate**	

The CPRI rating for Earthquakes is 2.95 or "Moderate Level of Risk" with a Probability rating of 3 or "Likely" due to the well-documented regular occurrence of earthquakes. Earthquake Magnitude/Severity has a score of 3 or "Critical" due to the potential for damage to critical facilities and likelihood that injuries or deaths may occur during a large earthquake. Warning Time carries a score of 4 or "Less Than 6 Hours" due to the spontaneous nature of earthquakes. Duration has a score of 1 or "Less Than 6 Hours" because earthquakes only last for a few seconds to not more than a few minutes. Climate Change is unlikely to have an impact on the probability/frequency, magnitude/severity, or duration of earthquakes.

4.2.4.1 EARTHQUAKE PROBABILITY

Earthquake shaking hazards are calculated by projecting earthquake rates based on earthquake

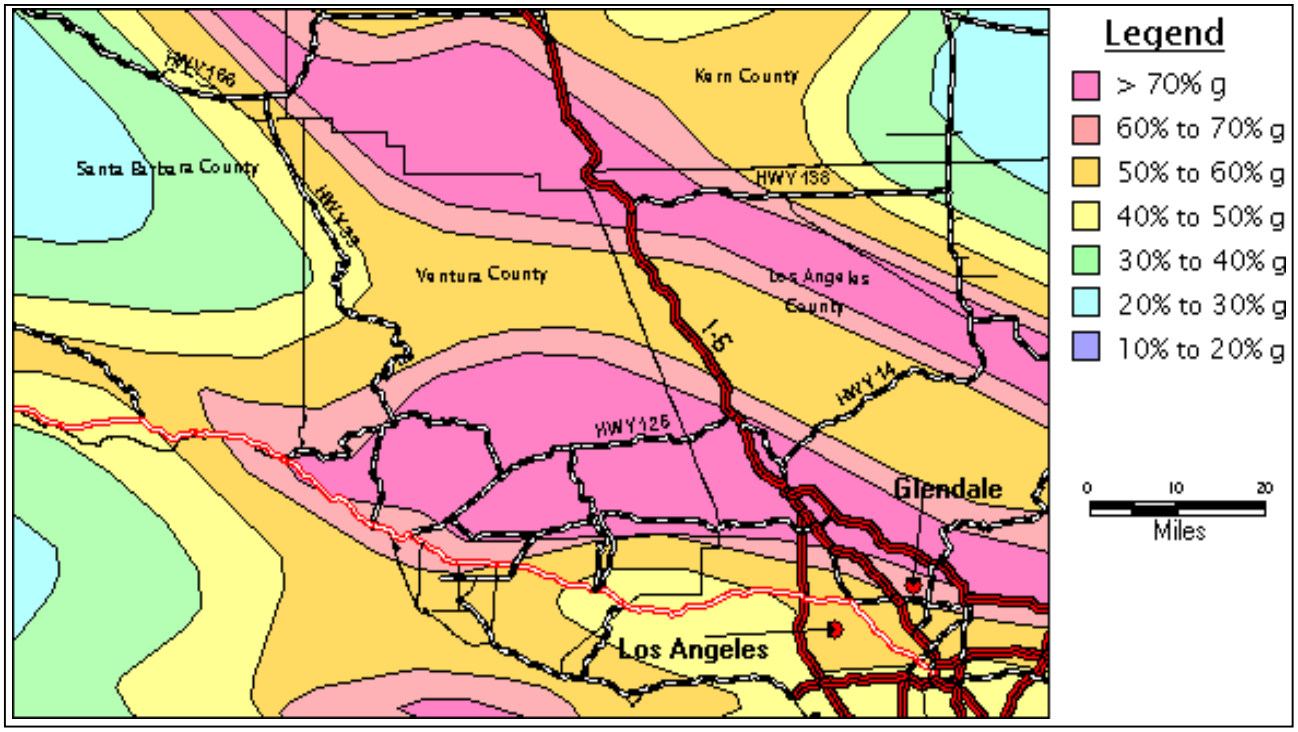
history and fault slip rates, the same data used for calculating earthquake probabilities. New fault parameters have been developed for these calculations and are included in the report of the Working Calculations of earthquake shaking hazard for California are part of a cooperative project between USGS and CGS, and are part of the National Seismic Hazard Maps. CGS Map Sheet 48 (revised 2008) shows potential seismic shaking based on National Seismic Hazard Map calculations plus amplification of seismic shaking due to the near surface soils.

Contour maps have been developed for all 1 degree by 2 degree areas of California (State of California Department of Conservation, 2008). The probabilistic seismic hazard map shows the hazard from earthquakes that geologists and seismologists agree could occur in California. It is probabilistic in the sense that the analysis takes into consideration the uncertainties in the size and location of earthquakes and the resulting ground motions that can affect a particular site.

The maps are typically expressed in terms of probability of exceeding a certain ground motion. For example, the 10% probability of exceedance in 50 years maps depict an annual probability of 1 in 475 of being exceeded each year. This level of ground shaking has been used for designing buildings in high seismic areas. The maps for 10% probability of exceedance in 50 years show ground motions that are not expected to be exceeded in the next 50 years. In fact, there is a 90% chance that these ground motions will NOT be exceeded. This probability level allows engineers to design buildings for larger ground motions than expected during a 50-year interval, which will make buildings safer than if they were only designed for the ground motions that we expect to occur in the next 50 years.

The map below indicates the probabilistic ground shaking (Peak Ground Acceleration [PGA] with a 10% probability of being exceeded in 50 years, assuming a uniform soft rock site condition) for the Santa Clarita area.

Map 7: Probabilistic Ground Shaking Map

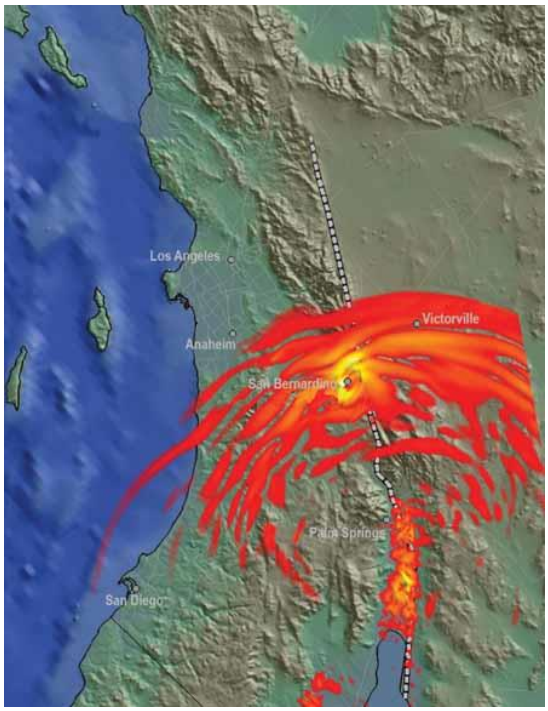


4.2.4.2 - SHAKEMAP SCENARIO: GREAT SOUTHERN CALIFORNIA SHAKEOUT

Predicted ground shaking patterns throughout Southern California for hypothetical scenario earthquakes are available from the United States Geological Survey as part of their on-going "ShakeMap" program. These maps are provided in terms of Instrumental Intensity, which is essentially Modified Mercalli Intensity (MMI) estimated from instrumental ground motion recordings. The following scenario depicts strong ground shaking patterns for a M 7.8 Earthquake on the San Andreas Fault ShakeOut Scenario. Modeling various scenarios is useful in estimating the likely impact to local populations, infrastructure, and facilities. This information can be used to assist emergency managers and the public to better prepare for future events.

A San Andreas Earthquake has been used as the scenario for the annual ShakeOut Earthquake Exercise and also serves as a basis for statewide emergency response exercises. Over 300 scientists, engineers, and others led by Dr. Lucy Jones, developed the Great Southern California ShakeOut to study the likely consequences of a 7.8 Mw earthquake on the San Andreas Fault with an epicenter at Bombay Beach, on the Salton Sea in Imperial County. The scenario estimates over 1,800 deaths, 50,000 injuries, $200 billion in damages and other losses, and severe, long lasting disruptions with regional implications.

Map 8: Great Southern California ShakeOut Scenario



Ground motion for the ShakeOut Scenario earthquake 60 seconds after the southern San Andreas Fault first begins rupturing. Yellow shows the highest amplitudes of ground motion. (Simulation by Rob Graves of URS Corporation for the Southern California Earthquake Center on high-performance computers at the University of Southern California; image courtesy of Geoff Ely, University of California San Diego/San Diego Supercomputer Center.)

4.2.4.3 MAGNITUDE AND SCALE

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 (Mw) 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 and more precise 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 is widely used to describe the impact of shaking.

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 various intensity levels using the Mercalli Scale and the corresponding Richter and Moment Magnitude Scales. The table also includes a description of the relative energy released in terms of TNT Energy (South Carolina Earthquake Education and Preparedness).

Table 4 - 10: Earthquake Size (Magnitude and Scale)

Intensity	**I**	**II-III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X-XII**
Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
Damage	None	None	None	Very Light	Light	Moderate	Moderate /Heavy	Heavy	Very Heavy

Modified Mercalli Scale		**Richter Scale**	**TNT Energy**	**Moment Magnitude**
I	Only felt by instruments	1.5	2 pounds	1
		2	13 pounds	
II	Felt by few persons at rest, especially on upper floors, delicate suspended objects may swing	2.5	63 pounds	
III	Felt indoors, but may not be recognized as an earthquake, vibrations like a large passing truck		123 pounds	2
IV	Felt indoors by many, some outdoors, may awaken some sleeping persons; dishes, windows, doors may move, cars rock	3	347 pounds	
		3.5	1,000 pounds	
V	Felt by most; some windows, dishes break: tall objects may fall		2 tons	3
VI	Felt by all, falling plaster and chimneys, light damage but some fear.	4	6 tons	
VII	Very noticeable, damage to weaker buildings on fill; driving automobiles notice	4.5	32 tons	
			62 tons	4
		5	199 tons	
		5.5	500 tons	
VIII			2,000 tons	

	Walls, monuments, chimneys, bookcases fall; liquefaction; driving is difficult	6	6,270 tons	5
IX	Buildings shifted off foundations. cracked and twisted; ground is cracked, and underground pipes are broken	6.5	31,550 tons	
			61,730 tons	5
X	Most structures severely damaged to destroyed: ground is cracked, rails are bent, landslides on steep slopes	7	199,000 tons	
XI	Few structures standing; bridges and roads severely damaged or destroyed, large fissures in ground	7.5	1,000,000 tons	
		8	6,270,000 tons	
XII	Total damage; can *see* the earthquake wave move through the ground; gravity overcome and objects thrown into the air		19,842,000 tons	7
		8.5	31,550,000 tons	
			61,729,400 tons	8
		9	199,999,000 tons	
			1,984,160,360 tons	9
			61,729,433,410 tons	10

4.2.5 EXPOSURE TO EARTHQUAKES – HAZUS ANALYSIS

The data in this section was generated using the HAZUS-MH program for earthquakes. Once the location and size of a hypothetical earthquake are identified, HAZUS-MH estimates the intensity of the ground shaking, the number of buildings damaged, the number of casualties, the amount of damage to transportation systems and utilities, the number of people displaced from their homes, and the estimated cost of repair and clean up. The scenario that was analyzed was a 7.2 magnitude earthquake along the San Gabriel Fault just northwest of the City limits.

4.2.5.1 *BUILDING INVENTORY*

HAZUS estimates approximately 89% of the building stock within the City of Santa Clarita is

residential housing consisting of wood frame construction. The remaining percentage is distributed between other general building types such as steel, concrete, precast, etc.

4.2.5.2 *BUILDING RELATED LOSSES*

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

The total building-related losses from the analysis is 5,712.48 (millions of dollars). 13% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 63 % of the total loss.

4.2.5.3 *BUILDING DAMAGE*

HAZUS estimates that about 26,220 buildings will be at least moderately damaged. This is over 41% of the buildings in the region. There are an estimated 2,587 buildings that will be damaged beyond repair. The table below shows the expected building damage ranging from no damage to complete damage or destruction.

Table 4 - 11: Expected Building Damage - HAZUS

Damage Extent	None	Slight	Moderate	Extensive	Complete
Total	**12,581**	**24,632**	**18,961**	**4,671**	**2,588**

4.2.5.4 *CRITICAL FACILITY INVENTORY*

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

For essential facilities, there is one hospital in the region with a total bed capacity of 238 beds. There are 72 schools, 8 fire stations, 2 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 18 hazardous material sites, no military installations and no nuclear power plants.

4.2.5.5 *TRANSPORTATION AND UTILITY LIFELINE INVENTORY*

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. Transportation systems include highways, railways, light rail, bus, ports, ferry and airports. Utility

systems include potable water, wastewater, natural gas, crude & refined oil, electric power and communications.

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

The total value of the lifeline inventory is over 5,368.00 (millions of dollars). This inventory includes over 222.45 miles of highways, 137 bridges, and 3,282.08 miles of pipes.

4.2.5.6 *UTILITY LIFELINE LOSSES*

For the utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Table 4-14 provides a detailed breakdown in the expected utility system pipeline losses and Table 4-15 shows a breakdown of estimated households without utility service after an earthquake event.

Table 4 - 12: Expected Utility System Pipeline Losses (Site Specific) - HAZUS

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	2,013	2,251	563
Waste Water	1,208	1,131	283
Natural Gas	62	21	5
Oil	0	0	0

Table 4 - 13: Potable Water and Electric Power System Performance - HAZUS

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	**74,175**	53,740	50,804	43,303	0	0
Electric Power		51,923	33,024	14,131	2,850	70

4.2.5.7 *CASUALTIES*

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

- **Severity Level 1:** Injuries will require medical attention, but hospitalization is not needed.

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

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time. Table 4-16 below represents a summary of casualties estimated for a San Gabriel M 7.2 earthquake scenario.

Table 4 - 14: Casualty Estimates - HAZUS

Time	Level 1	Level 2	Level 3	Level 4
2 AM	843	182	18	34
2 PM	2,607	761	127	242
5 PM	1,765	528	140	160
Level 1: Injuries will require medical attention, but hospitalization is not needed. **Level 2: Will require hospitalization but are not considered life-threatening.** **Level 3: Will require hospitalization and can become life threatening if not promptly treated.** **Level 4: Victims are killed by earthquake.**				

4.2.5.8 *SHELTER REQUIREMENT*

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 3,986 households to be displaced due to the earthquake. Of these, 2,606 people (out of a total population of 223,184) will seek temporary shelter in public shelters.

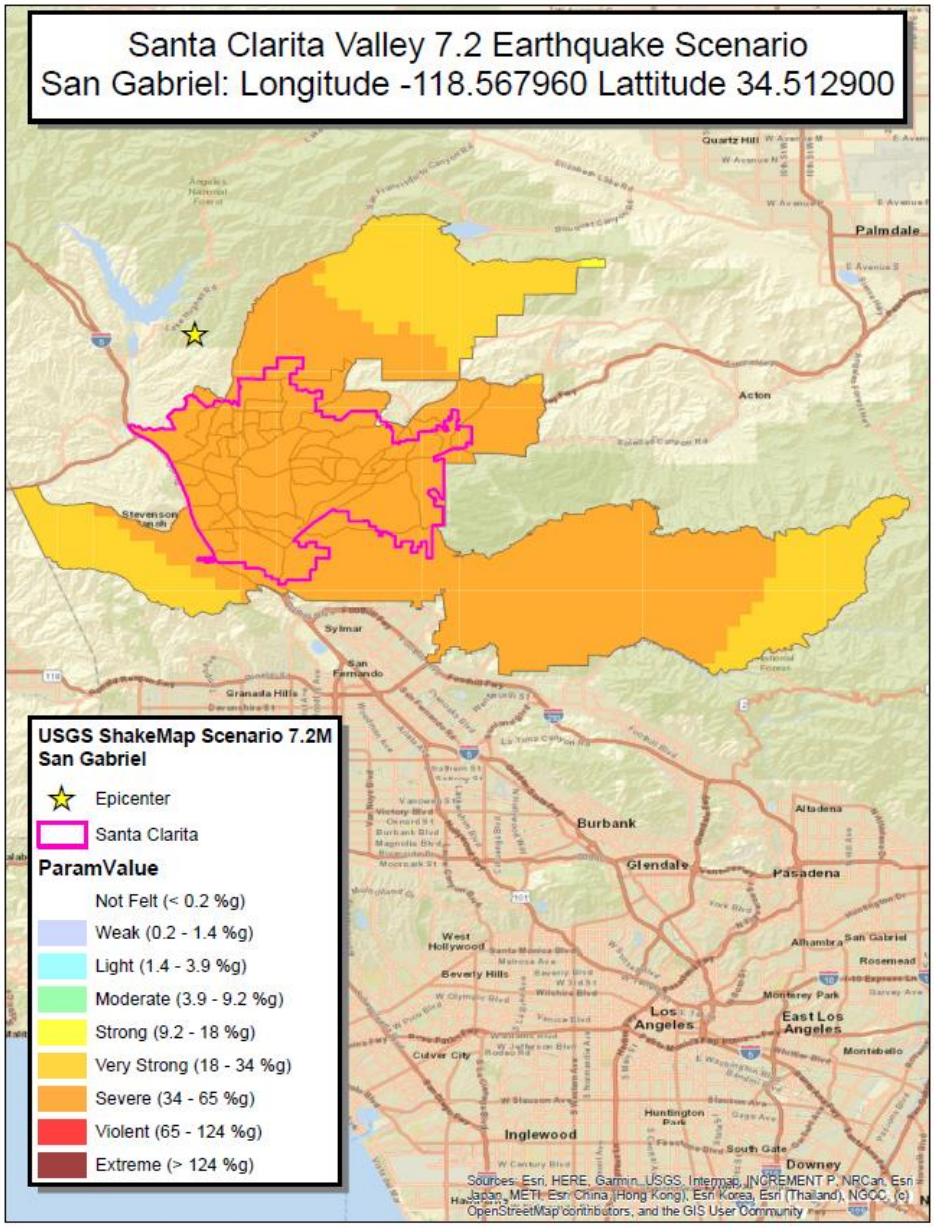
4.2.5.9 *TOTAL ECONOMIC LOSSES*

The total economic loss estimated for the San Gabriel M7.2 earthquake scenario is **$12,417.74 million dollars** which includes building and lifeline related losses based on the region's available inventory. The table below provides more detailed information about these losses.

Table 4 - 15: Economic Losses (Millions) - HAZUS

Category	Estimated Loss (millions)
Income	$744.82
Capital Stock	$5,712.48
Transportation Systems	$4,004.46
Utility Systems	$1,955.98
TOTAL	**$12,417.74**

Map 9: Shake Intensity Map – San Gabriel M 7.2 - HAZUS



4.3 ENERGY DISRUPTION

Energy disruptions are defined as electric power outages lasting more than 24 hours.

4.3.1 ENERGY OVERVIEW

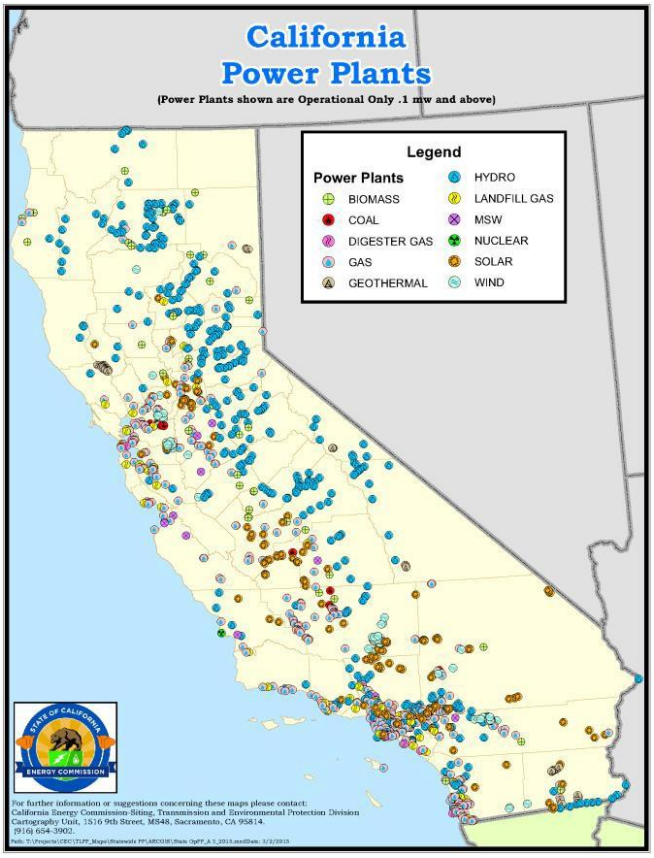
The City of Santa Clarita is supplied with energy by two primary providers:

- **Electricity:** Southern California Edison
- **Natural Gas:** Southern California Gas

4.3.1.1 ELECTRICITY

There are no electric power generating plants in Santa Clarita. (California Energy Commission, 2015). The nearby Castaic Power Plant is operated by the Los Angeles Department of Water and Power and private solar power also supplements the power grid but in general does not provide for backup power in the event of a power outage.

Map 10: California Power Plants



4.3.1.2 NATURAL GAS

Southern California Gas is the local area supplier for natural gas in Santa Clarita. SCG operates multiple natural gas transmission and high pressure distribution pipelines (Southern California Gas Company, 2011).

4.3.2 ENERGY DISRUPTION HAZARD: LOCATION AND EXTENT

The energy infrastructure in the United States consists of thousands of miles of electric transmission lines, oil and natural gas pipelines, and other geographically dispersed energy related resources. Energy infrastructure threats can be a result of natural or man-made disasters or a result of energy related issues such as spikes in demand during peak energy use, unanticipated power plant or refinery shutdowns, transmission system congestion, and equipment or system failures. Any of these events can result in the reduction of supply and disrupt distribution.

4.3.2.1 INJURIES

There is a potential for injuries both at home and on the roads during a power outage. Traffic signals may not function in a severe power outage, creating the potential for automobile and pedestrian accidents. If the outage occurs at night, streetlights will not work, increasing the probability of accidents and corresponding injuries. Emergency responders will have difficulty navigating traffic if the outage causes traffic issues on city streets, and police will be used to manage traffic at high-volume intersections, reducing their ability to respond to accident sites. Finally, injuries and fatalities as a result of smoke from household generators and fumes from gas appliances or barbeque equipment are common during power outages.

4.3.2.2 PERSONAL SAFETY

There will be risks to personal safety during a prolonged power outage. A prolonged outage will compromise medications that require refrigeration (such as diabetes medications) and access to home medical equipment. Closed pharmacies mean lack of access to prescription refills. Stress caused by power outages may exacerbate existing medical conditions such as respiratory disease, asthma and cardiovascular conditions. Power outages may stress people trapped in elevators, subways, mines, or other enclosed or isolated spaces (Bell, 2012). Home accidents such as food and carbon monoxide poisoning increase, and heat related illness or hypothermia is a concern depending on the location and date of the outage (Broder J, 2005).

4.3.2.3 POWER OUTAGES

The major energy disruption concern would be a large power outage in Santa Clarita that happens during the hottest part of summer or the coldest part of winter since an event during these periods would be especially likely to result in injury and possibly fatalities. Although an outage at any time will disrupt roads, highways, lifelines, public services, and the general health of local residents.

4.3.3 ENERGY DISRUPTION HAZARD: COMMUNITY ASSETS

4.3.3.1 TRANSPORTATION INFRASTRUCTURE

Residents in the Santa Clarita area commute frequently by automobile and public transportation. A power outage will affect usability of roads, railways, highways, and freeways. Traffic signals and streetlights will not continue to operate over long periods of time even if supplied with emergency backup batteries and Metrolink Train service to the Santa Clarita Valley will stop until power is returned.

4.3.3.2 PIPELINES

There are numerous high volume water, natural gas, and petroleum pipelines that cross through the City. See Hazardous Materials Releases Section of this HMP for additional information. This

section includes a high level pipeline map as well as a history of incidents in the Santa Clarita area.

4.3.3.3 LIFELINES

Many lifelines are dependent on power including water pumping stations, food distribution, telecommunications systems, some natural gas and fuel pipelines, and sewage systems. A power outage will prevent these systems from running normally as they are reliant on electricity for operations. A disruption to lifelines will impede the ability to distribute important information to the public, as well as endanger public health and safety. Examples include:

- Water pumping stations, wells, and sewage treatment plants dependent on electrical power. While the pumping stations have backup generators in case of power outages, an extended outage may affect the ability of the stations to provide or preserve the safety of water.
- Perishable foods and some medications are dependent on refrigeration provided by electrical power. Without electricity, these foods and medications expire relatively quickly, leading to the potential of foodborne illness and medical emergencies.
- The telecommunications infrastructure is comprised in part of hard-wired telephone and cable TV systems, microwave transmission stations, cellular telephone systems, and radio systems. Industries dependent on the telecommunications sector include oil and gas, electric power transportation, emergency services, government services, water, and banking and finance. Most telecommunications providers have backup power plans and agreements to procure the fuel needed to run during a power outage, although an extended outage may impede the ability of telecommunications providers to continue to deliver service to the dependent industries.
- Some gas and fuel pipelines (as well as water pumping stations) may be dependent on electricity at pumping and filtering stations. Utility offices and command centers may be reliant on gas or other fuels to maintain continuity of operations.

4.3.3.4 SERVICES

Public facilities are electricity dependent and will be disrupted during a power outage. An extended outage will affect the ability of some organizations to continue to provide public services as well as affect the ability of residents to function normally. Examples include:

- Most hospitals have backup generators to get through short power outages and plans to get through longer outages and battery systems to keep critical equipment functioning. Nevertheless, generators have been known to fail during power outages. In the case of generator failures, hospitals may have to move patients to other facilities and postpone scheduled non-emergency services.
- Emergency call centers are dependent on electricity to run and to dispatch emergency

services. During a power outage they may be out of service until the power returns.

- An outage may cause pump failures that result in a loss of water pressure in some areas, hampering firefighting efforts.
- ATMs and banks rely on electricity to provide money and services. Credit card and point of sale systems rely on electricity to process transactions. Without access to banks and ATMs, cash may be in short supply during a power outage, and many stores will only be able to accept cash transactions. Some stores will not be able function as cash registers, inventory systems, and electronic entry doors are dependent on electricity.
- Gas stations rely on electricity to power gas pumps; therefore, many gas stations will be inoperable during a power outage.
- Government services that rely on banking, transportation, or communications, such as electronic checks, may be delayed during an outage.

4.3.3.5 ECONOMY

Direct economic impacts due to power outages include lost business output and productivity, property damage, government overtime costs, and commodities losses caused by a lack of refrigeration. Indirect impacts include diversion of capital investments into blackout protection systems (Electricity Consumers Resource Council, 2004). Manufacturing companies may suffer heavy losses from a power outage, caused by production line losses, equipment failure, and loss of productivity. Companies outside of the manufacturing sector, i.e., service companies and retail establishments will also suffer losses in a power outage. These losses will be in terms of lost opportunity costs, customer dissatisfaction, and revenue loss. Small businesses are especially vulnerable as they generally have fewer resources and are less likely to have prepared or planned for such an event.

4.3.4 HISTORY OF POWER OUTAGES

Power outages are not uncommon in Southern California, and the region is at risk of outages caused by seismic activity and windstorms. Santa Clarita is occasionally affected by localized unplanned power outages. In addition, during the summer months when temperatures peak, rolling blackouts and brownouts are a continual threat. The table below summarizes the history of large power outage events in Southern California.

Table 4 - 16: Large Power Outages in Southern California

Year	Event	Affected Areas	Cause
2011	Southwest Blackout	California – San Diego, Orange, Riverside, and Imperial Counties. Also affected counties in Arizona and some northern states in Mexico.	Man-made: Human error
2005	Los Angeles Blackout	The City of Los Angeles, San Fernando Valley, and Hollywood	Man-made: Human error
2000 - 2001	California Electricity Crisis	California	Man-made: shortages caused by market manipulation, regulation and deregulation.
1996	Western North American Blackouts	Arizona, California, Colorado, Idaho, Montana, Nebraska, Nevada, New Mexico, Oregon, South Dakota, Texas, Utah, Washington, Wyoming, and parts of Canada and Mexico.	Man-made: trees too close to power lines caused systemic failures.

Santa Clarita was threatened with electricity shortages during the 2000 – 2001 Electricity Crisis. In addition, large power outages in other areas of California have been caused by human error (December 1998, San Francisco), structural failure (1982, Tracy, California), and earthquakes (1989 Loma Prieta Earthquake).

4.3.5 ENERGY DISRUPTION PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 17: Energy Disruption CPRI Rating

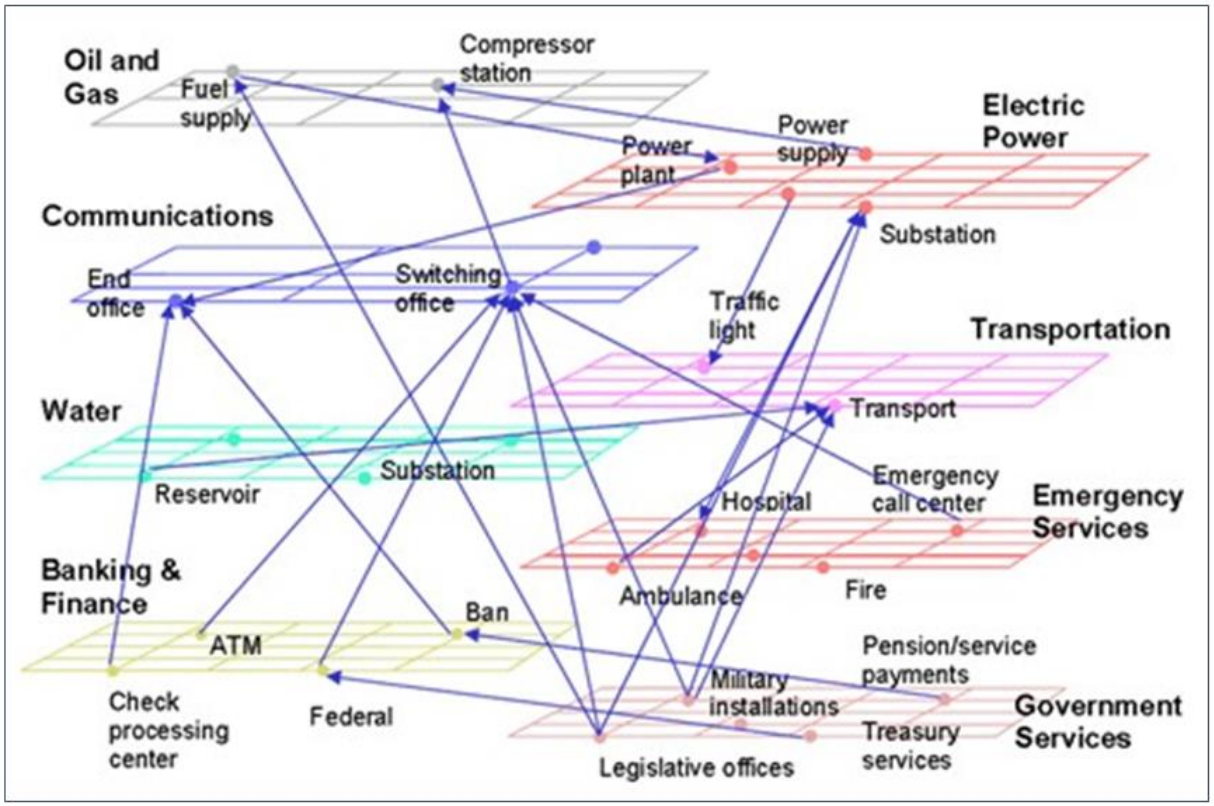
Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	2 x 0.45 = 0.9	Possible	**Severe**
Magnitude/Severity	3 x 0.3 = 0.9	Critical	**High**
Warning Time	2 x 0.15 = 0.3	12 to 24 hours	✓ **Moderate**
Duration	3 x 0.1 = 0.3	Less than 1 week	**Low**
CPRI Rating	**2.40**	**Moderate**	

The CPRI rating for Energy Disruption is 2.40 or "Moderate Level of Risk" with a Probability rating of 2 or "Possible" due to the fact that an energy disruption event can happen in any city at any time. Magnitude/Severity has a score of 3 or "Critical" due to the fact that an energy disruption event can have severe impacts on critical facilities and infrastructure and may lead to injury or death. Warning Time carries a score of 2 or "12 to 24 Hours" because most energy disruption events occur with little

to no warning. Duration has a score of 3 or "Less Than 1 Week" because the cause of an energy disruption can take several days to remedy. Climate Change may impact the frequency, magnitude, and duration of energy disruption events, and the CPRI rating may reach a "High Level of Risk" in the future.

The major concern regarding the impact on communities from power outage events is the failure of critical infrastructure and the danger to public health. Critical infrastructure failures may require days or weeks to repair. The impact to business and industry can result in immediate and long term economic loss. The diagram below depicts the complex interdependencies associated with the electrical power grid (source: FCC Public Safety and Homeland Security Bureau). These interdependencies can increase the severity of a hazard event and complicate emergency response.

Figure 5: Infrastructure Interdependencies



Energy threats can be categorized into four types of events (The National Association of State Energy Officials - NASEO, 2009):

- Deliberate attacks caused by people – (e.g. terrorists, criminals, hackers, delinquents, employees)
- Natural disasters caused weather and geological events (e.g., floods, wind, earthquakes)

- Accidental events caused by technological failure (e.g., pipeline rupture, chemical spills, nuclear system failure)
- Systemic threats caused by the physical inability of the energy delivery system (generation and distribution) to meet demand

4.3.5.1 DELIBERATE ATTACKS

Deliberate attacks are intentional, malicious acts caused by people that are aimed at personnel, equipment, infrastructure, or computer systems (cyber-attacks). Many power plants and other infrastructure are remotely controlled by supervisory control and data acquisition (SCADA) systems. SCADA systems are vulnerable to attack by hackers who can access the system and perform acts of sabotage against a target, and an attack against SCADA can shut down an energy provider's operations. A deliberate attack can slow or shut down a provider's Website and make it difficult for customers to access personal or billing information.

Deliberate attacks in the Santa Clarita Valley area can also include acts of vandalism, sabotage, and the theft of equipment and cabling. Physical attacks can target distribution points, transmission lines, and pipelines.

4.3.5.2 NATURAL DISASTERS

Natural hazard events have the potential to cause disruptions in the energy supply. In the Santa Clarita area, the following types of events can cause outages or other energy events:

- Drought (limiting hydroelectric generation)
- Earthquakes
- Flooding
- Severe Storms
- Subsidence (damaging underground power lines, utility vaults, and pipelines)
- Wildfires
- Windstorms

Santa Clarita is vulnerable to natural hazards that affect the power supply due to its proximity to multiple earthquake faults, valley flooding, storms, high winds, brush fires inside and outside of the city limits, and potential subsidence of the valley floor.

While the effects of any one of these natural events should be localized and effect only part of an area, it is probable that a widespread event such as a drought, severe storm, or earthquake will cause widespread energy outages and disrupt the delivery of electricity, natural gas, CNG, petroleum, and other energy products.

4.3.5.3 ACCIDENTAL EVENTS

Accidental events that cause energy disruptions can be due to technological failure, chemical spills, nuclear contamination, pipeline rupture, nuclear system failure, or accidental actions or inaction. Accidents can be a localized event such as a car crashing into a power pole or can be more widespread such as the Southwest Blackout of 2011 that was caused by an employee making repairs at an electrical substation. As the energy infrastructure ages, there is the possibility of equipment failure that can cause intermittent power or pipeline failures.

4.3.5.4 SYSTEMIC THREATS

Systemic threats affect the entire energy distribution and production network, including production plants and distribution infrastructure. Systemic events occur when energy delivery systems are physically unable to meet demand. Examples of systemic threats include gasoline or petroleum shortages, as well as electrical shortages caused when increased use strains the system during peak events such as a heat wave.

4.4 DROUGHT

When a region receives below-average precipitation for an extended period of time, a water shortage often occurs. A drought is the condition that happens as a result of below-average precipitation with extended shortages in its water supply. This occurs whether the region's water supply is provided by atmospheric, surface, or ground water means. The type and quality of infrastructure can also be a factor in supporting the water resource network including the transmission, distribution, and storage of water.

The extent and length of droughts are not easy to predict. Droughts can last for months or years or may be declared after as few as 15 days. Drought and water shortages are a gradual phenomenon and generally are not signified by one or two dry years. In California, this is largely due to its extensive system of water supply infrastructure (reservoirs, groundwater basins, and inter-regional conveyance facilities) that generally mitigates the effects of short-term dry periods.

Droughts are also largely due to the limited number of local water resources and reliance on water resources coming beyond California. Santa Clarita receives the majority of its water supply by importing water from the Colorado River and Northern California (State Water Project). However, it also depends on water from two local aquifers: the Alluvium and another much deeper aquifer, the Saugus Formation.

The Saugus Formation is the deepest aquifer in the Santa Clarita Valley with several layers that comprise the formation going down to 8,500 feet below the surface. There are several wells that produce water from the Saugus Formation that are approximately 2,000 feet deep. Groundwater levels change year to year depending on the level of precipitation and pumping of water from these aquifers. Over several decades, there has been no evidence of any trend toward permanent water level or storage decline in the Alluvium or the Saugus Formation (2018 SCV Water Report, 2018). This means that there will not be any water shortages in the Santa Clarita Valley in the foreseeable future even with severe drought conditions occurring again in California.

4.4.1 DROUGHT HISTORY

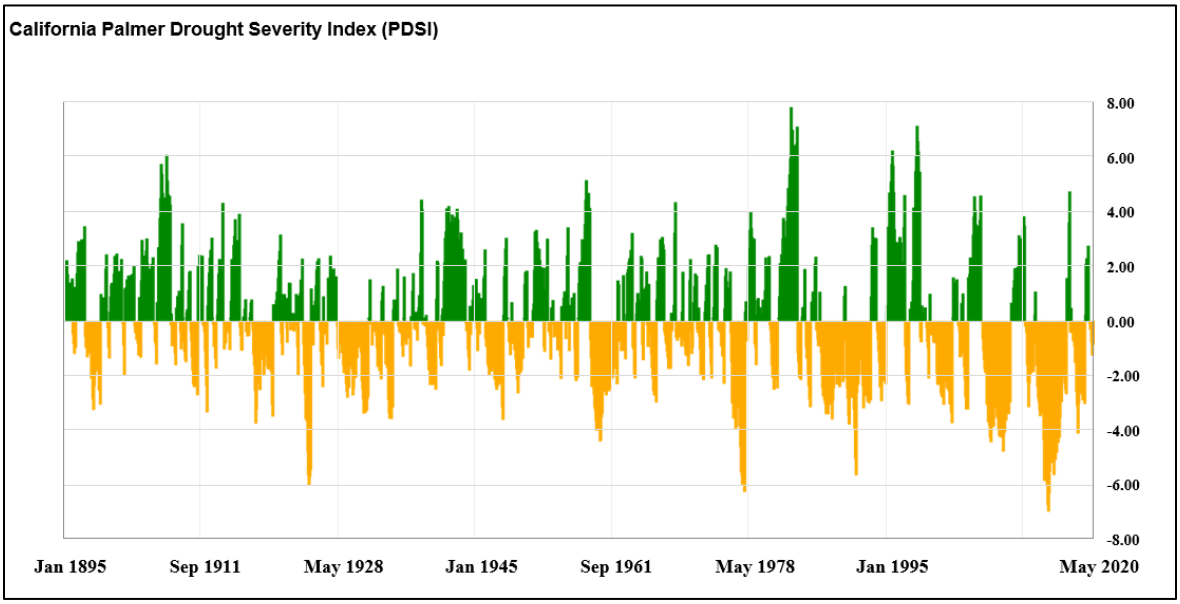
The worst drought in California's recorded history occurred from December 27, 2011 to March 5, 2019, lasting a total of 376 weeks. The most severe period of this drought cycle occurred during the week of July 29, 2014 with 58.41 % of the State experiencing D4 – Exceptional Drought conditions, discussed further in Section 4.2.3.1 Drought Magnitude and Scale (National Integrated Drought Information System, 2020).

On April 1, 2015, the California Department of Water Resources measured the statewide water content of Sierra snowpack at five percent of average for April 1st. These levels are lower than any year in records going back to 1950. The April 1 snowpack measurement is crucial because this is when the snowpack is normally at its peak and begins to melt into streams and reservoirs. Snowpack, through runoff, provides about one-third of the water used by California's cities and farms. California's 2014 Water Year, which ended September 30, 2014, was the third driest in 119 years of record. It also

was the warmest year on record (USGS California Water Science Center, 2015).

The following table illustrates historic drought conditions in California from January 1895 to May 2020, using the Palmer Drought Severity Index, which uses air temperature and precipitation data to estimate relative dryness and to quantify long-term drought conditions. The table below utilizes a -8 (dry) to +8 (wet) scale.

Table 4 - 18: Palmer Drought Severity Index (California 1895 – 2020)



4.4.2 DROUGHT PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 19: Drought CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	4 x 0.45 = 1.8	Highly Likely	**Severe**
Magnitude/Severity	3 x 0.3 = 0.9	Critical	✓ **High**
Warning Time	1 x 0.15 = 0.15	More than 24 hours	**Moderate**
Duration	4 x 0.1 = 0.4	More than 1 week	**Low**
CPRI Rating	**3.25**	**High**	

The CPRI rating for Drought is 3.25 or "High Level of Risk" with a Probability rating of 4 or "Highly Likely" due to the well-documented cyclical nature of droughts. Drought Magnitude/Severity has a score of 3 or "Critical" due to the impact prolonged droughts can have on critical infrastructure. Warning Time carries a score of 1 or "More Than 24 Hours" because we can usually predict when drought conditions will occur due to records of low snowfall and rainfall over the course of months or years preceding a drought event. Duration has a score of 4 or "More Than 1 Week" because drought conditions typically persist for several months to several years. Climate Change has impacted the frequency, magnitude, and duration of droughts. The CPRI rating is unlikely to reach a "Severe Level of Risk" however, because the Warning Time will maintain a score of 1, "More Than 24 Hours."

Figure 6: US Drought Monitor - California

May 26, 2020

(Released Thursday, May. 28, 2020)

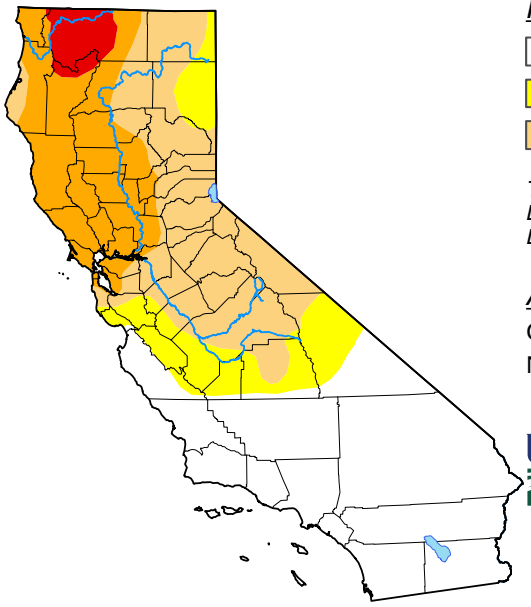
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	41.80	58.20	46.67	20.84	2.97	0.00
Last Week *05-19-2020*	41.80	58.20	46.67	20.84	2.97	0.00
3 Months Ago *02-25-2020*	30.26	69.74	23.34	0.00	0.00	0.00
Start of Calendar Year *12-31-2019*	96.43	3.57	0.00	0.00	0.00	0.00
Start of Water Year *10-01-2019*	95.29	4.71	2.06	0.00	0.00	0.00
One Year Ago *05-28-2019*	94.03	5.97	0.00	0.00	0.00	0.00

U.S. Drought Monitor

California



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

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National Drought Mitigation Center

droughtmonitor.unl.edu

4.4.2.1 DROUGHT MAGNITUDE AND SCALE

The U.S. Drought Monitor, established in 1999, is a weekly map of drought conditions produced jointly by the National Oceanic and Atmospheric Administration, the U.S. Department of Agriculture, and the National Drought Mitigation Center at the University of Nebraska-Lincoln. The map is based on measurements of climatic, hydrologic and soil conditions. Droughts are generally categorized into five categories: 1) Abnormally Dry, 2) Moderate Drought; 3) Severe Drought; 4) Extreme Drought; and, 5) Exceptional Drought. According to the U.S. Drought Monitor Map for California (Figure 6), the City of Santa Clarita is not currently experiencing drought conditions.

The following is a brief description of the U.S. Monitor Drought Scale:

- **D0 – Abnormally Dry:** characterized by short-term dryness slowing planting, and growth of crops; some lingering water deficits; and pastures or crops not fully recovered.
- **D1 – Moderate Drought:** characterized by some damage to crops and pastures; some water shortages developing; and, voluntary water-use restrictions requested.
- **D2 – Severe Drought:** characterized by likely crop and pasture losses; water shortages become common; and, water restrictions imposed.
- **D3 – Extreme Drought:** characterized by major crop and pasture losses; and, widespread water shortages and/or restrictions.
- **D4 – Exceptional Drought:** characterized by exceptional and widespread crop and pasture losses; and, shortages of water creating water emergencies.

4.4.2.2 DROUGHT PROBABILITY, FREQUENCY, AND LOCATION

The City of Santa Clarita has gone through periods of drought conditions over time like many areas of California. In April 2017, the state of California, with a few exceptions, declared the Drought State of Emergency over. However, the entire City of Santa Clarita is subject to drought conditions and water shortages at any time.

Droughts are often a slow buildup of conditions over many years and depend on the amount of precipitation that has fallen. To predict drought conditions, the best indicator is to look at El Niño Southern Oscillation (ENSO) patterns, since these patterns bring with them conditions that create higher levels of precipitation.

Although Southern California is not currently experiencing drought conditions, the region's location and topographic make it susceptible to recurring periods of drought. Table 4-18: Palmer Drought Severity Index (California 1895 – 2020) shows that droughts occur in California regularly, every few years or more. Climate change has increased the frequency and duration of drought events in the American Southwest.

4.4.3 DROUGHT VULNERABILITIES AND EXTENT

Santa Clarita vulnerabilities to drought include:

- Agriculture & Livestock
- Wildfires
- Energy
- Damage to local natural habitats
- Infrastructure

It should also be noted that excessive pumping of groundwater supplies, in response to water shortages brought about by extended drought events, can result in subsidence. Though this has not occurred in the City of Santa Clarita, in the California Central Valley, high water pumping activities has led to significant subsidence with some ground levels sinking 10 inches or more (Tom G. Farr, Cathleen Jones, Zhen Liu, 2015) causing concerns regarding damage to the local infrastructure including the California Aqueduct, parts of which traverse through the City of Santa Clarita.

Drought also has the potential to affect Santa Clarita by influencing the maintenance of parks, green belts, and other city horticulture. As the season dries out, landscaping requires a greater amount of irrigation. If restrictions are placed on the amount of water any jurisdiction can use, irrigation is usually the use that is cut back. Dry landscaping in urbanized areas located in the wildland urban interface, which includes large areas developed hillsides in the City of Santa Clarita, greatly increases the likelihood of wildfire spreading to residential areas, and greater impacts to particularly vulnerable populations, such as the elderly or disabled persons that would require additional help in the event of an emergency. Santa Clarita works with local water agencies to develop strategies for maintaining water supplies times of drought, providing informational resources to residents on how to properly store water and how to replace water intensive landscaping with drought tolerant landscaping.

4.5 SEVERE WEATHER: EXTREME HEAT & EXTREME WIND

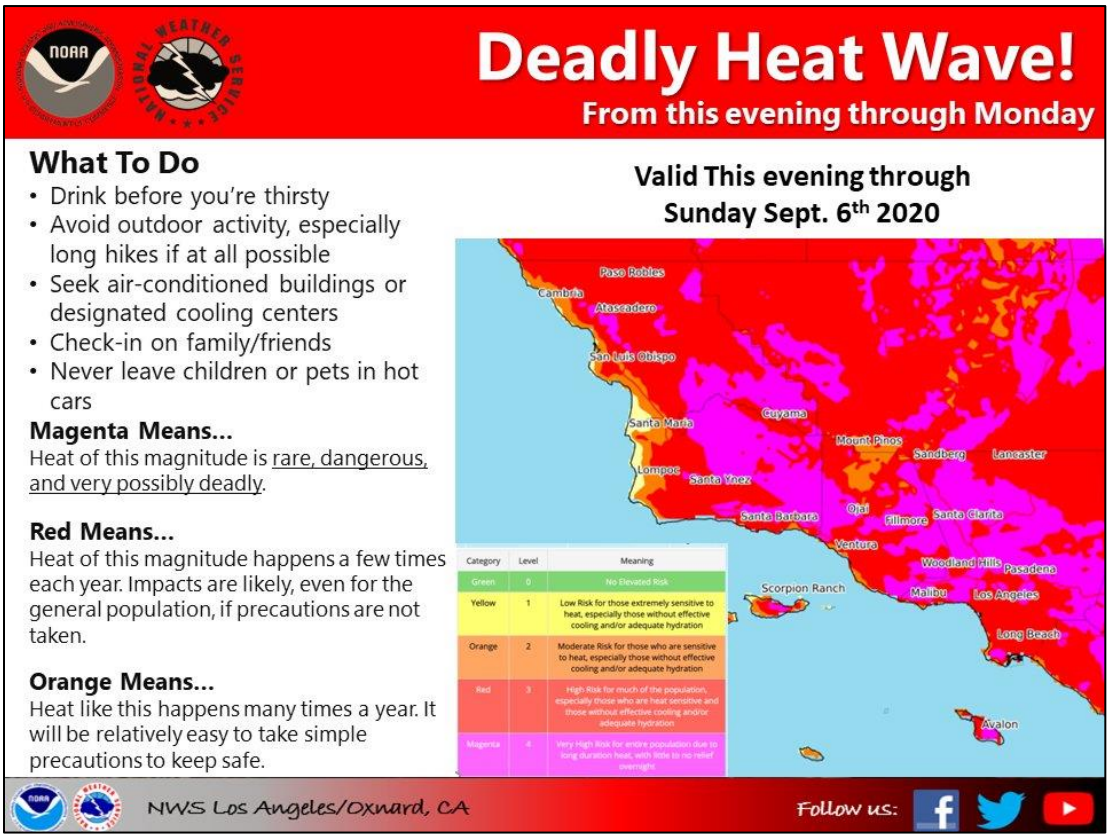
Extreme heat is defined as weather that is hotter than average at a given time and place and presents an ongoing threat to health and safety. Extreme heat can lead to secondary events such as energy disruptions due to high cooling demands, increased air pollution, and increased risk of wildfires. Extreme heat events in Santa Clarita occur annually, with multiple days with temperatures over 100 degrees Fahrenheit.

Climate change induced extreme heat and drought affect the overall condition of vegetation throughout the valley. Generally, under such conditions, vegetation tends to become dryer. This creates a risk of fire danger, such that much of Santa Clarita's natural areas are at risk of increased fire impacts, in addition impacting health and property of the entire regional population. In addition, long periods of extreme heat can affect the local water table and soil quality, making the risk of flash flooding prevalent.

4.5.1 EXTREME HEAT INFORMATION, BACKGROUND AND LOCATION

The entire City of Santa Clarita is subject to extreme heat and temperatures often exceed 100°F between the month of July and September. Southern California experienced an extreme heat event in early September of 2020 with recorded temperatures between 110 – 120 degrees Fahrenheit as shown in Table 4 - 24 below. The HeatRisk forecast is explained in Section 4.6.1.1.

Figure 7: HeatRisk Southern California – September 6, 2020



4.5.1.1 EXTREME HEAT RISK: VULNERABILITY AND EXTENT

The National Weather Service has developed the experimental HeatRisk forecast system to address heat risk and allow for preparation for upcoming heat events. The HeatRisk forecast considers maximum temperatures, minimum temperatures, climatology, historical records (both highs and lows), early season heat waves or unusual events, and duration of heat to assign advisory levels of concern for a particular geographical location. A lead time of 12 – 24 hours is given for Advisory Levels orange and red, and 24 – 48 hours for Advisory Levels red and magenta. Forecasts are given for a seven day period.

Table 4 - 20: National Weather Service HeatRisk Forecast

HeatRisk Values	Risk of Heat Effects	Level of Heat Concern
When the HeatRisk is this value:	…the risk of heat effects are:	…as symbolized by this color:
0	**Very Low**	**Green**
1	**Low**	**Yellow**
2	**Medium**	**Orange**
3	**High**	**Red**
4	**Very High**	**Magenta**

The Advisory Levels are defined as follows:

- **Green - Level 0:** No elevated risk
- **Yellow - Level 1:** Low risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration
- **Orange - Level 2:** Moderate risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration
- **Red - Level 3:** High risk for much of the population especially those who are heat sensitive and those without effective cooling and/or adequate hydration
- **Magenta - Level 4:** Very high risk for entire population due to long duration heat, with little to no relief overnight

The HeatRisk Forecast is intended to provide continuously available heat risk guidance for decision makers and heat sensitive populations, which include:

- The elderly and the very young
- Those on certain medication and/or those with preexisting conditions which make them more sensitive to heat

- Those working outdoors – especially new workers, temporary workers, or those returning to outdoor work after a week or more off
- Those exercising or doing strenuous activities outdoors during the heat of the day – especially those not used to the level of heat expected, those who are not drinking enough fluids, or those new to that type of activity
- Those without a reliable source of cooling and/or hydration
- Those not acclimated to the level of heat expected – especially those who are new to a much warmer climate
- Some economic sectors that are affected by increasing levels of heat, such as energy, agriculture, and transportation

Because extreme heat conditions are becoming more frequent and can impact so many people living, working, and visiting the city as described above, Santa Clarita maintains cooling centers throughout the city as detailed in Section 5.6.1 Santa Clarita Heat Emergency Plan.

Table 4 - 21: Possible Heat Disorders for People in High Risk Groups

Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

4.5.2 EXTREME HEAT LOSSES AND IMPACTS

Extreme heat events occur annually in the City of Santa Clarita with multiple days with temperatures over 100 degrees Fahrenheit. It is expected that these hazards will continue to occur seasonally, especially from June to September. Recently, on July 6th, 2018 a temperature of 113°F was reported by the National Weather Service in Santa Clarita Valley, which exceeded a 48-year-old record of 105°F in the region.

4.5.2.1 HEALTH IMPACTS OF EXCESSIVE HEAT

Heat emergencies are often slow to develop. It could take several 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, which include infants and small children, elderly people, low income populations, people with underlying medical and psychological conditions, non-English speaking, undocumented immigrants, communities of color, people working outdoors or in extreme conditions, and pregnant women.

Heat exhaustion occurs when the body is dehydrated resulting in an imbalance of electrolytes. Symptoms can include headache, nausea, dizziness, cool and clammy skin, pale face, cramps, weakness, profuse perspiration, and if left untreated, can lead to heatstroke. Heatstroke occurs when perspiration cannot occur and the body overheats. Symptoms can include headache, nausea, face flushed, hot and dry skin, no perspiration, body temperature over 101°F, chills, rapid pulse, and if left untreated can result in coma or death.

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.

4.5.2.2 OTHER IMPACTS OF EXCESSIVE HEAT

In addition to being a public health threat, extreme heat can impact communities in various ways including:

- **Transportation:** Aircraft can lose lift in extreme temperatures causing flight delays and even airport closures. Roadways can be damaged by extreme heat through the softening of asphalt and buckling or lifting of concrete. Vehicle cooling systems can become stressed and result in mechanical failures.
- **Agriculture:** Livestock can be lost during heat waves, and milk production and cattle reproduction may decrease. Extreme heat events during a crop growth cycle can inhibit crop yields.
- **Energy:** Heat can cause transmission lines to sag and short out. Increased demand for electricity to cool structures can result in rolling black outs.
- **Water Resources:** During heat waves, water is used to cool bridges and other metal structures susceptible to failures causing increased demand for water contributing to reduced water supply and pressure needed for fire suppression activities. This increased demand can also lead to water ecosystems failure and threats to aquatic species.

4.5.3 EXTREME HEAT HISTORY

Typical summer temperatures in California contribute to the deaths of 20 people on average per year. For example:

- July 2018 was characterized by higher than normal temperatures across the globe. Los Angeles set a new record for the highest monthly minimum nighttime temperature of 79 degrees Fahrenheit.
- The September 2007 heat wave in the Los Angeles area resulted in 18 heat related deaths.

- The July 2006 heat wave in California caused the death of at least 136 people over a 13-day period.

4.5.4 EXTREME HEAT PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 22: Extreme Heat CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	4 x 0.45 = 1.8	Highly Likely	**Severe**
Magnitude/Severity	2 x 0.3 = 0.6	Limited	**High**
Warning Time	1 x 0.15 = 0.15	More than 24 hours	✓ **Moderate**
Duration	3 x 0.1 = 0.3	Less than 1 Week	**Low**
CPRI Rating	**2.85**	**Moderate**	

The CPRI rating for Extreme Heat is 2.85 or "Moderate Level of Risk" with a Probability rating of 4 or "Highly Likely" due to the well-documented record of high temperatures in Southern California during the summer months. Magnitude/Severity has a score of 2 or "Limited" because Extreme Heat, but does not often result in damage to critical facilities and infrastructure, or injury and death. Warning Time carries a score of 1 or "More Than 24 Hours" because weather patterns can typically be predicted several days to sometimes weeks in advance. Duration has a score of 3 or "Less Than 1 Week" because extreme temperatures usually do not last more than a few consecutive days. Climate Change has impacted the frequency, magnitude, and duration of extreme events. The CPRI rating is unlikely to reach a "Severe Level of Risk" however, because the Warning Time will maintain a score of 1, "More Than 24 Hours."

High 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 Hospital, treats multiple cases of heat-related illness per year in the Santa Clarita Valley.

Although recent heat waves have not resulted in any fatalities in the City of Santa Clarita, in California extreme periods of heat have resulted in fatalities. For example in 2006 a severe heat wave was documented to have resulted in 140 heat related deaths (California Department of Health Services, Epidemiology and Prevention for Injury Control Branch, 2007), although a later study conducted by the California Office of Environmental Health Hazard Assessment put the figure at two to three times higher at 350 to 450 deaths (Chong, 2009). While most of the fatalities occurred in the California Central Valley, the event provides valuable lessons regarding the risk to public health during extreme

heat. For example, 90% of the heat related deaths were from socio economically depressed areas (i.e., zip codes where more than 50 percent of the residents live under the Federal Poverty threshold).

Table 4 - 23: Extreme Heat Data for the Santa Clarita Valley (2007 – 2008)

Date	Magnitude (Temperature in Fahrenheit)	Deaths/ Injuries	Event Summary
6/20/08 to 6/21/08	100F to 114F	0/0	The combination of strong high pressure centered over Arizona and weak offshore flow generated extreme heat conditions across Central and Southern California. Across many sections of the area, afternoon temperatures climbed to between 100 and 114 degrees which set numerous high temperature records. The extreme heat resulted in several power outages due to excessive electrical use.
9/1/07 to 9/3/7	105F to 112F	0/0	The heat wave which started at the end of August continued into the first few days of September. The combination of above normal temperatures and relative humidity continued to produce excessive heat conditions across sections of Southern California. At the end of the heat wave, 18 heat-related deaths were reported across Los Angeles county.
8/30/07	105F to 112F	0/0	From the 29th through the 31st, strong high pressure built over the southwest United States. With this pattern, above normal temperatures developed across the mountains and valleys of Southern California. An influx of monsoonal moisture from northern Mexico increased the relative humidity across the area. The combination of very hot temperatures and increased relative humidity produce heat index values between 105 and 112 degrees. The excessive heat resulted in numerous heat- related injuries and deaths. The heat wave extended into the first few days of September

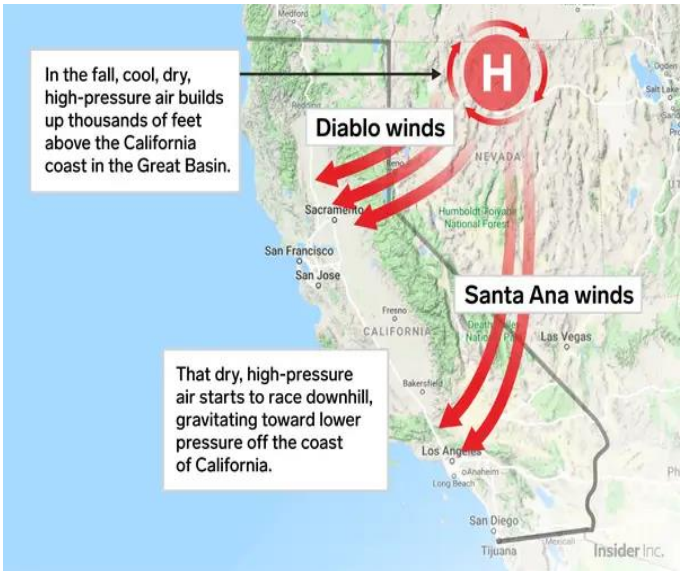
4.5.5 EXTREME WIND INFORMATION, BACKGROUND, AND LOCATION

Severe winds present a threat to health and safety as a result of energy disruptions caused by downed power lines, hazardous materials releases from tanker trucks overturned by strong winds, and other events. Severe wind events impact entire regions and are not limited to Santa Clarita.

The entire City of Santa Clarita is subject to continual strong winds, and to occasional episodes of the "Santa Ana" winds (see below), a local phenomenon which creates very strong, dry winds that spread wildfires and cause extensive wind-related damage.

The Santa Anas Winds are dry, warm (often hot) winds that blow westward through Southern California toward the coast. These winds typically occur between October and March and peak in December. They originate when high pressure systems form over the high-elevation deserts of the Great Basin between the Sierra Nevada's and the Rocky Mountains. Air from the system flows clockwise, so winds on the southern side of the system push west towards the Pacific Ocean.

Figure 8: Santa Ana Wind Patterns



The winds pass over the mountains between coastal California and the inland deserts, where the City of Santa Clarita is in the direct path of the ocean-bound Santa Ana winds. As they flow downslope, the air gets compressed and rises in temperature at a rate of almost 29 degrees per mile of descent. While air's temperature rises, its relative humidity drops, commonly to less than 20 percent and sometimes to even less than 10 percent. The winds also increase dramatically in speed when they're forced through narrow mountain passes and canyons and can cause a great deal of damage. The fast, hot winds cause the drying vegetation and plant life, increasing the risk of wildfires. Once the fires start, the winds fan the flames and accelerate their spread.

Santa Clarita can and does experience high winds at any time of the year. While local winds are generally below 50 MPH, or a Beaufort Force of between 8 and 9 on the Beaufort Scale discussed further in this section, higher velocities sustained winds exceeding 70 MPH (with higher wind gusts), a Beaufort Force of ≥ 11, are possible, particularly during seasonal Santa Ana wind events. Common effects 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, strong winds can reach a force great enough to threaten above ground utilities. Consequently the potential for utility failure is a realistic threat. 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. Based on the history of the region; windstorm events can be expected annually across widespread areas of the region.

4.5.6 EXTREME WIND HISTORY

Santa Clarita is subject to continual strong winds. Between the months of October and March, winds can reach speeds of over 65 miles-per-hour and occasional very high wind events have occurred in the past. A windstorm in the region can range from short term microburst activity lasting only minutes to a long duration, sustained wind event. Significant peak wind events identified by the National Weather Service (National Weather Service, National Climate Data Center, 2015) are listed in the appendices to this HMP. There were no reported property or crop damages for any of the events listed in the Santa Clarita Valley.

Table 4-24: Significant Wind Events > 65 MPH Since 2007

Date	Magnitude (MPH)	Deaths/ Injuries	Event Summary
10/27/19	50-70	0/5	After the Tick Fire burned 4,600 acres in the Los Angeles Region, the Santa Ana Winds which fueled the fire brought winds as fast as 50-70 MPH. Five firefighting personal suffered minor injuries.
10/9/17	67	0/0	Strong Santa Ana winds impacted the Santa Clarita Valley in Los Angeles county. Some wind reports from the area include: Newhall Pass (gusts up to 67 MPH) and Saugus (gusts up to 58 MPH).
2/17/17	66	0/0	Strong southerly winds were reported in the Santa Clarita Valley. Some wind gusts from local RAWS stations include: Saugus (gust 66 MPH) and Newhall Pass (gust 61 MPH).
3/28/16	50	0/28	Mountain wave activity produced winds in excess of 50 mph that generated a dust storm with near zero visibility along Highway 247 in Lucerne Valley. A multicar pileup ensued, involving more than a dozen vehicles and injuring 28 people.
11/15/15	71	0/0	Strong northerly wind developed across the Santa Clarita Valley. The RAWS sensor at Saugus reported northerly wind gusts of 71 MPH while the sensor at Del Valle reported gusts to 68 MPH.
4/8/13	79	0/0	An extended northerly wind event developed across Southwestern California. The combination of strong northerly (offshore) pressure gradient and strong winds above the surface produced northerly wind gusts between 65 and 85 MPH across sections of Ventura and Los Angeles counties.

12/1/11	67	0/0	On December 1st, a strong north to northeast wind event, which developed on November 30th, Widespread wind gusts between 60 and 70 MPH were reported across the mountains of Ventura county as well as the mountains and valleys of Los Angeles county through December 1st. Widespread power outages were reported, especially across the San Gabriel Valley where over 350,000 residents lost power. In the city of Pasadena, significant wind damage was reported with at least 42 buildings red-tagged due to wind damage. Along with the power outages, numerous trees were uprooted or severely damaged from La Canada-Flintridge to Monrovia.
3/7/11	71	0/0	Strong northwest to north winds developed across sections of Southwestern California. The strongest winds occurred in the mountains of Los Angeles and Ventura counties, the Antelope Valley and the Santa Clarita Valley. Sustained winds as high as 59 MPH were reported along with gusts as high as 76 MPH.
1/10/09	72	0/0	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.

4.5.7 EXTREME WIND EFFECTS: VULNERABILITY AND EXTENT

Based on the history of the region, windstorm events can be expected annually, across widespread areas of the City which can be adversely impacted during a windstorm event. Extreme winds severely impact life and property, utilities and infrastructure, transportation, and can increase wildfire threats as detailed below, requiring the City to take action following an extreme wind event. But the City has also identified mitigation goals and action items to prevent the severity of extreme wind events such as: partnering with Urban Forestry Division of the Los Angeles County Public Works Department on a program to help the City and its residents identify hazardous trees; management of debris removal; requiring the undergrounding of utilities for new development projects where appropriate, and; hosting national weather service spotter training as detailed in Mitigation Goals and Action Items SW-EW001 – SW-EW004 of Table 5-7.

4.5.7.1 LIFE AND PROPERTY

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, downed trees, power lines, and damaged property can be major hindrances to emergency response and disaster recovery.

4.5.7.2 UTILITIES/INFRASTRUCTURE

Historically, falling trees have been the major cause of power outages in the region. Windstorms such as strong microbursts and Santa Ana Wind conditions can cause flying debris and downed utility lines. 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. Rising population growth and new infrastructure in the region creates a higher probability for damage to occur from windstorms as more life and property are exposed to risk.

Windstorms can result in collapsed or damaged buildings, power lines, 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.

4.5.7.3 INCREASED WILDFIRE 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/wildland 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 wildland/urban interface areas.

4.5.7.4 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. Nevertheless, the risk remains, and the situation could become a major disaster in the event of a hazardous materials accident caused by extreme winds.

4.5.8 EXTREME WIND PROBABILITY, FREQUENCY AND MAGNITUDE

Table 4 - 25: Extreme Wind CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	2 x 0.45 = 0.9	Possible	**Severe**
Magnitude/Severity	2 x 0.3 = 0.6	Limited	**High**
Warning Time	1 x 0.15 = 0.15	More than 24 hours	**Moderate**
Duration	2 x 0.1 = 0.2	Less than 24 hours	✓ **Low**
CPRI Rating	**1.85**	**Low**	

The CPRI rating for Extreme Wind is 1.85 or "Low Level of Risk" with a Probability rating of 2 or "Possible" due to the fact that Santa Clarita has only experienced one wind event of wind speeds that reached a Beaufort Force of 12, the highest on the Beaufort Scale. Extreme Wind Magnitude/Severity has a score of 2 or "Limited" due to limited damage to critical facilities and infrastructure, and the rarity of injury or death that have been caused by wind events in Santa Clarita. Warning Time carries a score of 1 or "More Than 24 Hours" because most weather patterns, including extreme wind events can be predicted a few days to a few weeks in advance. Duration has a score of 2 or "Less Than 24 Hours" because extreme wind events usually occur in short bursts of not more than a few consecutive hours. Climate Change may impact the frequency, magnitude, and duration of extreme wind events, and the CPRI rating may reach a "Moderate" to "High Level of Risk" in the future.

4.5.8.1 WIND DAMAGE SCALE: MAGNITUDE

Various scales for estimating the potential damage caused by various wind speeds have been developed. The Beaufort Scale developed by Sir Francis Beaufort in 1805 is commonly used and illustrates the effects that varying wind speeds can have on sea swells and structures.

Table 4 - 26: Beaufort Scale

Beaufort Force	Speed (MHP)	Wind Description – Effects on Land
0	< 1	Calm - Smoke rises vertically
1	1 – 3	Light - Air Ripples look like scales - Smoke drift shows direction of wind, but wind vanes do not
2	4 – 7	Light Breeze - Wind vanes move; Leaves rustle; Wind can be felt
3	8 – 12	Gentle Breeze - Leaves and small twigs move constantly; Small, light flags are extended
4	13 – 18	Moderate Breeze - Wind lifts dust and loose paper; Small branches move
5	19 – 24	Fresh Breeze - Small trees with leaves begin to move
6	25 – 31	Strong Breeze - Large branches move; Telegraph wires whistle; Hard to hold umbrellas
7	32 – 38	Near Gale - Whole trees move; Resistance felt walking into wind
8	39 – 46	Gale - Twigs and small branches break off trees; Difficult to walk
9	47 – 54	Strong Gale - Slight structural damage
10	55 – 63	Storm - Trees broken or uprooted; Considerable structural damage
11	64 – 73	Violent Storm - Seldom experienced inland; Considerable structural damage
12	> 74	Hurricane - Widespread damage. Very rarely experienced on land.

4.6 PANDEMICS

As this HMP is being prepared in 2020, Santa Clarita and the world are in the midst of a worldwide pandemic created by the COVID-19 virus. The United States is currently on track to have more than 100,000 deaths attributed to the virus, which has sparked nationwide stay-at-home orders, sickened hundreds of thousands of Americans, and caused economic damage not seen since the Great Depression of the 1920s and 30s.

Pandemics are defined as large-scale outbreaks of infectious disease for which there is little or no human immunity. Pandemics cause disease and death over a wide geographic area and cause significant economic disruption. Evidence suggests that the likelihood of pandemics has increased over the past 100 years because of increased global travel and integration, urbanization, changes in land use, and greater exploitation of the natural environment. These trends likely will continue and will intensify.

The California Department of Public Health (CDPH) and Los Angeles County Department of Public Health have identified seasonal influenza and viral disease pandemics as specific hazards that would have a significant impact throughout Santa Clarita.

4.6.1 PANDEMIC HISTORY

The United States and the world have been affected by four worldwide pandemics over the past 100 years:

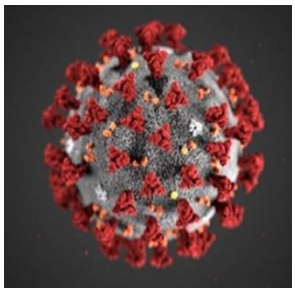
- **1918 "Spanish Flu" (H1N1 Virus)—**The 1918-1919 Spanish Flu was estimated to have sickened 20%-40% of the world's population. Over 20 million people lost their lives. Between September 1918 and April 1919, 500,000 Americans died. The flu spread rapidly; many died within a few days of infection; others from secondary complications. The attack rate and mortality were highest among adults 20-50 years old; the reasons for this are uncertain. By late September 1918, over 35,000 people throughout California had contracted the Spanish Flu. According to state officials, influenza was most prevalent in the southern part of California, but the death toll was high across the state.
- **1957-1958 "Asian Flu" (H2N2 Virus)**—This virus was quickly identified due to advances in technology, and a vaccine was produced. Infection rates were highest among school children, young adults, and pregnant women. The elderly had the highest rates of death. A second wave was developed in 1958 and in total, there were about 70,000 deaths in the United States. Worldwide deaths were estimated between roughly 1 and 2 million.

- **1968-1969 "Hong Kong Flu" (H3N2 Virus)**—The strain of the H3N2 Hong Kong Flu caused approximately 34,000 deaths in the United States and more than 700,000 deaths globally. It was first detected in Hong Kong in early 1968 and spread to the United States later that year. Those over the age of 65 were most likely to die. This virus returned in 1970 and 1972 and still circulates today.

- **2009 H1N1 Influenza Virus**—The first influenza pandemic of the 21st century occurred in 2009–2010 and was caused by an influenza A (H1N1) virus. It was the first pandemic for which many member States had developed comprehensive pandemic plans describing the public health measures to be taken, aimed at reducing illness and fatalities. For the first time, pandemic vaccinations were developed, produced and deployed in multiple countries during its first year.

  While most cases of pandemic H1N1 were mild, globally it is estimated that the 2009 pandemic caused between 100,000–400,000 deaths in the first year alone. Children and young adults were disproportionately affected in comparison to seasonal influenza, which causes severe disease mainly in the elderly, persons with chronic conditions, and pregnant women.

- **2019-2020 "COVID-19" Coronavirus**—The world is currently facing a global viral pandemic called Coronavirus Disease 2019 (COVID-19), caused by a novel Coronavirus (SARS-CoV-2). Coronaviruses are a large family of viruses that usually cause mild respiratory disease, such as the common cold, but can also cause more serious illness. Cases of COVID-19 have been detected in most countries worldwide, and on March 11, 2020, the World Health Organization characterized the outbreak as a pandemic.



  According to Johns Hopkins University Coronavirus Resource Center, as of October 7, 2020 there are roughly 35.9 million confirmed cases globally, 7.5 million confirmed cases in the United States, 831,225 confirmed cases in California, 275,849 cases in Los Angeles County, and 3,637 confirmed coronavirus cases in the City of Santa Clarita, and the numbers continue to rise. The virus that causes the Coronavirus is passed from person to person through respiratory secretions – such as saliva or discharge from the nose when one coughs or sneezes. Experts currently researching the virus believe that the virus can also be spread when a through aerosols. Those infected can experience symptoms such as high fever, cough, and difficulty breathing.

  The severity of COVID-19 symptoms ranges from mild to severe and affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization. Some of the most common symptoms include fever, dry cough, and

fatigue. Less common symptoms include aches and pains, nasal congestion, sore throat, diarrhea, conjunctivitis, headache, loss of taste or smell, a rash on skin, or discoloration of fingers or toes. The most serious symptoms include difficulty breathing or shortness of breath, chest pain or pressure, or loss of speech or movement.

4.6.2 PANDEMICS: EXTENT

As this Hazard Mitigation Plan is currently being written, the United States, as well as the rest of the world is facing the Novel Coronavirus/ COVID-19 Pandemic, impacting the entire population of Santa Clarita. Santa Clarita, as well as other cities and regions across the world, are facing high levels of illness, mortality, social disruption, political instability, mass unemployment, and economic losses. Current impacts range from school and business closings to the interruption of basic essential services such as public transportation, health care/first aid, and the delivery of food and essential medicines to those in need.

4.6.3 PANDEMIC PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 27: Pandemic CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	2 x 0.45 = 0.9	Possible	**Severe**
Magnitude/Severity	4 x 0.3 = 1.2	Catastrophic	**High**
Warning Time	1 x 0.15 = 0.15	More than 24 hours	✓ **Moderate**
Duration	4 x 0.1 = 0.4	More than 1 Week	**Low**
CPRI Rating	**2.65**	**Moderate**	

The CPRI rating for Pandemics is 2.65 or "Moderate Level of Risk" with a Probability rating of 2 or "Possible" due to the fact that pandemics do not occur often, but can occur at any time. Pandemic Magnitude/Severity has a score of 4 or "Catastrophic" due to the fact that pandemics are typically characterized by illness/injury and death. Warning Time carries a score of 1 or "More Than 24 Hours" because most pandemics start as outbreaks before rising to the level of pandemic which can take weeks or months to occur. Duration has a score of 4 or "More Than 1 Week" because pandemics typically last several months to several years. Climate Change is unlikely to impact the frequency, magnitude, and duration of pandemic events.

On March 4, 2020, Los Angeles County declared a local state of emergency to ensure that it will have the authority to take measures necessary to protect and preserve public health and safety, including seeking aid from state and federal authorities as necessary. On March 13, 2020, Santa Clarita issued a local emergency declaration in response to the coronavirus pandemic. This emergency declaration is a preparedness measure and allows the city to access resources and recover costs. Santa Clarita is

currently (May 2020) in a state of emergency and is working closely with the Los Angeles County Department of Public Health (DPH) to monitor the spread of the disease in the city.

The precise timing of a pandemic scale health related emergency is uncertain. Pandemic occurrences are most likely when a virus makes a dramatic change, or antigenic shift, that results in a new or "novel" virus to which the population has no immunity. Epidemic occurrences are more likely when there are ecological changes, the pathogen mutates, or the pathogen is introduced into an unprepared host population.

According to the World Bank, increased exposure to wildlife increases the risk to health, biosafety and global security. The current SARS-CoV-2 originated in wildlife; the virus managed to break the species barrier into humans, a phenomenon called zoonosis. Numerous other emerging vector-borne diseases also originated in wildlife and we transmitted to humans.

4.7 MAN-MADE HAZARDS: CYBER-ATTACK AND TERRORISM

4.7.1 CYBER-ATTACK INFORMATION AND BACKGROUND

Local governments such as Santa Clarita are increasingly targeted by cyber criminals because they have fewer resources to defend themselves and an obligation to restore normal services as quickly as possible. In October of 2019, CNN reported that more than 140 local governments, police stations and hospitals had been the victim of ransomware attacks in a ten month period.

Cyber infrastructure is vulnerable to a wide range of attacks, which target computer information systems, infrastructures, computer networks or personal computer devices to perform theft, fraud, and abuse. While cyber-attacks threaten individuals, global infrastructure is increasingly reliant on cyber networks, exposing large numbers of people by disrupting, destroying, or threatening the delivery of critical services. (CISA – Cybersecurity & Infrastructure Security Agency, Department of Homeland Security).

Cybercrime follows only government corruption and narcotics trafficking as the third most expensive crime in dollar value globally. The Center for Strategic and International Studies (CSIS) estimates that cybercrime costs the world approximately $600 billion annually. The rate of cybercrimes has increased dramatically in recent years. Among the reasons for this increase are the availability and quick adoption of new technologies by criminals, the growth in the number of new users who may not be security savvy or reside in countries with weak cyber security capabilities, and the growth of cybercrime black markets supported by the introduction of cryptocurrencies, which are not as easy to trace as standard currencies. (Romanow, 2020)

Since the release of the federal government's *National Strategy to Secure Cyberspace* (CISA – Cybersecurity & Infrastructure Security Agency, Department of Homeland Security, 2003) and the *Cyberspace Policy Review* (CISA – Cybersecurity & Infrastructure Security Agency, Department of Homeland Security, 2009), recognition of the potential threats and liabilities posed by cyber-attacks have increased in parallel with the concomitant sophistication and availability of technological tools. However, this presents a fundamental challenge as the techniques, methods, and tools used to operate and manage computer networks are constantly evolving, and therefore the cyber-attack landscape evolves with them.

4.7.1.1 CYBER-ATTACK THREATS

Cyber-attacks represent a major security risk and can increase vulnerabilities to economic disruption, critical infrastructure damage, privacy violations, and identity theft. In an increasingly interconnected world, cyber vulnerabilities are therefore magnified. As a consequence, the resilience of Santa Clarita's computer systems, software, and critical infrastructure to cybersecurity threats poses a continuing challenge in the face of the increased use of networked technologies in local government, as well as the ongoing maintenance and system upgrades made

to critical infrastructure. Recent trends suggest that persistent cyber intrusions are commonplace for many organizations and continue to increase every year, including the public sector.

Cybersecurity attacks include the following general types:

- ***Active Attacks*** - Blatant aggressive data breaches that are often detected immediately as the damage is done;
- ***Passive Attacks*** - Non-disruptive, covert breaches intended to collect large amounts of data over longer periods of time without being detected;
- ***External Threats*** - Attacks originating outside of established networks, often state-sponsored actors using Advanced Persistent Threats or a series of cascading attacks that can breach some of the most secure networks; or
- ***Internal/Insider Threats*** - Attacks originating from users within an existing network resulting from either an unintended mishandling of sensitive information, or a deliberate attack from current or former employees, contractors, or partners with access to the organizations networks.

In addition to the different ways an attacker can gain access to a network, there are several types of hacks including viruses, Denial of Service attacks, worms, malware, and password crackers.

4.7.1.2 THREATS TO UTILITIES/CRITICAL INFRASTRUCTURE

Santa Clarita utilizes the services of Southern California Edison (SCE) to meet its electrical utility needs. As part of its "Smart Grid" initiative, SCE has implemented system-wide measures to protect the exponentially large amounts of data from cyber-security threats. As part of its end-to-end security coverage, SCE's cyber-related efforts involve external engagement with technology suppliers, standards organizations and policy makers, and internal engagement to address the security requirements of SCE systems (Southern California Edison, 2010).

Cyber threats also have the potential to have a large impact on critical infrastructure, particularly for systems that are at risk of becoming outdated. These include computer systems underpinning everyday infrastructure such as Distributed Control Systems (DCS) and Site Control Data Acquisition (SCADA) Systems which are used to control key utility and police functions.

4.7.2 HISTORY OF CYBER-ATTACKS

While the City of Santa Clarita has not experienced a severe incident related to cyber-attack, from 2015 to 2020 the frequency of cyber-attacks on public and private sector organizations in general have continued to increase. In July, 2019 CISA released a report urging state and local partners to take steps toward resilience against ransomware following a string of attacks on state and local governments. In October, 2019, CNN reported that 140 local governments, police stations and hospitals had experienced ransomware attacks that year alone (Kim, 2019).

4.7.3 CYBER-ATTACK PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4- 28: Cyber-Attack CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	3 x 0.45 = 1.35	Likely	**Severe**
Magnitude/Severity	2 x 0.3 = 0.6	Limited	✓ **High**
Warning Time	4 x 0.15 = 0.9	Less than 6 hours	**Moderate**
Duration	2 x 0.1 = 0.2	Less than 24 hours	**Low**
CPRI Rating	**3.05**	**High**	

The CPRI rating for Cyber-Attacks is 3.05 or "High Level of Risk" with a Probability rating of 3 or "Likely" due to the large increase of cyber-attacks on public agencies over the last several years. Magnitude/Severity carries a score of 2 or "Limited" because although cyber-attacks can target critical facilities and infrastructure, these are rare occurrences that require a great deal of sophistication. The majority of cyber-attacks against government agencies are ransomware attacks that would have limited if any impact on critical facilities and infrastructure and are not likely to result in injury or death. Warning Time carries a score of 4 or "Less Than 6 Hours" because cyber-attacks happen quickly so the victim(s) does not have time to shore up their defenses prior to the attack. Duration has a score of 2 or "Less Than 24 Hours" because most cyber-attacks can be dealt with quickly. Climate Change will not have an impact on the probability/frequency or magnitude/severity of cyber-attacks.

With the introduction of more online systems and services being used to collect information such as Social Security numbers, driver's license numbers, and home addresses, this means that it is a matter of when, not if, a major data breach will occur for the sake of obtaining this information. The theft of personally identifiable information can also present monetary liabilities for the City of Santa Clarita; as a result of numerous incidents involving public governments and agencies, there is a growing trend toward public agencies facing fines and penalties for not implementing proper protocols.

A study published in January of 2018 was conducted by the U.S. Army Research Laboratory in an effort to predict the probability of a successful cyber-attack on an organization based on characteristics of the organization including: a) the domain name system (DNS) traffic based on the top-level domains (TLD) (i.e., .com, .net, .gov, .org, etc.) both foreign and domestic; b) a set of predictors called a "cyber footprint," consisting of the number of hosts on an organization's networks, similarity to educational institution behavior, and its number of records on scholar.google.com (ROSG); and c) the number of network security policy violations. The study determined that .net, .com, and .org TLDs are the most susceptible to successful cyber-attacks because .mil, .edu, and .gov TLDs all require proof that the organization is a military, educational, or government organization; such controls are not required for commercial, non-profit, or network technology organization.

4.7.4 TERRORISM INFORMATION AND BACKGROUND

Terrorism is a continuing threat throughout the world and within the United States. U.S. Code defines "international terrorism" and "domestic terrorism" (18 U.S.C. § 2331, 2010):

- **International terrorism** is characterized by the following:
  - Involve violent acts or acts dangerous to human life that violate federal or state law;
  - Appear to be intended to intimidate or coerce a civilian population; to influence the policy of a government by intimidation or coercion; or to affect the conduct of a government by mass destruction, assassination, or kidnapping; and
  - Occur primarily outside the territorial jurisdiction of the U.S., or transcend national boundaries, the persons they appear intended to intimidate or coerce, or the locale in which their perpetrators operate or seek asylum.
- **Domestic terrorism** is characterized by the following:
  - Involve acts dangerous to human life that violate federal or state law;
  - Appear intended (i) to intimidate or coerce a civilian population; (ii) to influence the policy of a government by intimidation or coercion; or (iii) to affect the conduct of a government by mass destruction, assassination. or kidnapping; and
  - Occur primarily within the territorial jurisdiction of the U.S.

Currently, there is no history of terrorist acts or organized political terrorist groups operating in the Santa Clarita area. Consequently, the probability of a terrorist attack in the City is considered low, although there are nearby sites that have a higher risk potential near Santa Clarita (Magic Mountain, California Aqueduct, etc.). Terrorists often focus on high visibility targets and civilian populations, and the potential consequences of an attack underscores the need to consider terrorism as a threat.

"Active Shooter" events can also be considered to be forms of terrorism. Namely the targeting of vulnerable populations resulting in loss of life and an intent to intimidate. While the risk of Active Shooter incidents is still considered low, including all forms of terrorism is an important component of a comprehensive mitigation plan.

4.7.5 TERRORISM LOCATION

The probability that an individual or location will be targeted by a terrorist or active shooter is a function of several factors including the attractiveness of the target, the potential for success of the event, and the potential for avoiding identification and capture. Categories of potential targets include:

- Bridges and Overpasses
- California Aqueduct, Castaic Dam, and Bouquet Canyon Dam (out of the planning area for

this document, but has an impact on the Santa Clarita area)

- Churches, and Religious Centers (e.g., Churches, Mosques, Synagogues, and Temples)
- Clinics and Hospitals
- Controversial Businesses and Defense Industry Companies
- Correctional Facilities (out of planning control for this document)
- Electrical Facilities
- Facilities that Store, Manufacture or Transport Hazardous Materials
- Federal, State, County and City Offices
- Highways and Freeways Law Enforcement Offices Mass Transit Facilities
- Military Sites and Recruiting stations
- Pipelines (Natural Gas, Petroleum, Water, Waste Water, and Other Hazardous Materials)
- Public Buildings and Assembly Areas
- Research Facilities Schools
- Shopping Malls
- Stadiums
- Telecommunications Facilities
- Water and Wastewater Facilities
- Other Places where Large Groups of People Congregate (e.g., public events such as fairs, marathons, etc.)

4.7.6 TERRORISM IMPACT ON THE COMMUNITY: EXTENT

Following a terrorist attack, panic, intense media interest, and the convergence of injured and possibly contaminated persons at local hospitals and urgent care centers can be expected. While local, state, and federal agencies will be mobilized to respond to a terrorist event, it will take time for assistance to arrive. Many specialized resources (such as military response teams) may need to be airlifted to the area requiring local resources to manage the initial phases of an emergency, especially in the case of a mass casualty event. The initial response phase may range from hours to a day or more. Consequently, a rapid assessment of the scope of the incident and activation of local emergency response resources will be critical to manage the situation.

Key issues include:

- Activation of local and regional Emergency Operations Centers (EOCs)
- Activation of local response teams and law enforcement (including SWAT teams), fire suppression resources, paramedic units, and HazMat teams
- Designation of casualty collection points and field triage / treatment sites

- Transportation (for personnel, equipment, and supplies to the impact location as well as casualty and public evacuation)
- Isolation (if needed to prevent further contamination)
- Use of personal protection equipment (PPEs)
- Communications (including internal communication, media response, and public bulletins)
- Decontamination points (if required)
- Activation and notification of Non-Governmental Organizations (NGO's)

The following table describes examples of the considerations expected during the initial stages of a terrorist event.

Table 4 - 29: Terrorist Event Considerations

Condition	Description
Down Wind Evacuation	A large release may result in a lethal plume that may travel for miles. Emergency agencies in neighboring jurisdictions must be advised of the release and included in incident management activities.
Traffic Restrictions and Congestion	Roads, freeways and transit systems may need to be closed to contain the incident. Regardless of the need, panic may cause some persons to self-evacuate, traffic congestion and gridlock conditions and confusion may result. These factors will slow response by emergency agencies and specialized resources to affected areas. Detailed traffic management plans will need to be developed.
Self-Transport to Medical Providers	Injured and contaminated victims may leave the immediate site of the incidentand then go to hospitals. In most cases, the care provider will not be equipped to decontaminate victims or treat terrorist related casualties. This can extend the scope of the incident, potentially lead to secondary contamination and strain local medical and emergency response resources Hospitals impacted by an influx of casualties who have not been decontaminated will have to establish a decontamination area and may not be able to continue providing treatment.
Panic Victims	In the immediate aftermath of a terrorist event, responders should anticipate a number of people who think they have been exposed to or contaminated by the agent(s) even though there has been no actual exposure. Provisions must be made to manage these persons and provide supportive care as necessary.

Scarce Supplies	Equipment and supplies needed to manage the consequences of a terrorist event will be scarce. Sufficient pharmacological supplies may not be available. Antidotes and other drugs used to treat WMD victims are usually not stockpiled in sufficient quantities for use in a mass casualty incident. Efforts to secure additional supplies will be an immediate need. Personnel involved in managing potential terrorist events must be aware of these concerns. Measures to address these issues must be incorporated into the Incident Action Plan and should be considered and assessed throughout the management of the WMD incident.

4.7.7 HISTORY OF TERRORIST AND ACTIVE SHOOTER INCIDENTS

There have not been any Terrorist Acts Incidents in Santa Clarita. Nevertheless, the possibility cannot be fully eliminated. Understanding the types and history of terrorism in the U.S. provides local planners and public with an understanding of the ongoing threats to the community.

The examples below provide a summary of major terrorist events in the U.S. The list contains summaries of the types of incidents that could occur in the area.

Table 4 - 30: Domestic Terrorism/Active Shooter Events (2001 – 2019)

Date	Event /Location	Description
9/11/2001	September 11 Attacks - New York, Virginia and Pennsylvania	Two hijacked planes crashed into World Trade Center towers, causing fires and collapse. Hijacked plane crashed into the Pentagon. Hijacked plane crashed into a rural area of Pennsylvania, following an attempt by passengers to regain control of the aircraft. 8,900 injuries and 2,993 deaths.
3/21/2005	Red Lake Indian Reservation school shooting - Minnesota	Student shooting at Red Lake Indian Reservation school. 7 injuries and 10 deaths.
4/16/2007	Virginia Tech shooting – Virginia	Student shooting attack at Virginia Polytechnic Institute. 17 injuries and 33 deaths.
3/10/2009	Multiple shootings – Alabama	Multiple shootings at residences and businesses in Samson and Geneva, AL. 6 injuries and 11 deaths.
4/3/2009	Immigrant Center attack – New York	Shooting attack at immigrant center. 4 injuries and 14 deaths.
11/5/2009	Fort Hood shooting - Texas	Shooting attack at Soldier Readiness Center at Fort Hood. 44 injuries and 13 deaths.
7/20/2012	Aurora Movie Theater shooting – Colorado	Shooting attack at movie theater; suspect was arrested afterwards; suspect had booby-trapped his nearby apartment with explosives which were successfully disarmed by police. 58 injuries and 12 deaths.
12/14/2012	Sandyhook Elementary school shooting	Shooting attack at elementary school; shooter killed himself and had killed his mother earlier that day. 3 injuries and 28 deaths.

4/15/2013	Boston Marathon bombing – Massachusetts	Two bombings at Boston Marathon kill 3 (including 1 child) and injured 264 (including 8 children).
10/1/2015	Umpqua Community College shooting – Oregon	Shooting attack at Umpqua Community College. 9 injuries and 10 deaths.
12/2/2015	San Bernardino terrorist attack – California	Two attackers at a county employee meeting and Christmas party; both attackers were killed hours later in a shootout with police in which 2 police officers were injured. 23 injuries and 16 deaths.
6/12/2016	Orlando Nightclub shooting – Florida	Shooting attack at nightclub. 53 injuries and 50 deaths.
8/12/2017	Charlottesville "Unite the Right" rally terrorist attack - Virginia	Vehicular attack on crowd protesting the rally. 19 injuries and 1 death.
10/1/2017	Las Vegas concert shooting – Nevada	Sniper attack on concert. 527 injuries and 59 deaths.
11/5/2017	Sutherland Springs Baptist church shooting – Texas	Shooting attack on church during worship service, attacker was shot and later killed himself. 30 injuries and 27 deaths.
2/14/2018	Majory Stoneman Douglas high school shooting – Florida	A former student entered a high school, shooting and killing 14 students and 3 staff; 25 others were injured.
5/18/2018	Santa Fe high school shooting – Texas	Shooting attack by a student at a high school. 14 injuries and 10 deaths.
10/27/2018	Tree of Life Synagogue terrorist attack – Pennsylvania	Shooting attack on Jewish worshippers at a synagogue; 4 police officers among those injured; terrorist was shot and arrested. 7 injuries and 11 deaths.
11/7/2018	Thousand Oaks shooting – California	Shooting attack at bar; attacker killed himself. 12 injuries and 13 deaths.
8/3/2019	El Paso shopping center shooting – Texas	Shooting attack at Walmart store. 24 injuries and 22 deaths.
8/4/2019	Dayton Ohio shooting – Ohio	Shooting attack outside bar; attacker was shot and killed by police. 27 injuries and 10 deaths.
8/31/2019	Odessa and Midland drive-by shootings – Texas	Multiple drive-by shootings by individual evading police; one teenager killed, one infant and 4 police officers among those injured; suspect was shot and killed. 19 injuries and 8 deaths.

4.7.8 TERRORISM EVENT PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 31: Terrorism CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	1 x 0.45 = 0.45	Unlikely	**Severe**
Magnitude/Severity	3 x 0.3 = 0.9	Critical	**High**
Warning Time	4 x 0.15 = 0.6	Less Than 6 Hours	✓ **Moderate**
Duration	1 x 0.1 = 0.1	Less than 6 hours	**Low**
CPRI Rating	**2.05**	**Moderate**	

The CPRI rating for Terrorism is 2.05 or "Moderate Level of Risk" with a Probability rating of 1 or "Unlikely" no terrorism events have occurred in Santa Clarita. Magnitude/Severity has a score of 3 or "Critical" due to the fact that terrorist attacks typically target critical facilities and infrastructure or large groups of people to cause injury or death. Warning Time carries a score of 4 or "Less Than 6 Hours" because most terrorism events occur with little or no warning. Duration has a score of 1 or "Less Than 6 Hours" because terrorism events do not last more than a few hours in most cases. Climate Change will not likely have an impact on the probability/frequency or magnitude/severity of terrorist attacks.

Santa Clarita has not experienced a terrorist act. However, the area does include a variety of pipelines, public works projects, electrical facilities, large public gathering places, as well as other potential targets that could attract the attention of terrorists.

The consequences of a terrorist act in the Santa Clarita Valley could impact the local area, e.g., disruption of Interstate 5, State Route 14, water pipelines, water supply contamination, natural gas and petroleum pipelines, hazardous materials release.

Recent trends toward large scale incidents generating significant casualties make preparedness and the mechanisms for effective response essential. In addition to large scale attacks, a full range of assault styles must be considered. Related threats include bomb threats, which disrupt the normal operations of business. Venues likely to suffer the impact of terrorism include facilities that store, manufacture or transport hazardous materials, highways and freeways, telecommunications facilities, federal, state, county and city offices, shopping malls, schools, houses of worship and religious centers, research facilities, electrical facilities, water and wastewater facilities, dams, bridges and overpasses.

If a terrorist act were to occur in or near Santa Clarita, the consequences or magnitude could range from a localized impact to a widespread event depending on the nature and type of act committed. Mass casualties could occur and local response and emergency resources could be quickly

overwhelmed or become victims themselves. A terrorist act also has the potential to disrupt local utility services, communications, and transportation systems that reach beyond the City. In fact, coordination of mass evacuation could be required and quickly become a major concern for local responders.

4.7.8.1 ACTIVE SHOOTER INCIDENTS

On November 14, 2019, a student shot five other students, wounding three and killing two, before killing himself. This incident illustrated that active shooter events can happen anywhere, and at any time. Local schools, college campuses, houses of worship, shopping malls, hotels, event centers, theaters, large commercial facilities, and local businesses all have the potential for an Active Shooter incident.

If another Active Shooter incident were to occur in Santa Clarita, the consequences or magnitude could range from a few casualties to several dozen. Local street closures and government, healthcare, business, school, and college shutdowns (depending on the location and type of incident) could also last from one to multiple days. Secondarily, media coverage would be extensive and cause ongoing disruptions in the area.

4.8 HAZARDOUS MATERIALS RELEASE

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 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.

4.8.1 HAZARDOUS MATERIALS RELEASE: INFORMATION AND BACKGROUND

Hazardous materials include hundreds of substances that 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, stored, or dumped illegally. The Los Angeles County Fire Department's Health Hazardous Materials Division (LACoFD HHMD) is responsible for maintaining information about the types of hazardous materials handled, produced, or stored in Santa Clarita and administering the County's Hazardous Material Area Plan.

The information required by the Fire Department 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 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

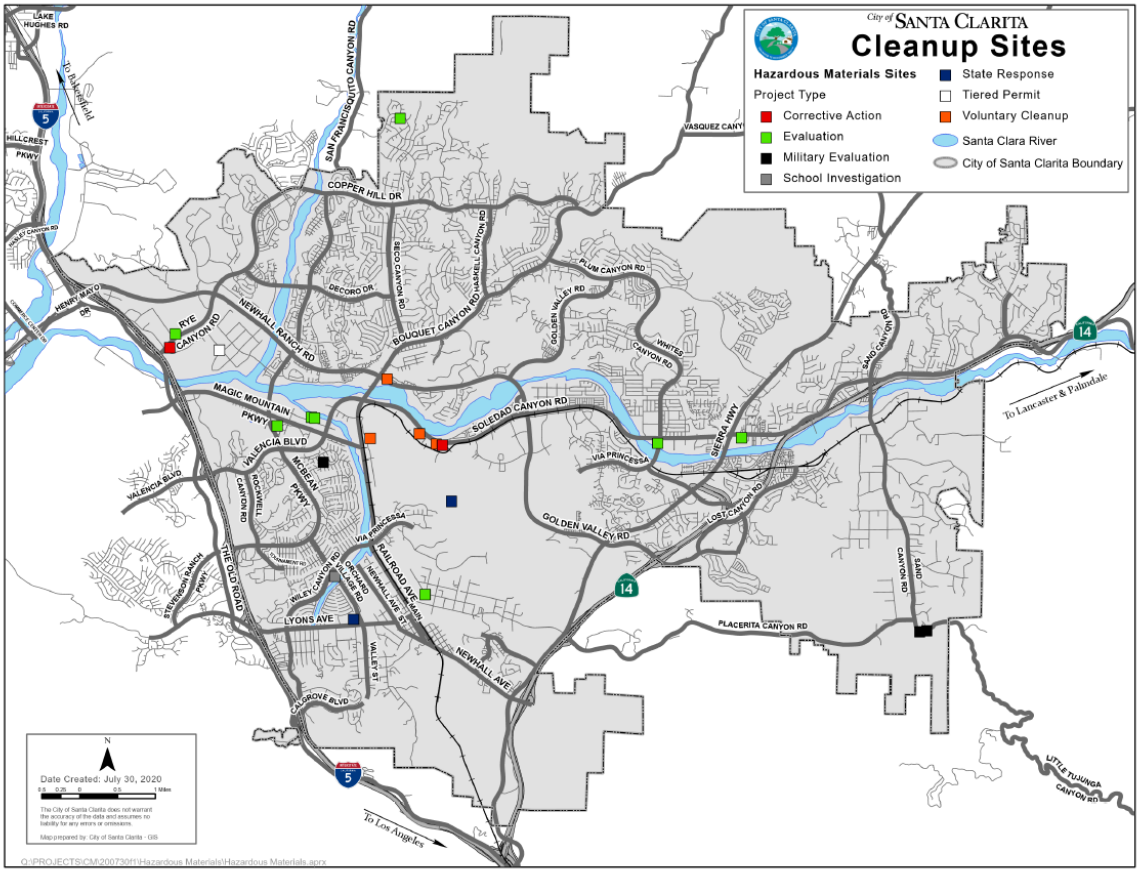
the LACoFD HHMD carry this data base, which allows emergency responders to identify the types, amounts, and locations of hazardous substances during an emergency at a fixed facility. LACoFD HHMD is the lead agency in Santa Clarita in the event of a hazardous materials incident and maintains an Emergency Operations Section (EOS) that is specifically trained and equipped to respond to emergencies involving potentially hazardous materials.

There are four County fire stations that house apparatus and personnel trained to respond and mitigate hazardous materials incidents. These are known as Hazardous Materials Taskforces and are comprised of nine personnel specially trained at the minimum level of Hazardous Materials Technician. Of these four stations, one (Fire Station 150) is located in Santa Clarita, and is home to the Hazardous Materials Taskforce 150, which is certified by the Office of Emergency Services (OES), State of California, as a Type 1 Hazardous Materials Taskforce.

4.8.1.1 CLEANUP SITES IN SANTA CLARITA

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. The list is maintained in the EnviroStor Data Management System. Table 45: Cleanup Sites in Santa Clarita (EnviroStor) lists the sites in the City and the surrounding unincorporated county area. As of May 2020, there were 22 cleanup sites within the Santa Clarita city limits and no Superfund sites. The Map below shows the location of active cleanup sites in Santa Clarita.

Map 11: Cleanup Sites in Santa Clarita (EnviroStor)



4.8.2 COMMUNITY ASSETS VULNERABLE TO HAZARDOUS MATERIALS RELEASE

4.8.2.1 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. Natural 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 and water contamination are potential threats if leaks occur.

Natural gas, fuel and water pipelines are part of the critical infrastructure that provides lifelines to communities. A disruption to these lifelines will impede the ability to provide potable water, natural gas, and fuel that the public depends on to ensure its health and safety. Examples include:

- Water pumping stations, wells, and sewage treatment plants are dependent on electrical power. While pumping stations have backup generators in case of power outages, an extended outage may affect the ability of the stations to provide or preserve the safety of

water. This will have public health implications to children, the elderly, and those with compromised immune systems, and affect the ability of some businesses to remain open.

- The delivery of gasoline and fuel is necessary to ensure that transportation is not interrupted and that first responders have the ability to use the correct vehicles and equipment necessary to provide services.
- Restaurants, hotels, hospitals, and any establishments that require fuel and hot water to wash utensils and tools and to regulate temperature will not be able to operate at full capacity.

Map 12: Pipelines in Santa Clarita and Surrounding Areas

- Dark Blue Transmission Lines: Generally large diameter pipelines that operate at pressures above 200 psi and transport gas from supply points to the gas distribution system.
- Light Blue High Pressure Distribution Lines: Pipelines that operate at pressure above 60 psi and deliver gas in smaller volumes to the lower pressure distribution system.

4.8.2.2 - PEOPLE

There is a potential for injuries to industry employees, the public, and first responders who are in close proximity to a pipeline if there is a pipeline failure (accidental or caused by a deliberate act). If the accident results in an explosion or a large release of fumes from toxic chemicals, there is a potential for deaths and the destruction of property.

4.8.2.3 - ECONOMY

The direct economic impacts due to hazardous materials releases include lost business output and productivity, property damage, and the loss of product. In addition, transportation disruptions can impact a widespread area including freeways and roads resulting in gridlock and other indirect losses to the local economy.

4.8.3 - HAZARDOUS MATERIALS RELEASE HISTORY

Laws governing hazardous materials were quickly adopted during the 1980s and 1990s, largely as a result of high profile cases worldwide, including in the United States. Since the City's incorporation, **no significant events have occurred in Santa Clarita**, but there is always the risk of an accidental or intentional release of hazardous materials wherever they are used, stored, or handled. 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.

4.8.3.1 - HISTORY OF OIL AND FUEL EVENTS IN SOUTHERN CALIFORNIA

Pipelines (usually underground) are used throughout California to distribute natural gas, fuels, and other potentially hazardous materials. In Santa Clarita, there are natural gas transmission pipelines that run throughout the Santa Clarita area and a hazardous liquids pipeline that runs north of the city through Edwards Air Force Base. The Pipeline & Hazardous Materials Safety Administration (PHMSA) provides reports on pipeline incidents in the U.S. and by State. From 2010 through 2019 there have been 20 fatalities and 89 injuries along with $936,955,735 in property damage from significant and serious pipeline incidents in California (Pipeline & Hazardous Materials Safety Administration (PHMSA), U.S. Department of Transportation, 2020).

- **Significant Incidents** are those incidents reported by pipeline operators when any of the following conditions are met:

    1. Fatality or injury requiring in-patient hospitalization
    2. $50,000 or more in total costs, measured in 1984 dollars
    3. Highly volatile liquid releases of 5 barrels or more or other liquid releases of 50 barrels or more
    4. Liquid releases resulting in an unintentional fire or explosion

- **Serious Incidents**, a subset of Significant Incidents, are incidents which involve a fatality or injury requiring in-patient hospitalization but do not meet other criteria for a "significant" incident.

4.8.3.2 HISTORIC LOSSES AND IMPACTS

Examination of past incidents provides an opportunity to assess the common causes and impacts of hazardous materials spills on the areas.

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 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. Santa Clarita coordinated a traffic detour plan with Caltrans, LA County Sheriff and CHP where traffic was diverted on the three detour routes through the City. Twenty four thousand vehicles were detoured on each route, in addition to 4,750 trucks.

Since the freeway would not open for the Monday morning rush hour, the City worked with Metrolink and coordinated a transportation plan to add additional commuter trains and parking at Santa Clarita'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 stations 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 Santa Clarita to submit claims for reimbursement totaling $12,281.

The table below depicts the hazardous materials incidents in Santa Clarita that were reported to Cal-OES for 2019-2020. In total, 11 incidents were reported in the Santa Clarita area. In general the reported incidents consisted of relatively small quantities with waste water and sewage representing the largest spill types.

Table 4 - 32: Hazardous Materials Incidents for Santa Clarita (2019-2020)

Location	Date	Cause	Injuries	Death	Substance/ Type	Quantity
NB Hwy 5 to NB 14, Santa Clarita	5/18/20	Semi-truck accident	None	None	Diesel/ Petroleum	40 gallons
25857 Mc bean Pkwy, Santa Clarita	5/5/20	Root intrusion caused release from sewer manhole into vegetated area.	None	None	Sewage	1,000 gallons
25100 Magic Mountain Pkwy, Santa Clarita	4/25/20	Power utility substation transformer mechanical failure	None	None	Mineral Oil/ Petroleum	500 gallons

Quigley Canyon, Santa Clarita	4/24/20	Corroded pipe leaked into nearby creek bed and storm drains	None	None	Produced Water 2% Oil/ Petroleum	15 barrels
SB Hwy 5, south of Osito Canyon, Santa Clarita	2/20/20	Semi-truck fire	None	None	Diesel/ Petroleum	150 gallons
NB 14 Newhall Ave off ramp, Santa Clarita	10/29/20	Battery tied down in back of truck spilled when truck hit curb	None	None	Battery Acid	12 cell 24 vault
21380 Centre Pointe Pkwy, Santa Clarita	10/3/20	Debris in sewer main caused overflow into storm drain	None	None	Sewage	1,200 gallons
End of Keaton Ave, Santa Clarita	9/30/19	Contractor moved portable generator and caused spill onto asphalt and nearby storm drain	None	None	Diesel/ Petroleum	20-30 gallons
23430 Riversbridge Way, Santa Clarita	5/18/19	Line blockage caused release	None	None	Grey Water/ Sewage	3,000 gallons
25713 Hawthorne Pl, Santa Clarita	5/5/19	Line blockage caused release	None	None	Sewage	Unknown
26214 Carroll Ln, Santa Clarita	2/7/19	Line blockage caused release	None	None	Sewage	600 gallons

4.8.4 HAZARDOUS MATERIALS RELEASE PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 33: Hazardous Materials Release CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	3 x 0.45 = 1.35	Likely	**Severe**
Magnitude/Severity	2 x 0.3 = 0.6	Limited	**High**
Warning Time	4 x 0.15 = 0.6	Less than 6 hours	✓ **Moderate**
Duration	3 x 0.1 = 0.3	Less than 1 Week	**Low**
CPRI Rating	**2.85**	**Moderate**	

The CPRI rating for Hazardous Materials Release is 2.85 or "Moderate Level of Risk" with a Probability rating of 3 or "Likely" due to the recorded regular occurrence of Hazardous Materials Release, but Magnitude/Severity has a score of 2 or "Limited" because the majority of Releases are small and quickly contained. Warning Time carries a score of 4 or "Less Than 6 Hours" because a Hazardous Materials Release event can occur at any time and there are no environmental factors that would act as predictors of such events. Duration has a score of 3 or "Less Than 1 Week" because although most Hazardous Materials are quickly contained, there is a fair amount of variability in duration due to the type of material and size of the Release event. Climate Change is unlikely to have any impact on Hazardous Materials Release events.

4.8.4.1 HAZARDOUS MATERIALS RELEASE PROBABILITY AND FREQUENCY

A Hazardous Materials Release can occur at any time in Santa Clarita given the location of transportation routes in the city, the presence of businesses that manufacture, handle or store hazardous materials, and the potential for illegal dumping. Over the last year and a half, 11 incidents have occurred in Santa Clarita as demonstrated in Table ##: Hazardous Materials Incidents for Santa Clarita (2019-2020).

4.8.4.2 HAZARDOUS MATERIALS RELEASE MAGNITUDE: POTENTIAL DAMAGE

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 depend on factors 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.

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 47: Hazardous Materials Building Count - identifies all structures by general occupancy type 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. Consequently a 1% loss estimate was used for planning purposes.

Table 4 - 34: Hazardous Materials Potential Building Count and Valuation by General Occupancy Type

Occupancy Type	Number of Buildings in High Risk Zone	Valuation of Buildings in High Risk Zone	Number of Buildings Damaged If a 1% Loss Occurs	Valuation of Buildings if 1 % Loss Occurs
Commercial	1,068	$2,379,596,691	11	$23,795,967
Industrial	1,063	$1,994,032,328	11	$19,940,323
Mixed Use	625	$314,258,253	6	$3,142,583
Residential	29,569	$13,269,480,262	296	$132,694,803
Specific Plan	3,034	$2,143,223,771	30	$21,432,238
Open Space	262	$51,652,720	3	$516,527
Other (Public/Institutional)	708	$503,387,572	7	$5,033,876
TOTAL	**36,329**	**$20,655,631,597**	**363**	**$206,556,316**
The number of buildings is greater than the actual number of buildings. This is because of stacked parcels with two different zones, essentially buildings are being double counted in some cases. 36,355 > 36,329 (# number of buildings from building layer.)				

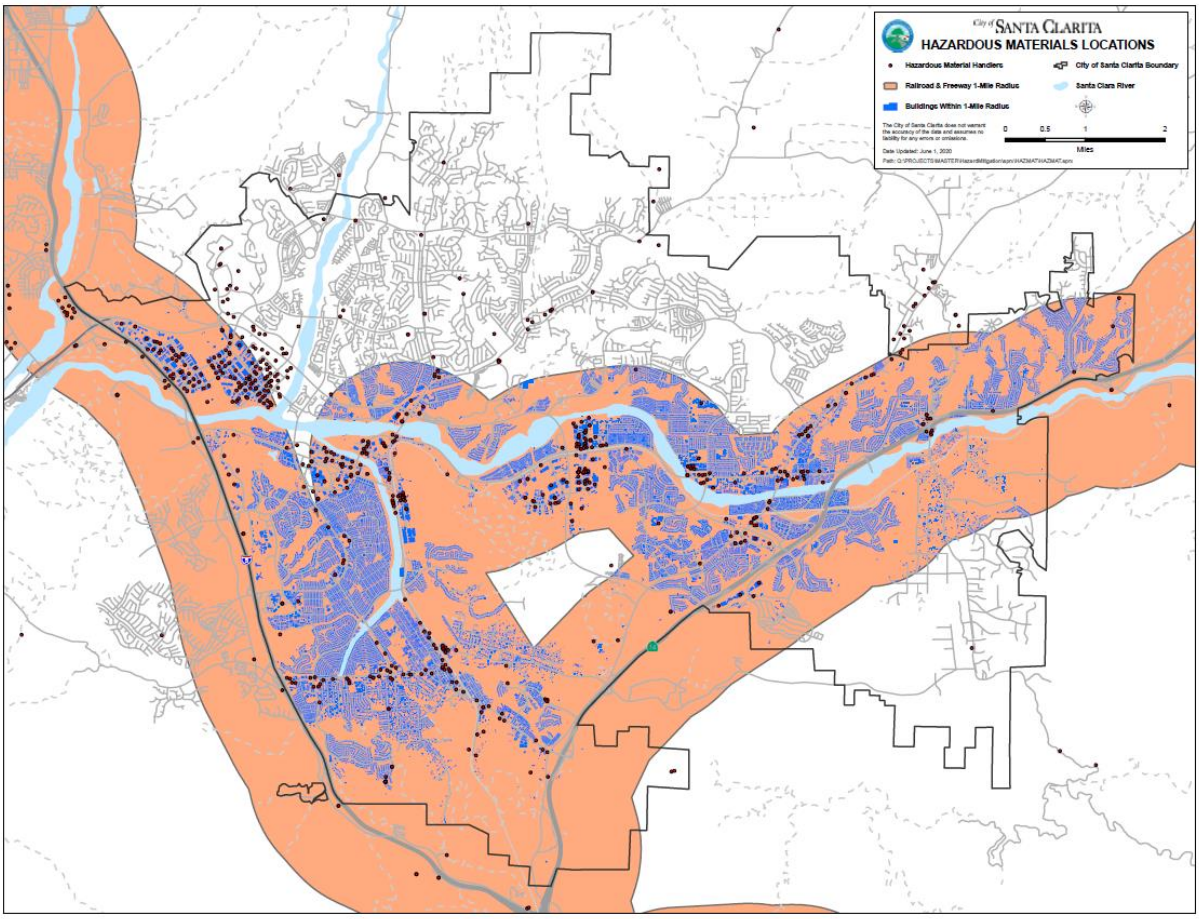
4.8.5 HAZARDOUS MATERIALS RELEASE VULNERABILITIES

The primary vulnerabilities for hazardous materials releases in Santa Clarita are from commercial vehicles and transport activities; releases at fixed facilities, pipeline breaks, and illegal clandestine dumping.

- **Transportation:** The greatest probability of a major hazmat incident is from a transportation accident, including freeways, highways, roads, and rail freight. 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. The map below provides an overview of where these hazardous material uses are located.

Map 13: Hazardous Materials Locations



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.

- **Pipeline Breaks:** Pipeline breaks can disrupt roads, highways, lifelines, public services, and the general health of local residents. An explosion or accident at a distribution or pipeline center may cause injury or death, as well as threaten water and air quality. Businesses and public services without gas and water will be forced to scale back operations or close. The examples listed below provide brief descriptions of community assets that may be impacted by a hazardous materials release.

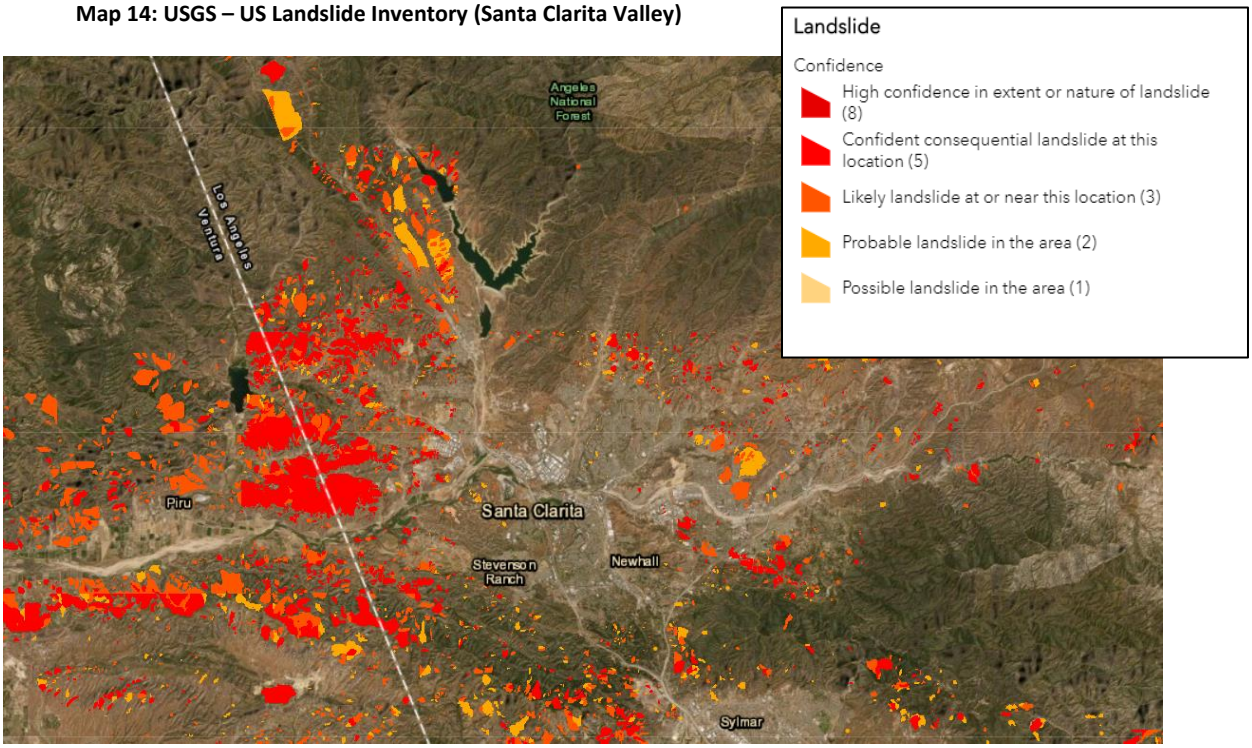
- **Illegal Clandestine Dumping:** Clandestine dumping is the criminal act of disposing of toxic materials and hazardous waste on public or private property. Acts of Illegal disposal of hazardous materials/wastes have declined over the last several years, but high disposal costs and restricted disposal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

4.9 LANDSLIDE/MUDSLIDE/SUBSIDENCE

Because of the steep topography in Santa Clarita, combined with soil types and damage to vegetation from wildfires (discussed elsewhere in this HMP), landslides—the movement of surface materials down a slope—are a hazard in the city.

Landslides can result in private property damage, and impacts to transportation corridors, fuel and energy conduits, and communication facilities. They can also pose a serious threat to human life. Nationally, landslides cause 25 to 50 deaths each year (Mileti, 1999) and (California Department of Public Health, 2015). The best estimate of direct and indirect costs of landslide damage in the United States range between $1 billion and $2 billion annually (Harrod, 1989). Much of the land area within the Planning Area consists of mountainous or hilly terrain with the presence of earthquake faults. As a result, large sections of the Planning Area are susceptible to landslides.

Map 14: USGS – US Landslide Inventory (Santa Clarita Valley)



4.9.1 LANDSLIDES, DEBRIS FLOWS, AND MUDSLIDES: THREAT DESCRIPTIONS

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. Environmental and geologic events, and human activity are the primary triggers for landslides.

- **Environmental and Geologic Landslide Triggers:** Landslides are often triggered by periods of heavy rainfall, earthquakes, subterranean water flow and excavations. 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.
- **Human Activity Triggers:** Human activities, including locating development near steep slopes, can increase susceptibility to landslide events. 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 affecting landslides include: excavation, drainage and groundwater alterations, and changes in vegetation (Department of Land Conservation and Development, 2000).

Table 4 - 35: Earth Movement Terms

EARTH MOVEMENT TERMS	DEFINITION
Debris Flow/Mudslide	A debris flow or mud slide 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.
Earthflow	Earthflows are slow moving landslides with plastic or liquid movements in which a land mass (e.g. soil and rock) breaks up and flows during movement.
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 and 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.
Liquefaction	Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading and occurs in saturated 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 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. 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 (University of Washington, 2000).

Rock Falls	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.
Sinkhole	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.
Subsidence	Land subsidence is a gradual settling or sudden sinking of the Earth's surface (National Oceanic and Atmospheric Administration, 2015).

4.9.2 LANDSLIDE/MUDSLIDE/SUBSIDENCE HISTORY

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. The increasing scarcity of land available for development, particularly in urban areas, increases the tendency to build on geologically marginal land. Hillside housing developments in Southern California are prized for the view lots that they provide, but increase landslide risks to the community.

Selected major landslides in the Los Angeles region and Santa Clarita in the recent past include:

4.9.2.1 1971 JUVENILE HALL, SAN FERNANDO, CALIFORNIA

Landslides on February 9, 1971, caused by a 6.5 magnitude earthquake, known as the Sylmar 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 electrical converter station, and several pipelines and canals (Schuster, n.d.).

4.9.2.2 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 square kilometers. Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. The earthquake destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. This event also caused deaths from Coccidioidomycosis (valley fever), the spore of which was released from the soil and blown toward the coastal populated areas. The spore was released from the soil by the landslide activity (Schuster, n.d.).

4.9.2.3 2004-2005 MUDSLIDES

Between June of 2004 and March of 2005, the City of Santa Clarita received 38.51" of rainfall. 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 damage to 64 homes and/or buildings. 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.

4.9.3 LANDSLIDE/MUDSLIDE/SUBSIDENCE PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 36: Landslide/Mudslide/Subsidence CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	3 x 0.45 = 1.35	Likely	**Severe**
Magnitude/Severity	2 x 0.3 = 0.6	Limited	**High**
Warning Time	4 x 0.15 = 0.6	Less than 6 hours	✓ **Moderate**
Duration	3 x 0.1 = 0.3	Less than 1 Week	**Low**
CPRI Rating	**2.85**	**Moderate**	

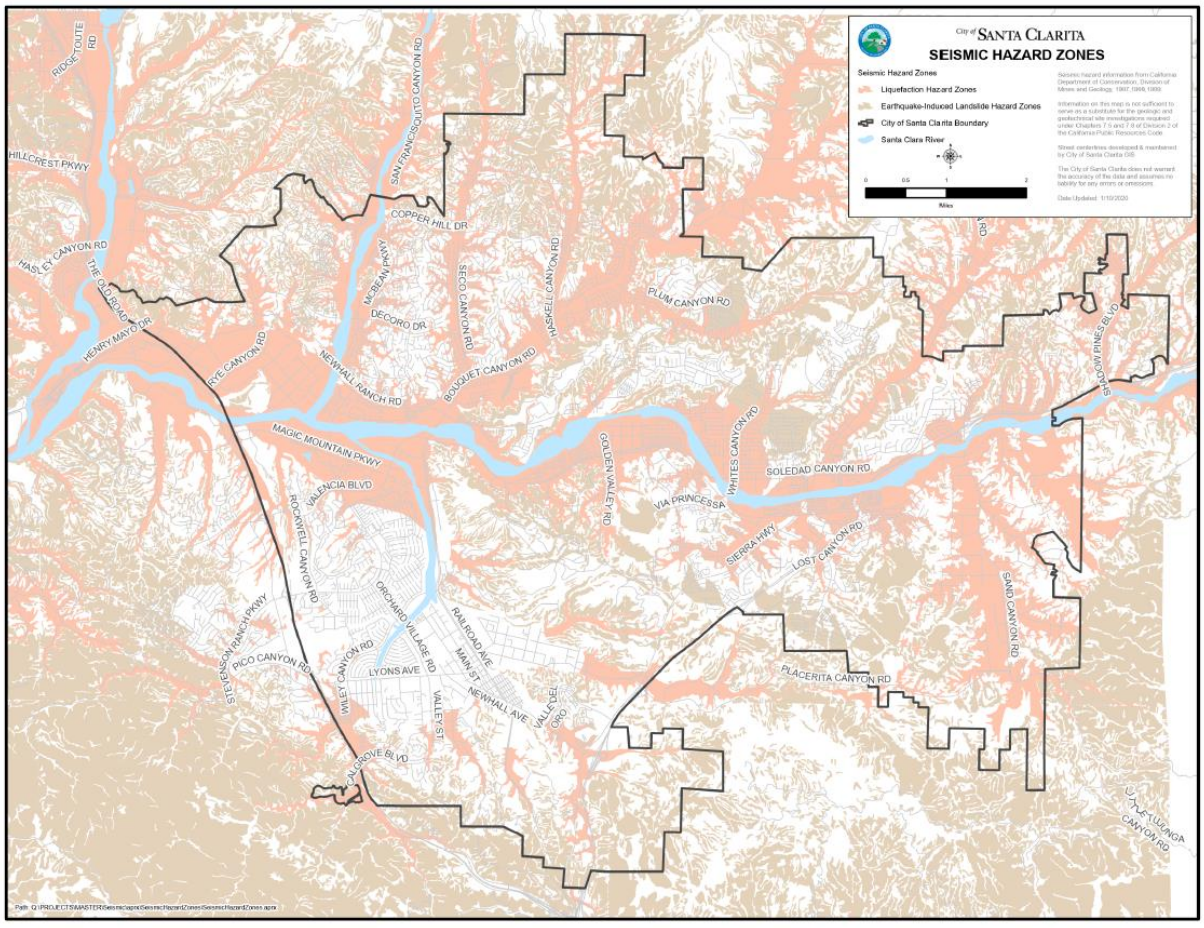
The CPRI rating for Landslide/Mudslide/Subsidence is 2.85 or "Moderate Level of Risk" with a Probability rating of 3 or "Likely" due to the well-documented cyclical weather patterns that cause Landslide/Mudslide/Subsidence events. Magnitude/Severity has a score of 2 or "Limited" because only in rare, severe occurrences will Landslide/Mudslide/Subsidence result in major damage to critical facilities and infrastructure or injuries and death. Warning Time carries a score of 4 or "Less Than 6 Hours" because Landslide/Mudslide/Subsidence events happen quickly and without warning, although the conditions under which these events typically occur are somewhat predictable. Duration has a score of 3 or "Less Than 6 Hours" because Landslide/Mudslide/Subsidence events typically occur very quickly and only last for a few minutes to a few hours. Climate Change is very likely to impact the frequency, and magnitude of Landslide/Mudslide/Subsidence and the environmental factors that cause these events.

According to the CDMG 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 (California Department of Conservation, Division of Mines and Geology, 1997). 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. Historically, landslides have occurred within the 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.

Data were then incorporated into the City's GIS system to identify areas of earthquake induced liquefaction and 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. Map 30: Santa Clarita Seismic Hazard Zones: Liquefaction and Landslide Areas identifies the areas subject to earthquake-induced liquefaction and landslides. Seismic hazard maps differ from the geologic maps in the following way: Seismic hazard maps show areas that have the potential to be affected by liquefaction and landslides, whereas geologic maps show existing landslides. Potential hazard areas are not shown on geologic maps.

Map 15: Seismic Hazard Zones – Landslide and Liquefaction Hazards

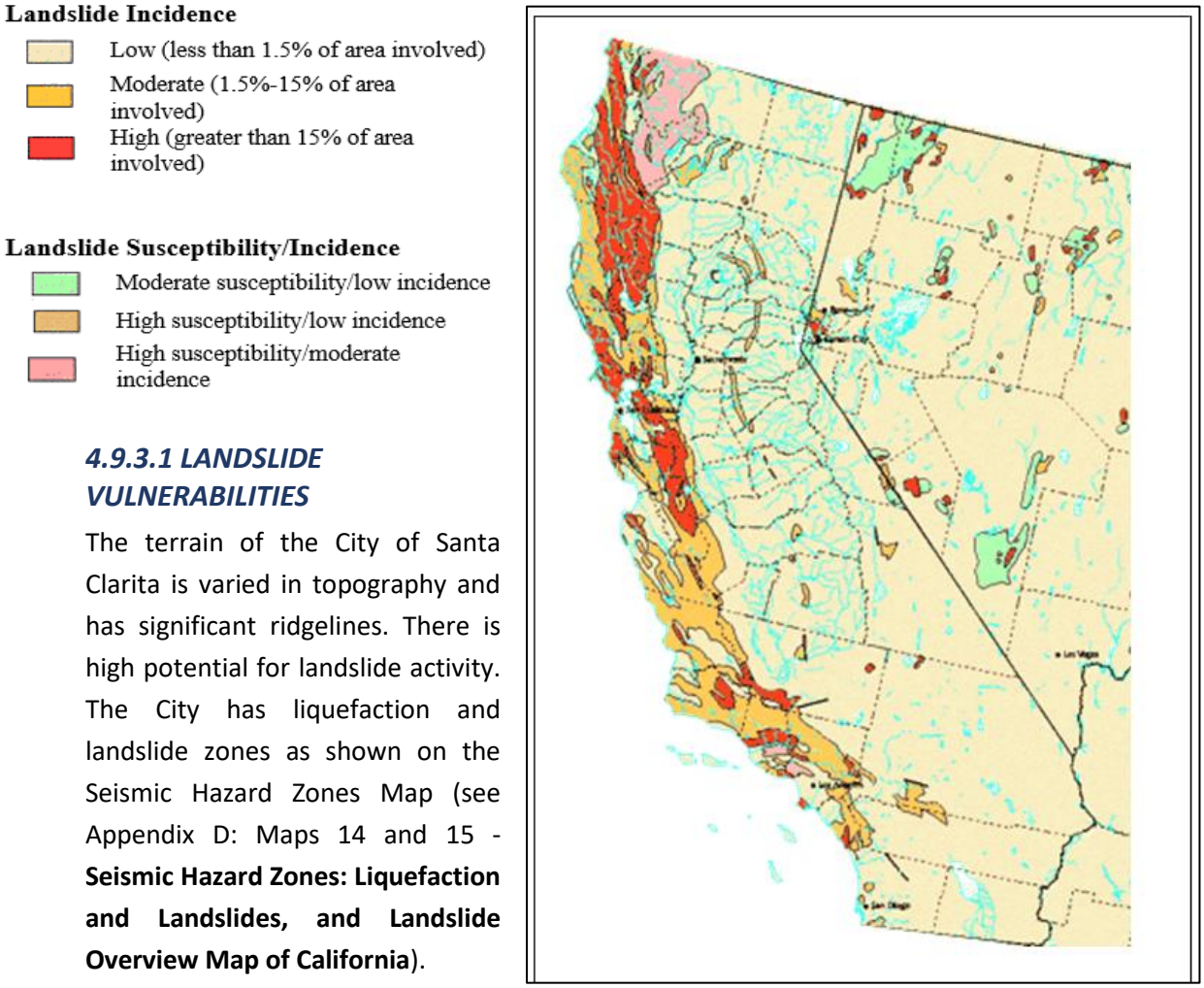


Map 15: Landslide Overview Map of California on the next page depicts the United States Geological Survey's (USGS), Landslide Overview Map of the Conterminous United States. This map identifies

the Santa Clarita Valley as having a high landslide incidence and high susceptibility/low incidence.

Susceptibility to landslides was defined as the probable degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of landslides.

Map 16: Landslide Overview Map of California



4.9.3.1 LANDSLIDE VULNERABILITIES

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 shown on the Seismic Hazard Zones Map (see Appendix D: Maps 14 and 15 - **Seismic Hazard Zones: Liquefaction and Landslides, and Landslide Overview Map of California**).

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.

Areas of risk include:

- Areas where wildfires or construction have destroyed vegetation
- Areas where landslides have occurred before
- Steep slopes and areas at the bottom of slopes or canyons
- Slopes that have been altered for construction of buildings and roads
- Channels along a stream or river
- Areas where surface runoff is directed

4.9.3.2 CRITICAL FACILITIES AND INFRASTRUCTURE

Landslides can affect utility services, transportation systems, and critical facilities and infrastructure. 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. Santa Clarita's Streets Division is responsible for responding to occurrences of earth movement events that inhibit the flow of traffic or are damaging to a road or a bridge, 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. 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. A list of Critical roads and bridges can be found in Section 3 of this HMP.
- **Communication Lines, Utilities and Pipelines:** 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, debris flows, and mudslides, which can have serious impacts on natural gas and other pipelines that are located in vulnerable soils.

4.9.4 POTENTIAL MAGNITUDE OF EARTHQUAKE INDUCED LANDSLIDES AND LIQUEFACTION

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. The table below provides a summary of structures in the city's seismic hazard zones.

Table 4 – 37: Landslide and Liquefaction Potential Building Count and Valuation by General Occupancy Type

Occupancy Type	Number of Buildings in Landslide Hazard Zone	Valuation of Buildings in Landslide Hazard Zone	Number of Buildings in Liquefaction Zone	Valuation of Buildings in Liquefaction Zone
Commercial	29	$193,303,581	846	$2,312,412,870
Industrial	92	$542,865,377	959	$2,172,156,362
Mixed Use	4	$12,64,620	515	$257,733,524
Residential	6,340	$4,552,344,777	24,111	$11,810,888,617
Specific Plan	407	$301,766,041	2,763	$2,565,423,784
Open Space	34	$6,062,899	181	$59,648,439
Other (Public/Institutional)	124	$265,655,615	557	$16,457,507
TOTAL	**7,030**	**$5,874,639,910**	**29,932**	**$19,194,721,103**

The number of buildings is greater than the actual number of buildings. This is because of stacked parcels with two different zones, essentially buildings are being double counted in some cases. 7,922 + 23,783 = 31,705 > 31,697 (# of buildings from the building layer).

4.10 FLOOD

Two types of flooding primarily affect the City of Santa Clarita: riverine flooding and urban flooding.

- **Riverine Flooding:** Riverine flooding is the overbank flooding of rivers and streams. 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. Santa Clarita is host to numerous streams, two dams, and the Santa Clara River, which could overflow during a severe storm event.
- **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. 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.

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 (a stream that flows most or all of the year and is marked on topographic maps with a solid blue line – FEMA).

Santa Clarita enjoys a mild Southern California Mediterranean climate. Winters are temperate and semi-moist, typically in the 40° - 65° range. Santa Clarita receives an average of approximately 18 inches of rain per year under normal conditions primarily between the months of November and March (Western Regional Climate Center, 2015). However, flooding is most common October through March during El Niño years which have the potential to bring intense rainfall to the area.

4.10.1 FLOOD HAZARD LOCATION AND EXTENT

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 plains. 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 allow flow through the City. The flood hazard areas are identified in Appendix D: Maps (see Map 17: Dam Inundation).

4.10.1.1 RESERVOIRS AND DAMS

There are 2 major reservoirs and dams that can impact Santa Clarita. A description of each is provided below along with the potential inundation areas if one or both of these dams fail. It should also be noted that the St. Francis Dam disaster in 1928 did have a catastrophic impact on the area and greatly influenced design requirements and safety regulations for all future dams in the U.S.

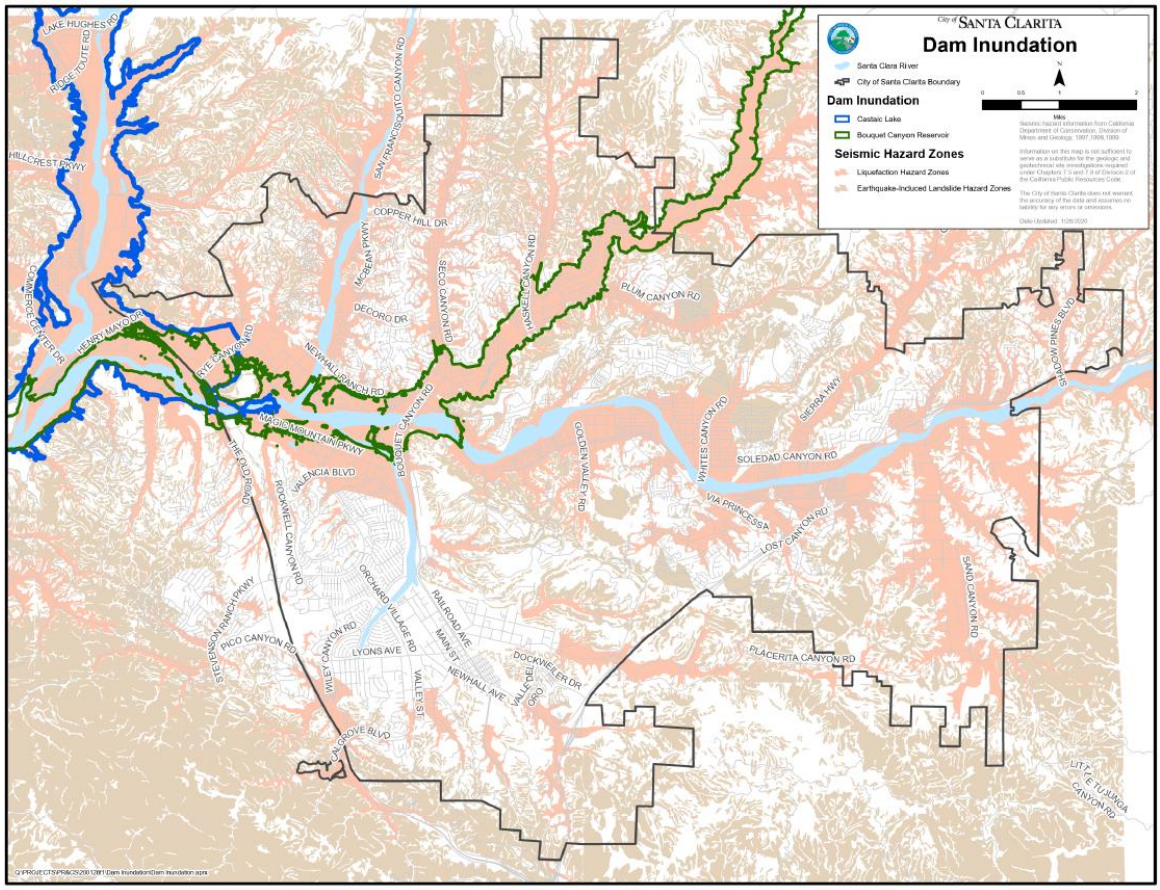
- **Castaic Reservoir:** Castaic Reservoir inundation maps, prepared by the California Department of Water Resources, indicate areas of potential flooding in Castaic, Val Verde, and Valencia in the event of a dam failure. Under such conditions, floodwaters would rapidly travel southward, flooding Castaic,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

Figure 9: Castaic Reservoir

- **Bouquet Reservoir Inundation:** In the event of a failure of the Bouquet Reservoir possible flood areas include 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. (Kfasimpaur)

Figure 10: Bouquet Reservoir

Map 17: Dam Inundation Map



4.10.2 NATIONAL FLOOD INSURANCE PROGRAM

The National Flood Insurance Program (NFIP) is a Federal program created by Congress to mitigate future flood losses nationwide through sound, community-enforced building and zoning ordinances and to provide access to affordable, federally backed flood insurance protection for property owners. The NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

The NFIP is administered by the Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security (DHS). In support of the NFIP, FEMA identifies flood hazard areas throughout the United States and its territories. Most areas of flood hazard are commonly identified on Flood Insurance Rate Maps (FIRMs). A FIRM is an official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

Areas not yet identified by a FIRM may be mapped on Flood Hazard Boundary Maps (FHBMs). Several areas of flood hazards are identified on these maps. One of these areas is the Special Flood Hazard

Area (SFHA). The SFHA is a high-risk area defined as any land that would be inundated by a flood having a 1- percent chance of occurring in a given year (also referred to as the base flood). The high-risk- area standard constitutes a reasonable compromise between the need for building restrictions to minimize potential loss of life and property and the economic benefits to be derived from floodplain development. Development may take place within an SFHA, provided that development complies with local floodplain management ordinances, which must meet the minimum Federal requirements. Flood insurance is required for insurable structures within high- risk areas to protect Federal financial investments and assistance used for acquisition and/or construction purposes within communities participating in the NFIP.

Participation in the NFIP is based on an agreement between local communities and the Federal Government that states that if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses.

The City of Santa Clarita participates in the National Flood Insurance Program as listed in the FEMA Community Status Book Report (FEMA, 2020) and the ongoing eligibility requirements are specified under 44CFR§59.21.

Table 4 – 38: FEMA Community Book Report: California

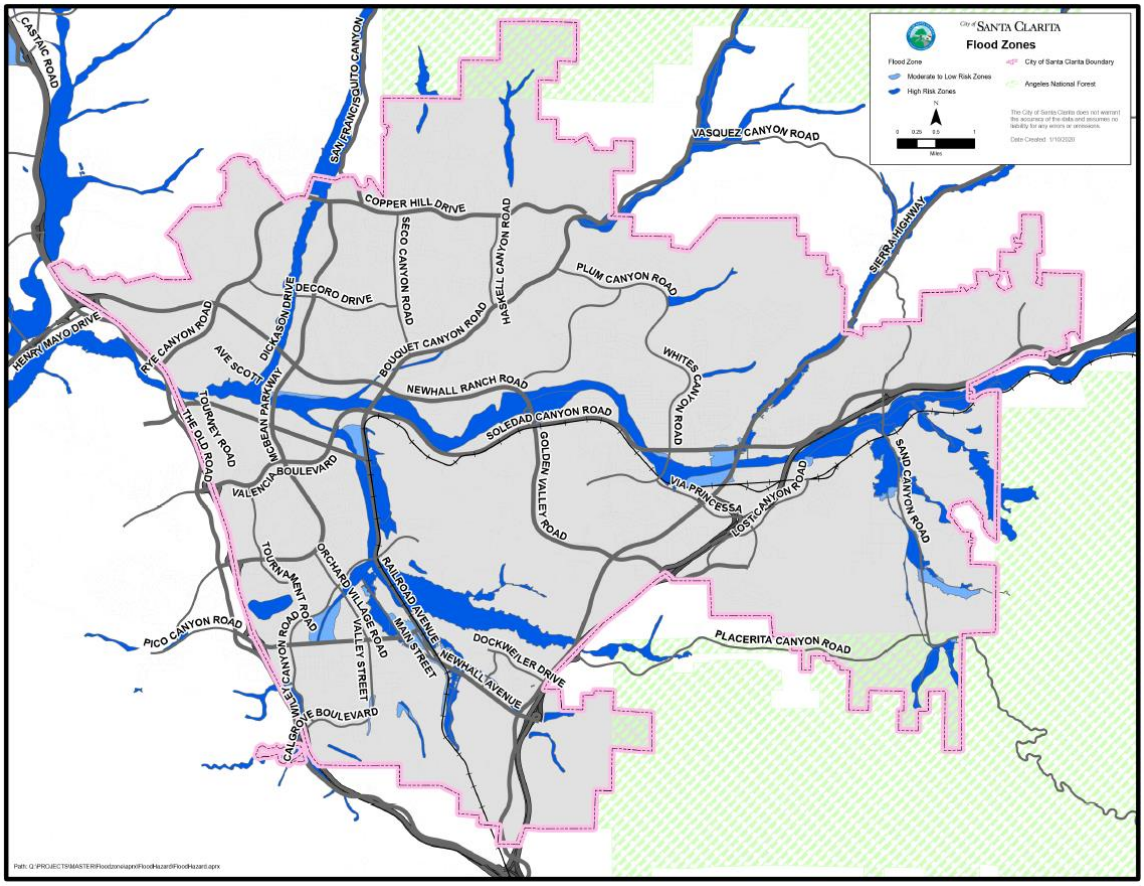
CID	Community Name	County	Init FHBM Identified	Init FIRM Identified	Curr Eff Mad Date	Reg-Emer Date	Tribal
060729	SANTA CLARITA	LOS ANGELES	10/24/78	9/29/89	9/26/08	3/23/89	No

4.10.2.1 FLOOD INSURANCE RATE MAPS (FIRM)

A Flood Insurance Rate Map (FIRM) is an official map produced by FEMA that delineates communities where NFIP regulations apply. FIRMs combine water surface elevations with topographic data to illustrate areas that would be inundated during a 100-year flood, floodway areas, and elevations marking the 100-year flood level. In some cases they also include base flood elevations (BFEs) and areas located within the 500-year floodplain. Flood Insurance Studies and FIRMs produced for the NFIP provide assessments of the probability of flooding at a given location.

All Special Flood Hazard Areas (SFHAs) are 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 zones are considered low-to-medium risk zones.

Map 18: Flood Zone Map - Santa Clarita



4.10.2.2 REPETITIVE LOSS PROPERTIES IN SANTA CLARITA

The Severe Repetitive Loss (SRL) grant program was authorized to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP). The definition of severe repetitive loss as applied to this program was established in section 1361A of the national Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a. An SRL property is defined as a **residential property** that is covered under an NFIP flood insurance policy and:

A. That has at least four (4) NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000;

OR

B. For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (A) and (B) above, at least two of the referenced claims must have occurred within any

ten-year period, and must be greater than ten (10) days apart.

Three properties within Santa Clarita have 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. In the case of all three properties, the homeowner's mitigated the flooding issues and have since been removed from the repetitive loss list by FEMA as of June 2011 (see summary below). Consequently, as of September 2015, there are no listed repetitive loss properties in the City of Santa Clarita.

- 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 third property is located in the Valencia area of Santa Clarita. The flooding was a result of improper grading and a lack of adequate drainage facilities in the rear yard of the residence. The owner of the property re-graded the backyard, installed area drains, and an underground pipe that conveys the water to the front connected 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 June 2011.

4.10.3 SANTA CLARITA FLOOD EVENT HISTORY

Localized flooding has been experienced intermittently in some areas of the Santa Clarita Valley due to local drainage conditions. During heavy rains some areas of Castaic, Newhall, Friendly Valley, and Bouquet Canyon have experienced mudflows or flooding. Two areas of the City of Santa Clarita that are 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.

The following flood events had a direct impact on the City of Santa Clarita and nearby areas.

- **1928 St. Francis Dam Disaster:** 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).
- **1983 El Niño:** In January and February of 1983, the Sand Canyon Road Bridge was washed out by El Nino floods.
- **1992 Winter Storms/1992 Late Winter Storms:** The winter storms in February of 1992 resulted in flooding, rainstorms, and mudslides 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).
- **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). 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.
- **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 (Jia-Rui Chong, Amanda Covarrubias and Richard Fausset, Los Angeles Times, 2005).18 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.

- **2010 Severe 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).

4.10.4 FLOOD PROBABILITY, FREQUENCY, AND MAGNITUDE

Table 4 - 39: Flood CPRI Rating

Category of Risk	Score/Weight	Description	Level of Risk
Probability/Frequency	3 x 0.45 = 1.35	Likely	Severe
Magnitude/Severity	2 x 0.3 = 0.6	Limited	High
Warning Time	1 x 0.15 = 0.15	More than 24 hours	✓ Moderate
Duration	3 x 0.1 = 0.3	Less than 1 Week	Low
CPRI Rating	**2.40**	**Moderate**	

The CPRI rating for Floods is 2.40 or "Moderate Level of Risk" with a Probability rating of 3 or "Likely" due to the fact that Santa Clarita has the topography and climate that are prone to seasonal flooding with a recorded history of such events. Magnitude/Severity has a score of 2 or "Limited" because most flood events are relatively minor and do not severely impact critical facilities and infrastructure or result in injury or death. Warning Time carries a score of 1 or "More Than 24 Hours" because although most flood events are related to weather patterns, it is difficult to predict when whether will be severe enough to cause impacts to the community. Duration has a score of 3 or "Less Than 1 Week" because flooding is often related to weather patterns which may for a few days or more. Climate Change may impact the frequency, magnitude, and duration of flood events, and the CPRI rating may reach a "Moderate" to "High Level of Risk" in the future.

4.10.4.1 100-YEAR AND 500-YEAR FLOOD PROBABILITY AND FREQUENCY

Some areas of the City of Santa Clarita are located in 100-year and 500-year floodplains as indicated on Map 18: DFIRM Flood Zone Map for the City of Santa Clarita. Detailed Flood Insurance Rate Maps (FIRM) are available directly from the FEMA Flood Map Service Center (https://msc.fema.gov). 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.

4.10.4.2 POTENTIAL MAGNITUDE OF FLOODS

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. Furthermore, mudslides and sinkholes

may occur causing the potential for further loss of life, infrastructure damage, and property losses. 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.

4.10.4.3 POTENTIAL FLOOD 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. The table below identifies these structures in the city's flood hazard zones.

Table 4 - 40: Building Count and Valuation in Flood Zones by General Occupancy Type

Occupancy Type	Number of Buildings in High Risk Flood Zone	Valuation of Buildings in High Risk Flood Zone	Number of Buildings in Low-Medium Risk Flood Zone	Valuation of Buildings in Low-Medium Risk Flood Zone
Commercial	308	$189,451,909	29	$44,832,134
Industrial	268	$117,455,239	1	$7,243,829
Mixed Use	74	$61,365,128	91	$81,926,415
Residential	1,526	$686,054,910	1229	$340,850,843
Specific Plan	148	$89,313,952	235	$127,552,012
Open Space	60	$20,374,757	4	$151,140
Other (Public/Institutional)	107	$16,354,565	14	$166,512
TOTAL	**2,491**	**$1,180,370,460**	**1,603**	**$602,722,885**

The number of buildings is less than the actual number of buildings. This is because some of the buildings are not within the parcels layer that should be.
2,460 + 1,296 = 3,756 < 3,763 (# of buildings from the building layer).

5.0 MITIGATION STRATEGIES

The Mitigation Strategy is the foundation of a Hazard Mitigation Plan and describes how the jurisdiction intends to accomplish the mitigation of local hazards. There are three main components of the Mitigation Strategy required by FEMA: Goals, Actions, and an Action Plan. Goals outline what the community wants to achieve through mitigation. Actions detail what the community will do to mitigate specific hazards. The Action Plan outlines how the actions will be prioritized and implemented. This section will outline mitigation efforts that are already underway in Santa Clarita as well as identify new mitigation activities determined by the Planning and Steering Committees.

5.1 GENERAL PLAN OBJECTIVES AND POLICIES RELATED TO SAFETY AND HAZARD MITIGATION

The Santa Clarita General Plan serves as a basis for the city's local decision making, establishes a clear set of development guidelines for citizens, developers, neighboring jurisdictions and agencies, and provides the community with an opportunity to participate in the planning process. In addition, the General Plan is an important tool in addressing environmental challenges related to land use, transportation, population growth and distribution, development, open space, resource preservation and utilization, air and water quality, noise impacts, public safety, infrastructure, and other related physical, social, and economic factors. The table below outlines objectives and policies that Santa Clarita has committed to uphold when making land use decisions in order to mitigate potential hazards to the community.

Table 5 - 1: Santa Clarita General Plan Objectives and Policies

General Plan Objectives related to Hazard Mitigation	General Plan Policies supporting Hazard Mitigation Objectives
Land Use Element Objective LU 3.3: Ensure that the design of residential neighborhoods considers and includes measures to reduce impacts from natural or man-made hazard. **(Multi-Hazard)**	**Policy LU 3.3.1:** Identify areas subject to hazards from seismic activity, unstable soils, excessive noise, unhealthful air quality, or flooding, and avoid designating residential uses in these areas unless adequately mitigated.
	Policy LU 3.3.2: In areas subject to wildland fire danger, ensure that land uses have adequate setbacks, fuel modification areas, and emergency access routes.
	Policy LU 3.3.4: Evaluate service levels for law enforcement and fire protection as needed to ensure

	that adequate response times are maintained as new residential development is occupied.
	Policy LU 3.3.5: Through the development review process, ensure that all new residential development is provided with adequate emergency access and that subdivision and site designs permit ready access by public safety personnel.
Land Use Element Objective 7.1: Achieve greater energy efficiency in building and site design. (**Severe Weather: Extreme Heat)**	**Policy LU 7.1.1:** Require shade trees within parking lots and adjacent to buildings to reduce the heat island effect, in consideration of Fire Department fuel modification restrictions.
	Policy LU 7.1.2: Promote the use of solar panels and renewable energy sources in all projects.
Land Use Element Objective 7.2: Ensure an adequate water supply to meet the demands of growth. **(Drought)**	**Policy LU 7.2.2:** If water supplies are reduced from projected levels due to drought, emergency, or other unanticipated events, take appropriate steps to limit, reduce, or otherwise modify growth permitted by the General Plan in consultation with water districts to ensure adequate long-term supply for existing businesses and residents.
Land Use Element Objective 7.3: Protect surface and ground water quality through design of development sites and drainage improvements. **(Floods)**	**Policy LU 7.3.4:** Implement best management practices for erosion control throughout the construction and development process.
	Policy LU 7.3.5: Limit development within flood-prone areas to minimize downstream impacts.
Land Use Element Objective 7.4: Promote water conservation through building and site design. **(Drought)**	**Policy LU 7.4.1:** Require the use of drought tolerant landscaping, native California plant materials, and evapotranspiration (smart) irrigation systems.
	Policy LU 7.4.2: Require the use of low-flow fixtures in all non-residential development and residential development with five or more dwelling units, which may include but are not limited to water conserving shower heads, toilets, waterless urinals and motion-sensor faucets, and

	encourage use of such fixtures in building retrofits as appropriate.
Circulation Element Objective 2.5: Consider the needs for emergency access in transportation planning. **(Multi-Hazard)**	**Policy C 2.5.1:** Maintain a current evacuation plan as part of emergency response planning.
	Policy C 2.5.2: Ensure that new development is provided with adequate emergency and/or secondary access for purposes of evacuation and emergency response; require two points of ingress and egress for every subdivision or phase thereof, except as otherwise approved for small subdivisions where physical constraints preclude a second access point.
	Policy C 2.5.3: Require provision of visible street name signs and addresses on all development to aid in emergency response.
	Policy C 2.5.4: Provide directional signage to Interstate 5 and State Route 14 at key intersections in the Valley, to assist emergency evacuation operations.
Conservation and Open Space Element Objective 1.1: Protect the capacity of the natural "green" infrastructure to absorb and break down pollutants, cleanse air and water, and prevent flood and storm damage. **(Multi-Hazard)**	**Policy CO 1.1.1:** In making land use decisions, consider the complex, dynamic, and interrelated ways that natural and human systems interact, such as the interactions between energy demand, water demand, air and water quality, and waste management.
Conservation and Open Space Element Objective 1.4: Minimize the long-term impacts posed by harmful chemical and biological materials on environmental systems. **(Hazardous Materials Release)**	**Policy CO 1.4.1:** In cooperation with other appropriate agencies, identify pollution sources and adopt strategies to reduce emissions into air and water bodies.
	Policy CO 1.4.2: In cooperation with other appropriate agencies, abate or remediate known areas of contamination and limit the effects of any such areas on public health.
	Policy CO 1.4.3: Encourage use of non-hazardous building materials, and nonpolluting materials and industrial processes, to the extent feasible.
	Policy CO 1.4.4: In cooperation with other appropriate agencies, continue to develop and implement effective

	methods of handling and disposing of hazardous materials and waste.
Conservation and Open Space Element Objective 2.1: Control soil erosion, waterway sedimentation, and airborne dust generation, and maintain the fertility of topsoil. **(Landslide/Subsidence/Mudslide)**	**Policy CO 2.1.1:** Review soil erosion and sedimentation control plans for development-related grading activities, where appropriate, to ensure mitigation of potential erosion by water and air.
Safety Element Objective 1.1: Identify and map areas in the Santa Clarita Valley that are susceptible to geological hazards, for use by the public and decision makers in considering development plans. **(Earthquake, Multi-Hazard)**	**Policy S 1.1.1:** Maintain maps of potentially active faults and fault zones, based on information available from the Alquist-Priolo Special Studies Zone maps, United States Geological Survey, State Board of Geologists, State Mining and Geology Board, and other appropriate sources.
	Policy S 1.1.2: Maintain maps of areas subject to liquefaction and landslides, based on data provided by the State and other appropriate source.
	Policy S 1.1.3: In the event of significant incidents of soil subsidence, compile data and prepare maps showing areas with potential for this hazard.
	Policy S 1.1.4: Maintain maps showing potential inundation areas from dam failure.
Safety Element Objective 1.2: Regulate new development in areas subject to geological hazards to reduce risks to the public from seismic events or geological instability. **(Earthquake)**	**Policy S 1.2.1:** Implement requirements of the Alquist-Priolo Earthquake Fault Zoning Act.
	Policy S 1.2.2: Restrict the land use type and intensity of development in areas subject to fault rupture, landslides, or liquefaction, in order to limit exposure of people to seismic hazards.
	Policy S 1.2.3: Require soils and geotechnical reports for new construction in areas with potential hazards from faulting, landslides, liquefaction, or subsidence, and incorporate recommendations from these studies into the site design as appropriate.
	Policy S 1.2.4: Enforce seismic design and building techniques in local building codes.

	Policy S 1.2.5: Consider the potential for inundation from failure of the Castaic or Bouquet Canyon Reservoir dams when reviewing development proposals within potential inundation areas.
Safety Element Objective 1.3: Reduce risk of damage in developed areas from seismic activity. **(Earthquake)**	**Policy S 1.3.1:** Identify any remaining unreinforced masonry buildings or other unstable structures, and require remediation or seismic retrofitting as needed to meet seismic safety requirements.
	Policy S 1.3.2: Increase earthquake safety in all public facilities through bracing of shelves, cabinets, equipment and other measures as deemed appropriate.
	Policy S 1.3.3: Provide informational materials to the public on how to make their homes and businesses earthquake safe.
	Policy S 1.3.4: Cooperate with other agencies as needed to ensure regular inspections of public infrastructure such as bridges, dams, and other critical facilities, and require repairs to these structures as needed to prevent failure in the event of seismic activity.
Safety Element Objective 2.1: Plan for flood protection as part of a multi-objective watershed management approach for the Santa Clara River and its tributaries. **(Flood)**	**Policy S 2.1.1:** On the Land Use Map, designate appropriate areas within the floodplain as open space for multi-use purposes, including flood control, habitat preservation, and recreational open space. Development in the floodplain will require mitigation as deemed necessary by the reviewing authority.
	Policy S 2.1.2: Promote Low Impact Development standards on development sites, including but not limited to minimizing impervious surface area and promoting infiltration, in order to reduce the flow and velocity of stormwater runoff throughout the watershed.
	Policy S 2.1.3: Promote the use of vegetated drainage courses and soft-bottom channels for flood control facilities to the extent feasible, in order to achieve water quality and habitat objectives in addition to flood control.
	Policy S 2.1.4: Cooperate with other agencies as appropriate regarding the related issues of flood control,

	watershed management, water quality, and habitat protection.
	Policy S 2.1.5: Promote the joint use of flood control facilities with other beneficial uses where feasible, such as by incorporating detention basins into parks and extending trails through floodplains.
Safety Element Objective 2.2: Identify areas in the Santa Clarita Valley that are subject to inundation from flooding. **(Flood)**	**Policy S 2.2.1:** Prepare and maintain maps of floodways and floodplains based on information from the Federal Emergency Management Agency (FEMA) and other appropriate sources, in order to qualify for FEMA's National Flood Insurance Program.
	Policy S 2.2.2: Identify areas subject to localized short-term flooding due to drainage deficiencies.
Safety Element Objective 2.3: Plan for and construct adequate drainage and flood control infrastructure to ensure flood protection. **(Flood)**	**Policy S 2.3.1:** Implement drainage master plans designed to handle storm flows from the 100-year storm.
	Policy S 2.3.2: Include funding for drainage and flood control improvements in the annual City budget.
Safety Element Objective 2.4: Implement flood safety measures in new development. **(Flood)**	**Policy S 2.4.1:** Require that new development comply with FEMA floodplain management requirements.
	Policy S 2.4.2: On the Land Use Map, restrict the type and intensity of land use in flood-prone areas, or require flood-proof construction, as deemed appropriate.
Safety Element Objective 2.5: Limit risks to existing developed areas from flooding. **(Flood)**	**Policy S 2.5.1:** Address drainage problems that cause flooding on prominent transportation corridors by working with multi-jurisdictional agencies and stakeholders to construct needed drainage improvements.
	Policy S 2.5.2: Provide for the maintenance of drainage structures and flood control facilities to avoid system malfunctions and overflows.
Safety Element Objective 3.1: Provide adequate fire protection infrastructure to	**Policy S 3.1.1:** Coordinate on planning for new fire stations to meet current and projected needs.

maintain acceptable service levels as established by the Los Angeles County Fire Department. **(Wildfire)**	**Policy S 3.1.2:** Program adequate funding for capital fire protection costs, and explore all feasible funding options to meet facility needs.
	Policy S 3.1.3: Require adequate fire flow as a condition of approval for all new development, which may include installation of additional reservoir capacity and/or distribution facilities.
Safety Element Objective 3.2: Provide for the specialized needs of fire protection services in both urban and wildland interface areas. **(Wildfire)**	**Policy S 3.2.1:** Identify areas of the Santa Clarita Valley that are prone to wildland fire hazards, and address these areas in fire safety plans.
	Policy S 3.2.2: Enforce standards for maintaining defensible space around structures through clearing of dry brush and vegetation.
	Policy S 3.2.3: Establish landscape guidelines for fire-prone areas with recommended plant materials, and provide this information to builders and members of the public.
	Policy S 3.2.4: Require sprinkler systems, fire resistant building materials, and other construction measures deemed necessary to prevent loss of life and property from wildland fires.
	Policy S 3.2.5: Ensure adequate secondary and emergency access for fire apparatus, which includes minimum requirements for road width, surface material, grade, and staging areas.
	Policy S 3.2.6: For areas adjacent to the National Forest, cooperate with the United States Forest Service regarding land use and development issues.
	Policy S 3.2.7: Continue to provide information and training to the public on fire safety in wildland interface areas.

Safety Element Objective 4.1: Identify sites that are contaminated with chemicals and other hazardous materials, and promote clean-up efforts. **(Hazardous Materials Release)**	**Policy S 4.1.2:** Coordinate with other agencies to address contamination of soil and groundwater from hazardous materials on various sites, and require that contamination be cleaned up to the satisfaction of the City and other responsible agencies prior to issuance of any permits for new development.
Safety Element Objective 4.2: Cooperate with other agencies to ensure proper handling, storage, and disposal of hazardous materials. **(Hazardous Materials Release)**	**Policy S 4.2.1:** On the Land Use Map, restrict the areas in which activities that use or generate large amounts of hazardous materials may locate, to minimize impacts to residents and other sensitive receptors in the event of a hazardous materials incident.
	Policy S 4.2.2: Through the development review process, ensure that any new development proposed in the vicinity of a use that stores or generates large amounts of hazardous materials provides adequate design features, setbacks, and buffers to mitigate impacts to sensitive receptors in the event of a hazardous materials incident.
	Policy S 4.2.3: Require businesses to verify procedures for storage, use, and disposal of hazardous materials.
	Policy S 4.2.4: Cooperate with other agencies to hold regular events to promote safe disposal of small amounts of household hazardous waste, including e-waste, by Santa Clarita Valley residents.
Safety Element Objective 6.1: Reduce damage from high winds through effective urban forest management. **(Severe Weather: Extreme Wind)**	**Policy S 6.1.1:** Continue tree trimming and maintenance programs for trees in the right-of-way and on public property, to limit damage from falling limbs.
	Policy S 6.1.2: Promote the planting of tree types appropriate to the local climate, to avoid breakage by brittle, non-native trees.
Safety Element Objective 7.1: Maintain and implement plans and procedures to prepare for disaster response and terrorist activities. **(Terrorism)**	**Policy S 7.1.1:** Regularly update emergency preparedness and response plans that are consistent with State plans.
	Policy S 7.1.2: Continue to provide regular training to public officials and the public on emergency procedures.
	Policy S 7.1.3: Ensure that evacuation routes are clearly posted throughout the Santa Clarita Valley.

	Policy S 7.1.4: Strengthen communication and cooperation between agencies, citizens and non-profit groups to plan for disaster response.

5.2 WILDFIRE - EXISTING MITIGATION ACTIVITIES AND WILDFIRE SERVICES

5.2.1 GENERAL PLAN POLICIES

Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of wildfire on the community in addition to the adoption of the California Fire Code (CFC) and local Building Codes discussed below. General Plan Policies S 3.2.1 – S 3.2.7 under General Plan Safety Element Objective 3.2, and General Plan Policies C 2.5.1 – C 2.5.4 under General Plan Circulation Element Objective 2.5 all relate directly to mitigation strategies that the City requires of new developments related to wildfire management.

5.2.2 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 2020, there are eleven fire stations in Santa Clarita with another 5 fire stations in the nearby area. These stations include engine companies, ladder trucks, Emergency Medical Service (EMS) paramedic squads, a Hazardous Materials Task Force, Urban Search and Rescue (USAR) services, several helicopters and other firefighting and emergency transport aircraft, serving the Santa Clarita Valley.

5.2.2.1 FIRE PREVENTION ACTIVITIES

Fire prevention services offered by LACoFD's Fire Prevention Bureau, and headed by the Fire Marshall 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 Units 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

5.2.2.2 PRESCRIBED BURNING

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

5.2.2.3 READY! SET! GO!

The READY! SET! GO! Personal Wildfire Action Plan provides the tools and tips to successfully prepare residents for wildfires or other disasters. The program provides guidance on retrofitting homes with fire-resistive construction, helps the homeowner create the necessary defensible space around their home, which will give firefighters a chance to fight the fire and protect homes and surrounding neighborhoods. Most importantly, it helps protect lives by explaining why families need to evacuate early, well ahead of a fast-approaching wildfire.

5.2.2.4 EMERGENCY PREPAREDNESS PROGRAMS

In addition to fire suppression and 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. The LACoFD also provides programs to educate youth about fire safety as well as helping to promote healthy communities.

5.2.2.5 SANTA CLARITA CERT AND SECURE PROGRAMS

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.

5.2.2.6 ADDITIONAL FIRE EDUCATION AND EMERGENCY PREPAREDNESS PROGRAMS

The City 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 include information on bioterrorism preparedness and response, sand-bagging classes for El Nino season, updates on epidemics, etc. An outreach event hosted by the City of Santa Clarita is the annual Emergency Expo, which educates 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 protection in urban/wildland interface areas may rely 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, as well as citations for property owners who resist maintaining the minimum brush clearances.

5.2.2.7 LOCAL 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 firefighting purposes. Furthermore, the Water Code specifies that water storage facilities be placed to ensure gravity emergency fire flow in the event that power lines are damaged.

5.2.3 FEDERAL PROGRAMS

The role of the federal land management 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 are responsible for providing fire suppression assistance grants and, in certain cases, major disaster assistance and hazard mitigation grants in response to fires, encouraging comprehensive disaster preparedness plans and programs, increasing the capability of state and local governments, and providing for a greater understanding of FEMA programs at the federal, state, and local levels.

5.2.3.1 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 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.

5.2.3.2 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.

5.2.3.3 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.

5.2.3.4 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.

5.2.3.5 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 and offers online resources and support.

5.2.4 WILDFIRE MITIGATION STRATEGIES AND ACTION PLANS

Table 5 -2: Wildfire Mitigation Goals and Action Items

GOAL WF001: Work with Los Angeles County Fire Department Division III, North Regional Operations Bureau (LACFD Division III) to enhance emergency services to increase the efficiency of wildfire response and recovery activities.

Wildfire Action No. 1: *Coordinate with LACFD 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 texting, mass notification and social media, i.e., Twitter, Facebook, etc.*

Action Item WF001-01: Urban Forestry provides handouts published by the LACFD to residents in high-risk areas. They include "Homeowner's Guide to Fire and Watershed Safety at the Chaparral/Urban Interface" and "Fire Hazard Reduction and Safety Guidelines." In the event of an emergency, the Streets Division will place portable, changeable message boards (CMS) to alert local residents of an emergency. The division possesses four CMS boards and additional CMS boards can be secured through local vendors. Additionally, the City and its Fire Department coordinates with the Los Angeles County Sheriff's Department to utilize ALERT LA for mass notifications for residents and businesses.

Timeline: Mass notification system (NIXLE) is already in place. Informational material is sent to high-risk residential areas on an annual basis.

Responsible Party: City Technology Services and Urban Forestry

Funding Source: General Fund

Plan Goals Addressed: Emergency Services

Priority: Low

GOAL WF002: Collaborate with LACFD 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.

Wildfire Action No. 2: *Emergency Management will pursue grants funding opportunities for individual mitigation projects, and will regularly train City Departments on grant application procedures.*

Action Item WF002-01: City will pursue funding for installation of water drop tower sites around the City of Santa Clarita to increase response time for LACFD Wildfire response in partnership with LACFD and SCV Water.

Timeline: Will pursue grants for water drop tower project starting in 2022-2023. Grant education/training conducted annually

Responsible Party: City Emergency Management, Planning, and Public Works, and partnerships with LACFD and Santa Clarita Valley Water for mitigation projects

Funding Source: General Fund, CIP, and Grants

Plan Goals Addressed: Protect Life and Property, Participation and Implementation, and Emergency Services

Priority: High

GOAL WF003: Continue collaborating with LACFD 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.

Wildfire Action No. 3: *Work with LACFD Division III to update wildland/urban interface maps.*

Action Item WF003-01: State-generated fire zone maps were adopted by the City Council in April 2012 for the Very High Fire Hazard Severity Zone.

Timeline: Maps ae updated every 3 – 5 years as determined by the State

Responsible Party: City GIS and Building & Safety Divisions

Funding Source: General Fund

Plan Goals Addressed: Protect Life and Property, Public Awareness

Priority: Moderate

Wildfire Action No. 4: *Encourage LACFD 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.*

Action Item WF003-02: The City's GIS Department updates fire zone maps per each annexation development in the City with input from the LACFD and approval through the CAL FIRE [California Department of Forestry and Fire Protection] Fire and Resource Assessment Program (FRAP). City Building and Safety staff worked with the LA County Fire Department to adopt the current Very High Fire Hazard Severity Zone maps.

Timeline: Maps are updated every 3 – 5 years as determined by the State

Responsible Party: City GIS and Building & Safety Divisions

Funding Source: General Fund

Plan Goals Addressed: Protect Life and Property, Public Awareness

Priority: Moderate

GOAL WF004: Collaborate with LACFD 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.

Wildfire Action No. 5: *Work with LACFD Division III to conduct specific community-based demonstration projects of fire prevention and mitigation in the urban interface.*

Action Item WF004-01: Los Angeles County firefighters assigned to stations in Santa Clarita conduct outreach efforts to mobile home park communities and distributed hundreds of smoke detectors/batteries to homeowners. The LACFD Forestry Unit supports development of "Fire Safe Councils;" The Sand Canyon Fire Safe Council within Santa Clarita is active and received support from LACFD for its formation and growth.

Timeline: Annually and as needed or requested

Responsible Party: City Emergency Management, LA County Fire Department

Funding Source: Funded by LACFD and City General Fund

Plan Goals Addressed: Protect Life and Property, Public Awareness

Priority: Moderate

Wildfire Action No. 6: *Continue to work with LACFD Division Ill to organize public outreach and information activities at fire stations. This allows the public to visit fire stations, see the equipment, and discuss wildfire mitigation with the station crews.*

Action Item WF004-02: The City's Communications division supports LACFD's fire awareness outreach efforts through Wildfire Awareness Week each May, in addition to their annual Swim Safety Expo held in the summertime, by sharing information on these events through social media and traditional media. These events are planned and produced by LACFD.

Timeline: Each of the two events occurs annually

Responsible Party: City Emergency Management, and Communications Division in partnership with LACFD

Funding Source: General Fund

Plan Goals Addressed: Protect Life and Property, Public Awareness

Priority: Moderate

GOAL WF005: Work with LACFD 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.

Wildfire Action No. 7: *Continue to encourage single-family residences to have fire plans and practice evacuation routes.*

Action Item WF005-01: This ongoing annual activity is promoted through the CERT program, various Fire and City outreaches, Fire-sponsored open houses, and the Emergency Expo. Outreach is completed by the City's Communications division and Emergency Services Analyst through advertisements and editorials in the City's quarterly recreation publication that is mailed for free to every residence in the City. This publication is produced using general funds.

Timeline: Annually

Responsible Party: City Emergency Management, and Communications Division

Funding Source: General Fund

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

Priority: High

Wildfire Action No. 8: *Work with LACFD Division III to continue performing fire inspections on residential property to increase awareness among homeowners and potential fire responders.*

Action Item WF005-02: During routine inspections, residents are advised of the clearance required by the LACFD for both their roof and around their structures. Pruning permits are issued to allow the resident to bring their project into compliance.

Timeline: Ongoing service provided annually or reactive as needed

Responsible Party: LACFD Division III

Funding Source: Funded through LACFD

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

Priority: High

Wildfire Action No. 9: *City and LACFD Division III continue working closely with landowners and/or developers who choose to build in the wildland/urban interface to identify and mitigate conditions that aggravate wildfire hazards in the wildland/urban interface.*

Action Item WF005-03: This ongoing practice is a coordinated effort through the Building & Safety Division, City Plan Check process, and LACFD prevention. Projects located in the VHFHSZ are required to incorporate certain construction-related requirements designed to reduce the building's risk of catching fire. These requirements are identified during building plan check and confirmed during the building inspections.

Timeline: Information provided as development projects are submitted

Responsible Party: Building & Safety, Planning, and LACFD

Funding Source: Permit fees

Plan Goals Addressed: Protect Life and Property, Public Awareness

Priority: High

Wildfire Action No. 10: *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.*

Action Item WF005-04: Per the California Residential Code, all new homes and additions to existing homes are required to install a "class A" fire-retardant roof. All new homes are required to install a sprinkler system. This requirement is consistent throughout California and is required in all states that have adopted the International Residential Code.

Timeline: Information provided as development projects are submitted

Responsible Party: Building & Safety, and Planning

Funding Source: Permit fees

Plan Goals Addressed: Protect Life and Property, Public Awareness

Priority: High

Wildfire Action No. 11: *Continue working with LACFD 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.*

Wildfire Action Item WF005-05: LACFD promotes these preparedness concepts through its "Ready, Set, Go" program, which is significantly important for the rural and canyon communities in Santa Clarita. This information is posted to the City and Fire Department websites. The City's Communications Division and Tech Services Division update the City's website with updated "Ready, Set, Go" information as directed by LACFD.

Timeline: Information provided as development projects are submitted

Responsible Party: Planning, Communications Division, Tech Services, and LACFD

Funding Source: Permit fees

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

Priority: High

GOAL WF006: 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.

Wildfire Action No. 12: *Maintain tree program in the City which includes routine inspections and review of the tree maintenance cycle.*

Wildfire Action Item WF006-01: All parkway trees located within the public right of way are part of the Tree Inventory System (Arbor Access). Urban Forestry maintains a three to six-year pruning cycle, where all city-maintained trees are pruned every three to six years depending on need. Trees identified as hazards during routine inspections are removed and replaced. The Arbor Access system is used to track and maintain all records of work performed on each individual tree; this system includes all trees on city-owned property, special districts, public right of way and parks.

Timeline: Annually and as requested

Responsible Party: Urban Forestry Division, and Landscape Maintenance Department

Funding Source: General Fund, and Landscape Maintenance District fees

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

Priority: High

Wildfire Action No. 13: *Mitigate tree hazards by addressing trees that pose a public safety hazard.*

Action Item WF006-02: Hazard trees that are located within the public right of way are removed and replaced with new trees. Trees that may be causing a visual hazard are raised and trimmed for appropriate clearance and trees with hazardous branches or limbs are addressed through selective pruning. Trees on City maintained slopes are inspected for hazardous conditions and pruned/removed if necessary. The stumps and root systems are usually left in the slope to help slope stability and prevent slope movement."

Timeline: Ongoing based on requests from the resident service center

Responsible Party: Urban Forestry, and Landscape Maintenance Division

Funding Source: General Fund, and Special Assessment fees for LMD trees

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

Priority: High

Wildfire Action No. 14: *Utilize full-size bucket truck for tree maintenance operations to enable city staff to safely perform emergency limb removal.*

Action Item WF006-03: Urban Forestry currently has a chipper truck, chipper and bucket truck that allows for full-time staff to respond quickly and effectively to an emergency situation.

Timeline: Ongoing, or as requested

Responsible Party: Urban Forestry, and Landscape Maintenance Division

Funding Source: General Fund

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

Priority: High

5.3 EARTHQUAKE - EXISTING MITIGATION ACTIVITIES

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 (not applicable for the City of Santa Clarita), ground motion amplification, liquefaction, and earthquake induced landslides. Seismic hazard maps have been published and are available through the State Division of Mines and Geology.

5.3.1 CALIFORNIA EARTHQUAKE MITIGATION LEGISLATION

The State of California is very active in addressing the threats it faces from earthquakes. As the State's population continues to grow, and urban areas become even more densely built up, the risk continues to increase. The following provides a sample of some of earthquake related codes:

- **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
- **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 building
- **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 K-12 public and 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.

5.3.2 BUILDING CODES

In California, earthquakes are often followed by revisions and improvements in the State 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. Existing mitigation activities include current mitigation programs and activities that are being implemented by county, regional, state, or federal agencies or organizations.

The City of Santa Clarita adopts the California Code of Regulations, Title 24 (the California State Building Codes), as the set of codes regulating construction within its jurisdiction, and also 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 buildings in the City's jurisdiction. The Santa Clarita Department of Building and Safety enforces building codes pertaining to earthquake hazards. These codes include:

- 2019 California Building Code
- Seismic Design Category 'E' or 'F' as determined by USGS Maps and CBC Chapter 16

5.3.3 REQUIREMENTS FOR NEW DEVELOPMENT PROJECTS

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, liquefaction and other hazards as appropriate. However, Santa Clarita does not plan check, inspect or approve "essential facilities" such as hospitals, schools and emergency response facilities (police, fire, etc.). These are under the jurisdiction of the Department of the State Architect.

The 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.

5.3.4 GENERAL PLAN POLICIES

Santa Clarita has also adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of earthquakes on the community. General Plan Policy LU 3.3.1 under General Plan Land Use Element Objective 3.3, General Plan Policies C 2.5.1 – C 2.5.4 under General Plan Circulation Element Objective 2.5, General Plan Policies S 1.1.1 – 1.1.4 under General Plan Safety Element Objective 1.1, General Plan Policies S 1.2.1 – 1.2.5 under General Plan Safety Element Objective 1.2, and General Plan Policies S 1.3.1 – 1.3.4 under General Plan Safety Element Objective 1.3 all relate directly to mitigation strategies that the City requires of new developments related to earthquake management.

5.3.5 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, which caused severe damage to four major hospital campuses, all of which were evacuated. Two hospital buildings collapsed as a result of the Sylmar Earthquake, killing 47 people. 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**).*

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." (California Seismic Safety Commission, 2001).

5.3.6 UNIVERSITY RESEARCH AND EDUCATION PROGRAMS

Earthquake research and education activities are conducted at several major universities in the Southern California region, including CalTech, USC, UCLA, UCSB, UCI, and UCSB. The local clearinghouse for earthquake information is the **Southern California Earthquake Center (SCEC).** 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).

5.3.7 LOS ANGELES COUNTY ESP

In addition, Los Angeles County along with other Southern California counties, sponsors the **Emergency Survival Program (ESP)** http://www.lacoa.org/esp.htm. The ESP is an educational resource 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.

5.3.8 SANTA CLARITA EMERGENCY MANAGEMENT PROGRAM

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

5.3.9 EARTHQUAKE MITIGATION STRATEGIES AND ACTION PLANS

Table 5 – 3: Earthquake Mitigation Goals and Action Items

GOAL E001: Identify funding sources for structural and nonstructural retrofitting of structures that are identified as seismically vulnerable.
Earthquake Action No. 1: *Provide information for property owners, small businesses, and organizations on sources of funds available to assist with post-earthquake recovery.* **Action Item E001-01:** The "Red Guide to Recovery" was secured by the City in 2013 through a grant. These books will be given to people who experience a disaster to their property. **Timeline:** Distributed to residents affected by a disaster as needed **Responsible Party:** City Emergency Management, and Code Enforcement **Funding Source:** General Fund, and Grants **Plan Goals Addressed:** Public Awareness **Priority:** Low
Earthquake Action No. 2: *Explore options for including seismic retrofitting in existing programs such as low-income housing, insurance reimbursements, and pre and post disaster repairs.* **Action Item E001-02:** Certain building renovation and repair projects require retrofitting to components of entire lateral force-resisting systems. The extent of the retro fitting depends upon the scope of the renovation. Timeline and priority remain the same for this action item. **Timeline:** Case-by-case; during plan check process for new developments or remodels **Responsible Party:** Public Works **Funding Source:** Permit Fees **Plan Goals Addressed:** Protect Life and Property, Public Awareness **Priority:** Low
GOAL E002: Seismically retrofit city-owned facilities to meet essential and critical building codes and standards, as needed.
Earthquake Action No. 3: *Evaluate and identify facility in the community for mass shelter and ensure seismic retrofit is completed.* **Action Item E002-01:** Identify preferred location by 2022 and begin to seek grant for any necessary retrofit projects. **Timeline:** 2 – 5 years **Responsible Party:** Building & Safety, CIP Division, Parks and Recreation **Funding:** General Fund and Grants **Plan Goals Addressed:** Protect Life and Property, Emergency Services **Priority:** High
GOAL E003: Educate citizens about seismic risks, the potential impacts of earthquakes and opportunities for mitigation actions.
Earthquake Action No. 4: *Organize and hold an annual Earthquake Forum.* **Action Item E003-01:** 2013 Santa Clarita Emergency Expo, produced by KHTS AM 1220 radio and supported in sponsorship with the City, Henry Mayo Newhall Hospital, utilities, and the private sector. 3,000 people ended the Expo. In addition to earthquake forums, Building and Safety conducts public outreach meetings to inform the building industry of changes to the building code prior to each three-year adoption cycle. The information includes changes to seismic design requirements.

Timeline: Annual
Responsible Party: Various City departments in partnership with local non-profits
Funding Source: General Fund and non-profit organization funding
Plan Goals Addressed: Protect Life and Property, Public Awareness
Priority: Moderate

Earthquake Action No. 5: *Distribute emergency preparedness information to the public.*

Action Item E003-02: The City's Communication Division uses Twitter, Facebook, Instagram, City of Santa Clarita website, and the City e-Notify system to provide preparedness outreach, training opportunities, and workshop information to community partners and residents. Updates are posted and information is sent through social media on an as needed basis. Examples include the Great Shakeout, National and Earthquake Preparedness Months. The Communication staff continues to increase use of social media for preparedness and emergency response. Preparedness video downloadable for social media. City E- Notification requests for emergency preparedness information has increased by 12%.

Timeline: Annually and as needed
Responsible Party: Communication Division, and Emergency Management
Funding Source: General Fund
Plan Goals Addressed: Protect Life and Property, Public Awareness
Priority: Moderate

Earthquake Action No. 6: *Encourage residents to prepare an earthquake kit, an evacuation plan and mitigate non-structural hazards.*

Action Item E003-03: Outreach efforts are ongoing pertaining to earthquake preparedness were made to homeowner associations, service organizations, senior apartments, parent-teacher associations, and church groups. Additionally, a component in the CERT program offered each year addresses this preparation. The City's Communications Division includes messaging on social media and e-Notify system. The Emergency Management Analyst coordinates the CERT program with LACFD.

Timeline: Annually
Responsible Party: Communication Division, and Emergency Management
Funding Source: General Fund
Plan Goals Addressed: Protect Life and Property, Public Awareness
Priority: Moderate

GOAL E004: 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.

Earthquake Action No. 7: *Develop an inventory of City facilities that require seismic upgrades.*

Action Item E004-01: The City is currently evaluating stress cracks in structural concrete tilt-up panels at the Sports Complex Gymnasium building to assess risk/hazard and to propose a retrofit and/or repair. Will evaluate if more detailed engineering for earthquake retrofitting is needed.

Timeline: Inventory will be complete by 2023
Responsible Party: Public Works
Funding Source: General Fund
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: Moderate

Earthquake Action No. 8: *Encourage owners of non-retrofitted structures to upgrade them to meet seismic standards.*

Action Item E004-02: Provide Building Code related assistance to owners of structures that are interested in performing structural upgrades. In addition, the City's Building and Safety staff are aware of the need to enforce seismic strengthening of existing older buildings when undergoing significant alterations or change of use if significant hazards or deficiencies are noted during the plan check process.

Timeline: Information provided as development projects are submitted
Responsible Party: Building & Safety
Funding Source: Permit Fees
Plan Goals Addressed: Protect Life and Property, Public Awareness, Participation and Implementation
Priority: Moderate

GOAL E005: Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.

Earthquake Action No. 9: *Provide information to City facilities on securing bookcases, filing cabinets, light fixtures, and other objects that can cause injuries and block exits.*

Action Item E005-01: Every two years, City Emergency Management will provide information to City facilities on this topic.

Timeline: Every two years
Responsible Party: City Emergency Management and Facilities
Funding Source: General Fund
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: Moderate

5.4 ENERGY DISRUPTION - EXISTING MITIGATION ACTIVITIES

The City of Santa Clarita has adopted various California State codes and programs, and local ordinances Building to mitigate power disruptions and to plan mitigation strategies. Building codes can be used to ensure that minimum required construction standards are met to safeguard public health and safety, and can also be used to increase a community's ability to deal with electrical outages by requiring that facilities are adequately prepared for power disruptions. General Plan policies and Zoning ordinances can specify the type of land use that is acceptable in various locations in a community, and thus affect the electric power requirements of an area as areas zoned "residential" will have a different electricity profile than areas zoned "commercial" or "industrial."

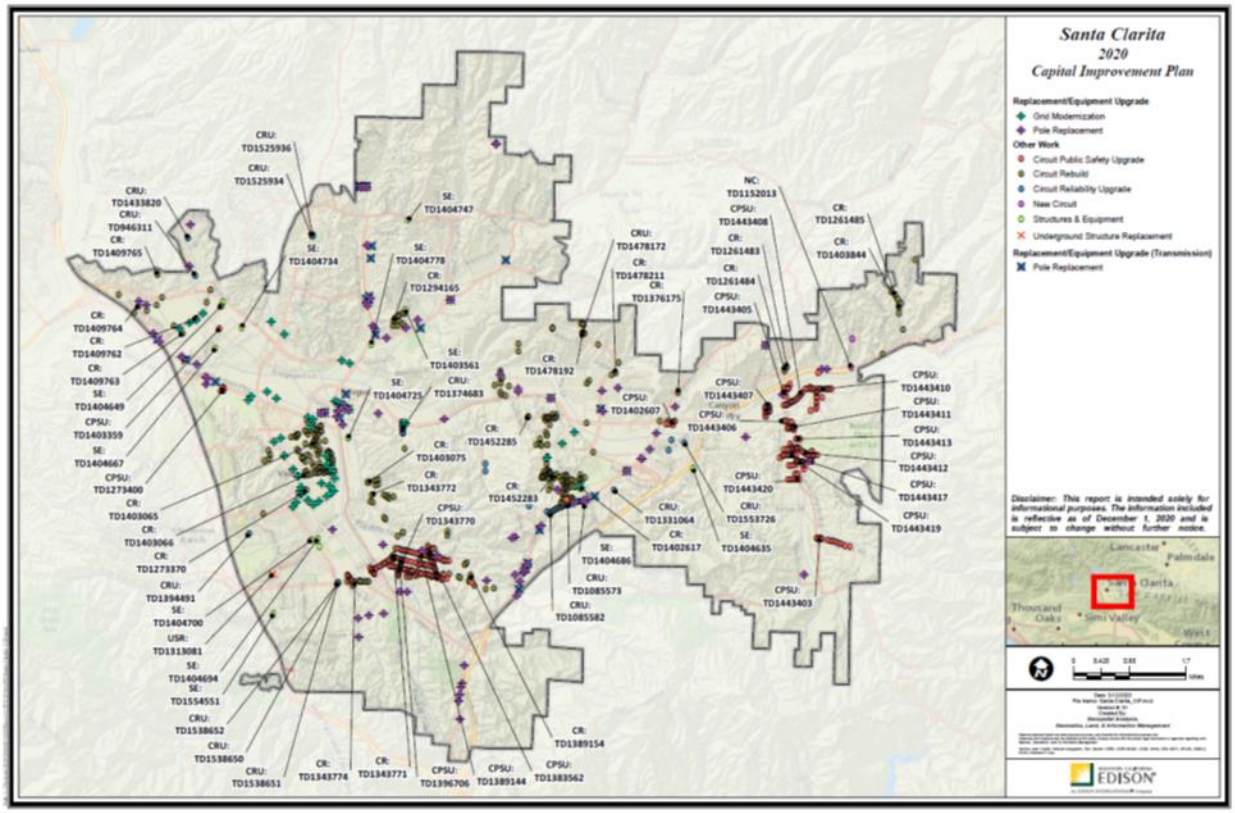
5.4.1 STATE BUILDING CODES

Effective January 1, 2020, the Building and Safety Division of the Department of Public Works began enforcement of the 2019 State Building Codes for all new residential and non-residential construction projects. Projects submitted after January 1, 2020, shall comply with the new codes. Projects submitted prior to January 1, 2020, shall comply with the 2016 state building codes. A description of building codes and design criteria can be found on the City's website: http://www.santa- clarita.com/Index.aspx?page=554. Santa Clarita uses these codes as part of a strategy to mitigate the potential for electrical and other energy outages as well as to ensure public safety, under the guidance of the Electrical Power Disruption – Toolkit for Local Government (Cal-OES, 2020).

5.4.2 ELECTRIC UTILITY POLE REPLACEMENT PROGRAM

Per Southern California Edison, the Pole Loading, Intrusive Pole Inspection and Pole Remediation programs are part of a 12-year plan to perform pole assessments and replacements of wood, light duty steel, and fiberglass/composite poles in the electrical system and to bring poles into compliance with new, regulated safety standards. Poles are inspected and replaced relative to specified compliance due dates. The number of poles scheduled to be replaced in the system will vary from year-to-year. Within the City of Santa Clarita, SCE has identified 965 projected distribution poles and 128 projected sub transmission poles to be replaced. SCE's plan is to continue to communicate the scope of work and progress each year to the City as well as to joint pole owners and renters. The map below provides an overview of pole replacement program locations.

Map 19: SCE Pole Replacement Map - Santa Clarita



5.4.3 GENERAL PLAN POLICIES

The City of Santa Clarita is primarily urban and as such, is subject to multiple hazards that can result in energy disruption. Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of energy disruption on the community. General Plan Policy CO 1.1.1 under the General Plan Conservation and Open Space Element Objective 1.1, General Plan Policy S 1.1.4 under General Plan Safety Element Objective 1.1, and General Plan Policies S 7.1.1 – 7.1.4 under the General Plan Safety Element Objective 7.1, all relate directly to mitigation strategies that the City requires of new developments related to energy disruption resulting from man-made or natural disasters.

5.4.4 ENERGY DISRUPTION STRATEGIES AND ACTION PLANS

Table 5 – 4: Energy Disruption Mitigation Goals and Action Items

Goal ED001: Mitigate the impact of eletrical outages on special needs residents
Energy Disruption Action No. 1: *Address the requirements of special needs residents and programs to ensure ongoing power and mitigate the impact of power outages.* **Action Item ED001-01:** A) Work with CERT members to identify and assess the key vulnerabilities of special needs residents in their communities. B) Create a program with SCE to share the database of special needs customers with the City and assess the feasibility of battery back-up program for special needs residents. **Timeline:** Begin quarterly meetings w/SCE in early 2022 **Responsible Party:** City Emergency Management and SCE **Funding Source:** General fund and SCE **Plan Goals Addressed:** Protect Life and Property, Public Awareness, Participation and Implementation **Priority:** Moderate
Goal ED002: Develop an Energy Assurance Plan in Accordance to the State of California Energy Assurance Planning Framework
Energy Disruption Action No. 2: *Develop and implement new energy assurance strategies for critical City facilities.* **Action item ED002-01:** Partner with USACE to identify generator hook-up capabilities at key City locations. **Timeline:** Quarterly meetings with SCE and complete installation of generators at key city facilities by 2023 **Responsible Party:** Emergency Management and Public Works **Funding Source:** General fund and grants **Plan Goals Addressed:** Protect Life and Property, Emergency Services **Priority:** Moderate

5.5 DROUGHT - EXISTING MITIGATION ACTIVITIES

The worst drought in California's recorded history occurred from December 2011 to March 2019 and many of the mitigation measures outlined below were initiated during that period which had been declared a State of Emergency. Southern California is not currently experiencing drought conditions, but will likely experience extreme droughts like this with growing frequency due to climate change. Some of the mitigation measures, such as the Santa Clarita Valley Water Division Ordinance 43 are not currently enforced, but can be re-implemented at any time as necessary.

5.5.1 STATE AND FEDERAL WATER MANAGEMENT OPERATIONS

On January 17, 2014, Governor Jerry Brown Jr. declared a state-wide drought State of Emergency. Under the requirements issued by the Governor, specific water use restrictions were put into place and goals were established for communities to decrease water use (State of California, California Department of Water Resources, 2015). Key measures in the proclamation include:

- Asking all Californians to reduce water consumption by 20 percent and referring residents and water agencies to the Save Our Water campaign - www.saveourh2o.org - for practical advice on how to do so
- Directing local water suppliers to immediately implement local water shortage contingency plans
- Ordering the State Water Resources Control Board (state water board) to consider petitions for consolidation of places of use for the State Water Project and Central Valley Project, which could streamline water transfers and exchanges between water users
- Directing the California Department of Water Resources and the state board to accelerate funding for projects that could break ground this year and enhance water supplies
- Ordering the state water board to put water rights holders across the state on notice that they may be directed to cease or reduce water diversions based on water shortages
- Asking the state water board to consider modifying requirements for releases of water from reservoirs or diversion limitations so that water may be conserved in reservoirs to protect cold water supplies for salmon, maintain water supplies and improve water quality

Although the drought ended in 2019, droughts are a common occurrence in Southern California and are increasing in frequency, duration and severity. The measures listed above will most likely be implemented in some form depending on the length and severity of the next drought.

5.5.2 SANTA CLARITA DROUGHT PROGRAMS

The Santa Clarita Valley Water Division (SCVWD) provides water services to the Santa Clarita Valley, and provides conservation and drought information via its website which also includes rebate program links and other water savings initiatives (https://yourscvwater.com/).

On June 10, 2015, the Castaic Lake Water Agency Board of Directors approved the Santa Clarita Valley Water Division **Ordinance No. 43** establishing Water Conservation and Water Supply Shortage Restrictions and Regulations in compliance with the State Water Resources Control Board 32% conservation mandate (Santa Clarita Water Division, 2015).

Ordinance No. 43 prohibited the following actions:

- Irrigating outdoor lawns, turfs and landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, and or/structures.
- The application of potable water to driveways, sidewalks, and other hardscape. Failure to repair a leak within 24 hours of detection or notification.
- Irrigating outdoor lawns, turf, or vegetated area of landscape during and within 48 hours following measurable precipitation.
- The use of a hose to wash a motor vehicle without an automatic shut-off nozzle. Non-recirculating fountains and decorative features.
- Irrigating outdoor lawns, turf, landscape or other vegetated area during the hours of 9:00 a.m. to 5:00 p.m.
- Irrigating outdoor lawns, turf, landscape, or other vegetated area using a landscape irrigation system for more than ten (10) minutes per station per day.
- Customers must adjust to the following water schedule based on the last digit of their address.

These prohibited actions would constitute a violation, punishable by a fine of up to five hundred dollars ($500) for each day in which the violation occurs.

Internal City drought and climate change efforts include the turning off of public fountains, replacing toilets and urinals to comply with California “Green” code water conservation requirements, replacing water fixtures, and limiting outdoor watering at City-owned facilities. Furthermore, the City installed Smart controllers at City facilities that save 330 million gallons of water annually, including an irrigation controller modernization program that replaced more than 500 obsolete irrigation controllers with Smart, weather-based irrigation controllers in water parks, medians, and streetscaping. The result was a significant water savings per year.

As with the State Water Management Operations outlined above, the City may need to implement the prohibitions of Ordinance 43 during the next drought cycle.

5.5.3 GENERAL PLAN POLICIES

Because California is prone to regular periods of drought, which have increased in severity and longevity due to climate change, Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of drought on the community. General Plan Policy LU 7.2.2 under General Plan Land Use Element Objective 7.2, and General Plan Policies LU 7.4.1 – LU 7.4.2 under General Plan Land Use Element Objective 7.4 all relate directly to mitigation strategies that the City requires of new developments related to drought management.

5.5.4 DROUGHT MITIGATION STRATEGIES AND ACTION PLANS

Table 5 – 5: Drought Mitigation Goals and Action Items

Goal D001: Work with local Water agencies to develop new drought mitigation strategies
Drought Action No. 1: *Partner with SCV Water to provide educational material to be released to the public on drought condition and conservation action.* **Action Item D001-01:** During the last major drought cycle in 2014, City officials in coordination with Castaic Lake Water Agency, presented an update on the severe drought conditions, weather probabilities, public information, outreach, and legislation on water conservation. Updates to this information is ongoing and provided to residents in annual water report and Drought Ready SCV. **Timeline:** Continued discussions with SCVWA and internal quarterly drought team meetings **Responsible Party:** City Emergency Management, Parks and Recreation, Landscape Maintenance Division, and Communications Division **Funding Source:** General fund and LMD **Plan Goals Addressed:** Public Awareness, Participation and Implementation **Priority:** Moderate

5.6 SEVERE WEATHER: EXTREME HEAT/EXTREME WIND - EXISTING MITIGATION ACTIVITIES

5.6.1 SANTA CLARITA HEAT EMERGENCY PLAN

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:

Table 5 - 6: Excessive Heat Temperature Thresholds

Location	Excessive Heat Warning Temperature Threshold
Mountains	100 degrees Fahrenheit or higher
Coastal Areas	105 degrees Fahrenheit or higher
Valleys	110 degrees Fahrenheit or higher

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. City libraries have been designated by LA County Public Health as Cooling Centers in Santa Clarita, but any City-owned may be designated as a Cooling Center as necessary. 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.”

5.6.2 SEVERE WIND EMERGENCY RESPONSE AND VOLUNTEER WEATHER SPOTTERS

Severe wind can result in the involvement of City’s emergency response personnel. In addition, to assist 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.

5.6.3 PARTNERSHIPS

Santa Clarita continually works with Southern California Edison to mitigate the damage to the electrical infrastructure due to wind events. This includes the installation of underground utility lines and an active tree removal program to eliminate dead trees in the area.

5.6.4 HAZARDOUS TREE MAPPING AND REMOVAL PROGRAM

Santa Clarita works with Urban Forestry to coordinate efforts for mapping potentially hazardous trees. In addition, the City has a portal for the public to report the locations of trees that may pose a risk. The City also has an ongoing tree removal program to mitigate the damage caused by falling trees during a wind event.

5.6.5 GENERAL PLAN POLICIES

Because Southern California is prone to extreme heat and extreme wind events, Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of severe weather: extreme heat/extreme wind on the community. General Plan Policies LU 7.1.1 – 7.1.2 under the General Plan Land Use Element Objective 7.1, and General Plan Policies S 6.1.1 – 6.1.2 under General Plan Safety Element Objective 6.1 all relate directly to mitigation strategies that the City requires of new developments related to severe weather: extreme heat/extreme wind management.

5.6.6 SEVERE WEATHER: EXTREME HEAT/EXTREME WIND STRATEGIES AND ACTION PLANS

Table 5 – 7: Severe Weather – Extreme Heat/Extreme Wind Mitigation Goals and Action Items

Goal SW-EH001: Continue to enhance participation in Southern California Edison's independent system operator notification procedure process for rolling blackouts.
Severe Weather Action No. 1 (Extreme Heat): *Continue to participate with SCE's notification system to inform the community of impending rolling blackouts.* **Action Item SW-EH001-01:** Annual notification tests conducted by Southern California Edison in preparation for power outages and rolling blackouts. **Timeline:** Flash Drills conducted quarterly **Responsible Party:** City Emergency Management, Communications Division, and SCE **Funding Source:** SCE **Plan Goals Addressed:** Public Awareness, Participation and Implementation, and Emergency Services **Priority:** Moderate
Goal SW-EW001: Enhance programs to keep trees from threatening lives, property, and public infrastructure during windstorm events.

Severe Weather Action No.2 (Extreme Wind): *Partner with responsible agencies and organization to make information electronically available to property owners to reduce risk from tree failure to life, property, and utility systems.*

Action Item SW-EW001-01: Urban Forestry distributes informational brochures published by the International Society of Arboriculture (ISA) to residents during special events and routine field work. This information includes "How to Recognize Hazardous Trees." The Urban Forestry Division is also active in professional tree organizations, which are comprised of both municipal and private tree professionals. Specifically, the City is involved with Street Tree Seminar (STS), where 85% of members/attendees are from other municipal agencies. Through seminars and meetings at STS, City staff are able to network with other agencies on different methods used for emergency response.

Timeline: Ongoing; information distributed upon request
Responsible Party: Urban Forestry
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Public Awareness
Priority: Moderate

Severe Weather Action No. 3 (Extreme Wind): *Develop partnerships between utility providers and City/County Public Works agencies to document known hazard areas.*

Action Item SW-EW001-02: Urban Forestry has a positive working relationship with Southern California Edison (SCE). In a cooperative effort, Urban Forestry and SCE provide residents with informational brochures to guide them in selecting an appropriate tree for situations where power lines exist. Both agencies provide ISA's "Right Tree, Right Place" brochure as a guideline for homeowners. The City has partnered with SCE to remove inappropriate trees located under power lines and replace those trees with trees that will not interfere with those lines; the program removes potentially hazardous trees (when grid pruning is performed) at no cost to residents.

Timeline: Ongoing; updates to known hazard areas submitted as necessary
Responsible Party: Urban Forestry
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Public Awareness
Priority: Moderate

Severe Weather Action No. 4 (Extreme Wind): *Identify and track potentially hazardous trees.*

Action Item SW-EW001-03: Urban Forestry uses a tree inventory program (Arbor Access) that allows it to track, monitor, and address potentially hazardous trees in its inventory. In addition, Urban Forestry participates in the City's eService system (CRM) that residents can use to report hazardous trees to officials. All concerns that are submitted are then inspected by Urban Forestry staff and any corrective actions needed are identified. Additionally, Urban Forestry staff respond to reports of fallen tree limbs, performs routine inspections on major thoroughfares and City maintained landscape, and continues to identify dead trees in neighborhoods across the City. In the event of a hazardous condition arising from severe weather in city maintained landscape, contracts are in place to immediately have the area closed off to the public and made safe.

Timeline: Ongoing; updates to inventory program submitted as necessary
Responsible Party: Urban Forestry, and Landscape Maintenance Division
Funding Source: General Fund and Special Assessment fees
Plan Goals Addressed: Protect Life and Property, Public Awareness
Priority: Moderate

Goal SW-EW002: Enhance strategies for debris management for windstorm events.

Severe Weather Action No. 5 (Extreme Wind): *Develop coordinated management strategies for clearing debris from roads of fallen trees and clearing debris from public and private property.*

Action Item SW-EW002-01: Santa Clarita's Debris Management Plan includes:
• Phase 1 - Debris is moved to allow for movement of emergency vehicles for emergency response purposes.
• Phase 2 - A coordinated debris removal from the public right of way initiated. Determination of whether additional contractors/agencies are needed is based on the severity of the event.
Debris monitoring also takes place to measure truck capacities, identification of hazardous waste, and identify recyclable materials within debris. Urban Forestry and the landscape maintenance division receives emergency calls and responds to each location to resolve issues by securing the public right of ways. Outside contractors may be called in for severe conditions. The Streets Division will respond and will also contract out to private contractors in severe situations. Both Urban Forestry and Street Maintenance have a standard out-call procedure for emergencies. Designated employees are on-call at all times and on weekends in the event an emergency occurs, and a 30-minute response time is standard. The City works with AAMCOM to allow residents 24 hour access to report emergencies. A contracted landscape monitor is available 24 hours to inspect, assess and report emergency situations. Contracts are in place to allow contractors to respond immediately to hazard locations to address fallen trees, debris, and make safe city maintained public and private property.
Urban Forestry is working with other departments to actively monitor the overall health of forests, focusing efforts on removing dead trees, and proactively pruning/deep watering trees along major thoroughfares and City maintained landscape in an effort to minimize limb and complete tree failures as a result of drought.

Timeline: Following an extreme wind event
Responsible Party: General Services, Engineering Services, and Landscape Maintenance Division
Funding Source: General fund, emergency funding, or emergency reserves depending on nature of the event
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: Moderate

Goal SW-EW003: Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.

Severe Weather Action No. 6 (Extreme Wind): *Increase use of underground utilities or covered conductors where possible and participate in Underground Utilities Program.*

Action Item SW-EW003-01: Zoning Code requires undergrounding of utilities with powerlines that handle voltage amounts in excess of 34KV. The City conditions eligible development and redevelopment projects to underground utilities as necessary.

Timeline: Case-by-case basis as development and redevelopment projects are submitted to the City
Responsible Party: Public Works
Funding Source: SCE
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: Moderate

5.7 PANDEMICS - EXISTING MITIGATION ACTIVITIES

The World Health Organization has urged countries, including the United States to scale up the testing, isolation of infected persons, and contact tracing in order to combat the spread of a pandemic viral outbreak. By adopting these practices, infected persons can be located, isolated and treated, and traced to the close contacts with whom they might have infected, and isolate them too.

By separating infected persons from the rest of the general population/public, the spread of a virus can be slowed, slowing the speed of the epidemic. This strategy has been used extensively in the past, for example to stop epidemics of smallpox and Ebola. Using testing and tracing helps to avoid having a nation or region from having to proceed with mandatory lockdown measures, or may decrease the length of time lockdown measures may be necessary.

5.7.1 CDC GUIDANCE FOR REDUCING COVID-19 TRANSMISSION

The Centers for Disease Control (CDC) has outlined a framework for states and local municipalities to consider as they decide what mitigation efforts to implement in response to the COVID-19 Pandemic. This framework for considering mitigation strategies that are tailored to each community is broken into three sections:

5.7.1.1 LEVEL OF MITIGATION NEEDED BY LEVEL OF COMMUNITY TRANSMISSION AND COMMUNITY CHARACTERISTICS

Table 5 - 8: COVID-19 Community Transmission Mitigation

Level of Community Transmission	Community Characteristics & Description	Level of Mitigation
Substantial, uncontrolled transmission	Large scale, uncontrolled community transmission, including communal settings (e.g., schools, workplaces)	Shelter in place
Substantial, controlled transmission	Large scale, controlled transmission, including communal settings (e.g., schools, workplaces)	Significant mitigation
Minimal to moderate community transmission	Sustained transmission with high likelihood or confirmed exposure within communal settings and potential for rapid increase in cases	Moderate mitigation
No to minimal community transmission	Evidence of isolated cases or limited community transmission, case investigations underway; no evidence of exposure in large communal settings	Low mitigation

5.7.1.2 FACTORS TO CONSIDER FOR DETERMINING MITIGATION STRATEGIES

- **Epidemiology:** Consists of accounting for a) extensive mitigation where community transmission is high, b) number and type of outbreaks in vulnerable populations such as nursing homes and correctional facilities, c) severity of the disease, d) impact on healthcare systems and other critical infrastructure/services, and e) epidemiology in surrounding communities.
- **Community Characteristics:** Consists of determining a) size of community/population density, b) level of community engagement/support, c) size and characteristics of vulnerable populations, d) access to healthcare, e) transportation infrastructure, f) type of business/industry, g) congregate living facilities, h) planned events/gatherings, and i) relationship with surrounding communities.
- **Healthcare Capacity:** Considers a) healthcare workforce, b) number of healthcare facilities, c) testing activity, d) intensive care capacity, and e) availability of personal protective equipment (PPE).
- **Public Health Capacity:** Takes into account a) public health workforce and availability of resources to implement strategies such as testing and contact tracing, and b) available support from other state/local government agencies and partner organizations.

5.7.1.3 OVERVIEW OF POSSIBLE MITIGATION STRATEGIES TO CONSIDER IN COMMUNITIES WITH LOCAL COVID-19 TRANSMISSION ACROSS SETTINGS AND SECTORS

- **Promote Behavior that Prevents Spread:** Emphasizes educating the community about staying home when sick or exposed to COVID-19, proper hand hygiene and respiratory etiquette, use of face coverings, and ensuring adequate availability of cleaning supplies, and posting messages that promote prevention behaviors.
- **Maintain Healthy Environments:** Promotes intensifying cleaning/disinfection of frequently touched surfaces, ensuring adequate ventilation, and safety of water systems, modifying layouts and installation of physical barriers in indoor spaces to promote social distancing, closure or staggering use of communal spaces and intensified cleaning/disinfection, and limit or clean/disinfect shared objects between uses.
- **Maintain Healthy Operations:** Focuses on protecting vulnerable populations, promoting physical and mental health, maintaining awareness of local and state regulations, staggering/rotating schedules, creating static “cohort” groups and avoid mixing groups, promoting virtual events and social distancing at small in-person events, limiting on-essential visits and activities, encourage work from home strategies, limiting non-essential travel, designating a COVID-19 point of contact, implementing flexible non-punitive leave policies, create back-up staffing, train staff on safety protocols, consider

daily health checks (temperature/symptom screening), implementing communication system for reporting and notification of exposure, and notification of facility closures.

- **Prepare for When Someone Gets Sick:** Focuses on safely transporting and isolating infected individuals to their home or healthcare facility, encouraging infected persons to follow CDC guidance caring for oneself while sick, notifying local health officials of new cases while maintaining confidentiality, notifying persons exposed to COVID-19 and advise to self-isolate and self-monitor for symptoms, advise people who have contracted COVID-19 when they may return based on CDC criteria, and closing off areas used by infected individuals then disinfecting after 24 hours.

5.7.2 SANTA CLARITA COVID-19 RESPONSE AND MITIGATION

Santa Clarita has been tracking developments in the COVID-19 pandemic since early March 2020. A web page has been created that features almost daily press releases covering the latest developments, local organization updates, event cancellations, resources, information on COVID-19 testing, and City News related to COVID-19. In addition to the webpage, the City has followed State and County Public Health Department guidelines throughout the pandemic and regularly posts guidance updates as they change.

5.7.2.1 SANTA CLARITA SAFER BUSINESS COMMITMENT – SHOP LOCAL INITIATIVE

The City of Santa Clarita announced the launch of the "Safer Business Commitment", on June 16, 2020 as a part of the Shop Local initiative! The program is intended to let the community know that after months of being shut down due to the COVID pandemic, many local businesses have reopened and want customers to know it is safe to Shop Local. The intent is to promote the success of local businesses and build community confidence.

Santa Clarita Valley businesses can make the commitment by abiding to a set of safety guidelines and best practices, as issued by the Centers for Disease Control and Prevention (CDC) and Los Angeles County Department of Public Health in response to the COVID-19 pandemic, and completing a short online form. Completing the form adds each business to a published list of "Safer" businesses. Potential customers can view this list online at VisitSantaClarita.com/SaferBusinessCommitment to know which local businesses are committing to safety precautions for the safety of patrons and employees alike.

5.7.3 PANDEMIC STRATEGIES AND ACTION PLANS

Table 5 – 9: Pandemic Mitigation Goals and Action Items

Goal P001: Take action to prepare for a pandemic.
Pandemic Action No. 1: *Establish stockpile of Personal Protective Equipment (PPE) supply for City employees.* **Action Item P001-01:** Work with local, state, and federal agencies to determine the community need for PPE in the event of a pandemic. Emergency Services Analyst will continue to evaluate the need for PPE for City staff. **Timeline:** Inventory taken annually **Responsible Party:** Emergency Management **Funding Source:** General fund, Emergency Management fund, and Grants **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation **Priority:** High
Pandemic Action No. 2: *Development workplace safety protocols to ensure continuity of City services and alternative programming.* **Action Item P001-02:** Implement strategies to ensure safe work environment for all staff at each City facility. **Timeline:** Updated as necessary to be compliant with most current County Public Health Orders **Responsible Party:** Technology Services, and Human Resources **Funding Source:** General fund, and Grants **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation **Priority:** High
Pandemic Action No. 3: *Routine audit technology to work efficiently under pandemic conditions.* **Action Item P001-03:** Provide VPN access and additional computers with video conferencing and establish means for electronic submittal of applications and city forms. Establish protocols for remote work by City employees where possible. **Timeline:** Completed and provided on a case-by-case basis **Responsible Party:** Technology Services, human Resources **Funding Source:** General fund, and Grants **Plan Goals Addressed:** Protect Life and Property **Priority:** High

Pandemic Action No. 4: *Develop plan to provide assistance to support local economy.*

Action Item P001-04: Help local businesses to develop strategies to continue operations safely, including waiving or reducing business license fees, and an expedited process for temporarily moving operations outdoors.

Timeline: Policies already created and implemented as necessary
Responsible Party: Community Development
Funding Source: General fund, and Grants
Plan Goals Addressed: Protect Life and Property, Public Awareness, Participation and Implementation
Priority: High

Goal P002: Develop methods for reducing the impacts of a pandemic during an event.

Pandemic Action No. 5: *Conduct a public awareness and educational campaign to raise awareness about proper hygiene, and social distancing.*

Action Item P002-01: The City will post informational flyers with proper hand washing, social distancing and disinfecting guidelines at all public facilities. This message will provide phone numbers and links to Public Health Organization websites and will be created when Public Health agencies with jurisdiction over Santa Clarita issue pandemic related health orders.

Timeline: Evaluate and implement as needed for compliance
Responsible Party: Communications, Human Resources, Risk Management, and Emergency Management
Funding Source: General Fund
Plan Goals Addressed: Protect Life and Property, Public Awareness
Priority: High

5.8 MAN-MADE HAZARDS: CYBER-ATTACK/TERRORISM - EXISTING MITIGATION ACTIVITIES

5.8.1 CYBER-ATTACK MITIGATION

In the 2003 *National Strategy to Secure Cyberspace*, the Cybersecurity & Infrastructure Security Agency (CISA) division of the Department of Homeland Security identified major actions and initiatives designed to secure government agencies' cyberspace. These have been adapted to apply to Santa Clarita and can be considered the strategic goals of any efforts to mitigate cyber threats.

- Continuously assess threats and vulnerabilities to Santa Clarita cyber systems;
- Authenticate and maintain authorized users of Santa Clarita cyber systems;
- Secure Santa Clarita's wired and wireless local area networks;
- Improve security in city government outsourcing and procurement; and
- Establishment of information technology security programs and participation in information sharing and analysis efforts with other state and local government agencies.

5.8.2 TERRORISM MITIGATION

The following examples provide a summary of mitigation and prevention activities that support Santa Clarita and the County of Los Angeles.

5.8.2.1 SANTA CLARITA TERRORISM MITIGATION EFFORTS

The City of Santa Clarita publishes emergency preparedness information, downloads, and videos on its Web site, including the LA County Emergency Survival Guide that includes a section on terrorism. The City has an active CERT program with volunteers trained to assist in disasters. Santa Clarita has also implemented the eNotify System that allows the City to E-mail residents that sign-up in case of an emergency situation. Finally, Santa Clarita's Emergency Operations Plan addresses emergency response actions that the EOC Center will take in the event of any catastrophic event including acts of terrorism.

Santa Clarita also has an active Emergency Communications Team (Santa Clarita Emergency Communications Team - SCECT) comprised of amateur radio operators that are trained in disaster communication operations. In addition the City utilizes the Nixle system for emergency notifications (texting and E-mail). Nixle supplements the E notify system as a communications tool.

5.8.2.2 LOS ANGELES COUNTY SHERIFF'S DEPARTMENT

The Los Angeles County Sheriff's Department is the lead law enforcement agency for the region in the event of a terrorist event. Individual cities will be responsible for consequence management. The following are practices or projects that are currently active in the Region.

- **Canine Unit:** The Los Angeles County Sheriff maintains five (5) specially training canines to detect explosives as part of the Arson/Explosive Detail and one chemical/biological threat K-9 as part of the Hazardous Materials Detail.
- **ALERT LA:** The Los Angeles County has made ALERT LA, a reverse 911 system for mass notification and communication, available to Santa Clarita.
- **Terrorism Early Warning Group*:*** In 1996, the Los Angeles County Sheriff Department established the Terrorism Early Warning (TEW) Group (Terrorism Early Warning Group, 2008) to act as an interdisciplinary group in which local, state, and federal agencies work together, share information, combine resources, enhancing the ability to identify and respond to acts and threats of terrorism. This group is a significant resource for identifying and assessing potential threats, making appropriate notifications and recommendations, and aiding in mission planning and the efficient allocation of resources.
- **Emergency Response Actions*:*** The Los Angeles County Sheriff's Department is the lead agency for crisis management, perimeter security, access control, traffic/crowd control, evacuations, notifications, and safeguarding evidence. Crisis management activities may include: a) investigation, tracking, and maintaining scene integrity, b) coordinating coroner issues with the Los Angeles County Coroner's Department, c) use of Special Weapons and Tactics (SWAT) or Rapid Deployment Force (RDF) units, and d) assisting with damage assessment and fatalities management.

5.8.2.3 LOS ANGELES COUNTY FIRE DEPARTMENT

The Los Angeles County Fire Department is the lead agency for fire response, hazardous materials events, and medical/rescue operations. The County Fire Department provides support as necessary to the Sheriff for Crisis Management activities. Existing procedures, such as the Fire Department's Hazardous Materials Response procedures are used as necessary. The Fire Department assists with:

- Fire and rescue operations
- Emergency medical services coordination
- Perimeter and access control
- Evacuation operations
- Notifications
- Safeguarding evidence
- Damage assessment
- Fatalities management
- Addressing environmental needs
- Obtaining personnel with radiological training
- Ensuring decontamination procedures (radiological and chemical) are in place

- Ensuring biological agents are contained

5.8.2.4 JOINT REGIONAL INTELLIGENCE CENTER

The Joint Regional Intelligence Center (JRIC) was established in 2006 as a cooperative effort between federal, state, and local law enforcement and public safety agencies to centralize the intake, analysis, synthesis, and appropriate dissemination of terrorism-related threat intelligence for the greater Los Angeles region, which includes the counties of Los Angeles, Riverside, San Bernardino, Santa Barbara, San Luis Obispo, and Ventura. The JRIC provides essential support and training to a region-wide network of public safety officials, including law enforcement, fire safety, and public health agencies, as well as private sector partners, and designated community groups. The JRIC also supports regional critical infrastructure protection initiatives, including:

- FBI-coordinated InfraGard Program
- Regional Public & Private Infrastructure Collaboration System
- County-level Critical Infrastructure Working Groups
- Department of Homeland Security Protective Security Advisors

5.8.3 GENERAL PLAN POLICIES

The City of Santa Clarita is primarily urban and as such, is subject to the man-made hazards of the built environment, including cyber-attack, and terrorism. Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of man-made hazards: cyber-attack/terrorism on the community. General Plan Policies LU 3.3.4 – 3.3.5 under the General Plan Land Use Element Objective 3.3, General Plan Policies C 2.5.1 – 2.5.4 under the General Plan Circulation Element Object 2.5, General Plan Policy S 1.1.4 under General Plan Safety Element Objective 1.1, and General Plan Policies S 7.1.1 – 7.1.4 under the General Plan Safety Element Objective 7.1, all relate directly to mitigation strategies that the City requires of new developments related to man-made hazards: cyber-attack/terrorism management.

5.8.4 MAN-MADE HAZARDS: CYBER ATTACK/TERRORISM STRATEGIES AND ACTION PLANS

Table 5 – 10: Man-Made Hazards – Cyber-Attack/Terrorism Mitigation Goals and Action Items

Goal MM-CA001: Ensure that every physical and virtual computing infrastructure currently utilized by the City are secure. Revise current standard IT operating procedures to meet industry best practices.
Man-made Action No. 1 (Cyber Attack): *Ensure that all hardware and software currently utilized by city staff are updated including anti-virus, spyware, and malware mitigation measures.* **Action Item MM-CA001-01:** Hardware / Software security controls in place. Monitoring ongoing. **Timeline:** Monthly **Responsible Party:** Technology Services **Funding Source:** General fund **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation **Priority:** High
Man-made Action No. 2 (Cyber Attack): *Conduct updates of cyber threat management tools.* **Action Item MM-CA001-02:** Tools in place. Monitoring and updates ongoing. **Timeline:** Daily antivirus definitions, monthly Windows updates, server updates every other month **Responsible Party:** Technology Services **Funding Source:** General fund **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation **Priority:** High
Man-made Action No. 3 (Cyber Attack): *Review ways to increase bandwidth on Local Area Networks and Wi-Fi networks used by the city to ensure capability to handle sudden, increased data usage.* **Action Item MM-CA001-03:** Bandwidth to City Network increased ten-fold in 2020 with the ability to expand further as necessary. **Timeline:** Annual evaluation **Responsible Party:** Technology Services **Funding Source:** General fund **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation **Priority:** High
Man-made Action No. 4 (Cyber Attack): *Implement controls of access ports used for City services and take action to reduce the threat of cyber threats.* **Action Item MM-CA001-04:** Controls in place. Monitoring and updates ongoing. **Timeline:** Daily **Responsible Party:** Technology Services **Funding Source:** General fund **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation **Priority:** High

Goal MM-CA002: Adopt and comply with all relevant United States Computer Emergency Readiness Team (US-CERT) and other national requirements for local governments and utilize existing resources and programs made available by US-CERT and other federal agencies for system resilience and security testing.

Man-made Action No. 5 (Cyber Attack): *Integrate incident notification requirements into existing IT department policies.*

Action Item MM-CA002-01: Incident notification included in IT department policies.
- **Timeline:** Daily
- **Responsible Party:** Technology Services
- **Funding Source:** General fund
- **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation
- **Priority:** High

Man-made Action No. 6 (Cyber Attack): *Conduct a Cyber Resilience Review.*

Action Item MM-CA002-02: Reviews conducted on a scheduled basis.
- **Timeline:** Daily
- **Responsible Party:** Technology Services
- **Funding Source:** General fund
- **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation
- **Priority:** High

Man-made Action No. 7 (Cyber Attack): *Adopt National Institute of Standards and Technology's (NIST) Framework for Improving Critical Infrastructure Cybersecurity.*

Action Item MM-CA002-03: Additional policies and standards such as the NIST Framework under review for incorporation into IT department policies and procedures.
- **Timeline:** Annually
- **Responsible Party:** Technology Services
- **Funding Source:** General fund
- **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation
- **Priority:** High

Man-made Action No. 8 (Cyber Attack): *Include National Cybersecurity and Communications Integration Center (NCCIC) into IT Department policies and procedures.*

Action Item MM-CA002-04: Inclusion of NCCIC under review for incorporation into IT department policies and procedures.
- **Timeline:** Review to be conducted in 2021 to determine applicability
- **Responsible Party:** Technology Services
- **Funding Source:** General fund
- **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation
- **Priority:** High

Man-made Action No. 9 (Cyber Attack): *Consider participation in DHS C3 Voluntary Program, which provides resources to help State, local, tribal, and territorial governments address their cybersecurity needs.*

Action Item MM-CA002-05: Participation in DHS C3 under review.
Timeline: Review to be conducted in 2021 to determine applicability
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 10 (Cyber Attack): *Consider having DHS Cyber Security Advisors/Protective Security Advisors conduct assessments of Santa Clarita cyber and critical infrastructure resources.*

Action Item MM-CA002-06: Conducting security evaluations by DHS under review.
Timeline: Technology Services applied in 2020 and is awaiting a response from DHS
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Goal MM-CA003: Review IT Department staff credentials, policies, and procedures and update them to meet industry best practices for software security, access management, and cybersecurity mitigation.

Man-made Action No. 11 (Cyber Attack): *Conduct regular updates to ensure security.*

Action Item MM-CA003-01: Conduct regular updates to IT department policies to incorporate the latest cyber security best practices.
Timeline: Annual review of City's Electronic Communication Policy
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 12 (Cyber Attack): *Password maintenance.*

Action Item MM-CA003-02: Review and strengthen internal IT administrator password and credential controls.
Timeline: Biannually
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 13 (Cyber Attack): *Password maintenance.*

Action Item MM-CA003-03: Review current password management practices and controls.
Timeline: Biannually
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 14 (Cyber Attack): *Perform regular testing to ensure security.*

Action Item MM-CA003-04: Perform regular testing to confirm that critical systems are not subject to compromise.

Timeline: Monthly vulnerability assessments with annual penetration tests
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 15 (Cyber Attack): *Maintain procedures for ensuring security of City smartphones or tablet computers.*

Action Item MM-CA003-05: Maintain procedures for performing "remote wipes" of lost or stolen smartphones or tablet computers.

Timeline: Case-by-case basis
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 16 (Cyber Attack): *Insurance procedures.*

Action Item MM-CA003-06: Assess the need for cyber-insurance coverage.

Timeline: Under review for renewal in summer 2021
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 17 (Cyber Attack): *Cyber incident response.*

Action Item MM-CA003-07: Periodically test IT cyber incident response plans.

Timeline: Biannually (coincides with EOC and disaster recovery testing)
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 18 (Cyber Attack): *Cyber security risk assessment.*

Action Item MM-CA003-08: Conduct regular risk assessments to identify potential cybersecurity threats.

Timeline: Monthly vulnerability assessments with annual penetration tests
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 19 (Cyber Attack): *Elimination of old data.*

Action Item MM-CA003-09: Proactively and systematically archive or delete obsolete data and users.
Timeline: Every 90 days
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 20 (Cyber Attack): *Evaluate third party risk.*

Action Item MM-CA003-10: Evaluate third-party/vendor risk and indemnification provisions to ensure they cover the full costs of a data breach, including notification costs and credit monitoring.
Timeline: Contract-by-contract basis
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Goal MM-CA004: Ensure that existing Santa Clarita training protocols reflect current and industry best practices in the fields of cyber, information, and critical infrastructure security. Where necessary or applicable, include cyber-security training requirements towards staff professional training/development goals and/or performance reviews.

Man-made Action No. 21 (Cyber Attack): *Cybersecurity training.*

Action Item MM-CA004-01: Conduct cybersecurity training to help IT staff maintain expertise and foster operational readiness.
Timeline: Monthly new employee trainings, annual LASD training, as needed email diligence reminders, and ongoing training videos and tests
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Man-made Action No. 22 (Cyber Attack): *Cybersecurity training.*

Action Item MM-CA004-02: Conduct periodic employee training on privacy and security policies and incident response procedures.
Timeline: Monthly new employee trainings, annual LASD training, as needed email diligence reminders, and ongoing training videos and tests
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Goal MM-CA005: Partner with the California Office of Emergency Services and the California Cybersecurity Integration Center.

Man-made Action No. 23 (Cyber Attack): *Outreach to Cal-OES and the California Cybersecurity Integration Center.*

Action Item MM-CA005-01: Partner with the California Office of Emergency Services and the California Cybersecurity Integration Center to assess the risks to Santa Clarita's critical infrastructure and information technology networks, enable cross-sector coordination and sharing of recommended best practices and security measures, and support.

Timeline: Technology Services will review to determine applicability in 2021
Responsible Party: Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: High

Goal MM-T001: Partner with the California Office of Emergency Services and the California Cybersecurity Integration Center to assess the risks to Santa Clarita's critical infrastructure and information technology networks, enable cross-sector coordination and sharing of recommended best practices and security measures, and support.

Man-made Action No. 24 (Terrorism): *Active Shooter included in CERT training.*

Action Item MM-T001-01: Conduct CERT training to mitigate the number of casualties during an Active Shooter incident and improve response capabilities.

Timeline: One class per season
Responsible Party: Emergency Management and LACFD
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Public Awareness, Participation and Implementation
Priority: Moderate

Goal MM-T002: Identify City-owned potential terrorist targets and take action to harden vulnerable sites.

Man-made Action No. 25 (Terrorism): *Identification of site vulnerabilities and capabilities.*

Action Item MM-T002-01: Work with the Department of Homeland Security to conduct a review of City-owned and operated facilities. The review to include access controls and security for each site.

Timeline: Complete walkthrough by 2022
Responsible Party: Emergency Management and Risk Management
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: Moderate

Man-made Action No. 26 (Terrorism): *Increase site resilience.*

Action Item MM-T002-01: Based on the results of the site review, take actions to increase resilience critical City-owned sites.

Timeline: Complete by 2023 or as funds are available
Responsible Party: Emergency Management, Public Works, and Planning
Funding Source: General fund, and Grants
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: Moderate

Goal MM-T003: Work with critical infrastructure partners to identify potential terrorist targets and take action to harden vulnerable sites.

Man-made Action No. 27 (Terrorism): *Harden vulnerable infrastructure sites.*

Action Item MM-T002-01: Continue to work with Critical Infrastructure and Key Resource (CIKR) partners including healthcare facilities, utility providers, event centers, and other major public venues. This includes working with LASD on developing the site list.

Timeline: Quarterly meetings with Santa Clarita Emergency Preparedness Working Group
Responsible Party: Emergency Management
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation
Priority: Moderate

5.9 HAZARDOUS MATERIALS RELEASE - EXISTING MITIGATION ACTIVITIES

The following hazardous materials release mitigation activities are performed on an ongoing basis:

- 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.
- Santa Clarita 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 Hazardous Materials Division (HMD) 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.

5.9.1 DEPARTMENT OF TOXIC SUBSTANCE CONTROL

The role of the Department of Toxic Substances Control (DTSC), a Division of the California Environmental Protection Agency, is to protect against exposures to hazardous wastes through regulation, contamination clean-up, 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. Under RCRA, DTSC has the authority to implement permitting, inspection, compliance and corrective action programs to ensure proper handling procedures compliant with state and federal requirements. As such, the management of hazardous sites in Santa Clarita is under the regulatory authority of the DTSC.

5.9.2 SENATE BILL 1082

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:

- 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 (CalARP)
- 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 Certified Unified Program Agency (CUPA).

5.9.3 BUSINESS REPORTING

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 annually. Businesses must also prepare safety and hazard mitigation plans, review the plans regularly, and provide annual training. Any releases or threatened releases of hazardous materials must be reported to the LACoFD HHMD and to the California Office of Emergency Services (Cal-OES) Warning Center. Those businesses using certain Regulated Substances (a list of substances comprises about 260 specific flammable or toxic chemicals) must also develop a Risk Management Plan (RMP) upon request by LACoFD HHMD. The RMP includes analysis of operations on-site, and projection of off-site consequences with accompanying mitigation plans.

5.9.4 GENERAL PLAN POLICIES

Because the industrial nature of our economy creates circumstances in which hazardous materials releases routinely occur, Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of hazardous materials release on the community. General Plan Policy CO 1.4.1 – 1.4.4 under General Plan Conservation and Open Space Element Objective 1.4, General Plan Policy S 4.1.2 under General Plan Safety Element Objective 4.1, and General Plan Policies S 4.2.1 – 4.2.4 under General Plan Safety Element Objective 4.2 all relate directly to mitigation strategies that the City requires of new developments related to hazardous materials release management.

5.9.5 HAZARDOUS MATERIALS RELEASE MITIGATION STRATEGIES AND ACTION PLANS

Table 5 -11: Hazardous Materials Release Mitigation Goals and Action Items

Goal HM001: Increase public awareness about hazardous and toxic materials.
Hazardous Materials Release Action No. 1: *Support LACoFD's efforts to disseminate and keep current emergency information on hazardous materials. Include phone numbers for contacting the proper agencies.* **Action Item HM001-01:** Provide emergency contract numbers to the public on the City's websites, publications, and at preparedness outreach events. Maintain and update community and partner agency contact information in the Emergency Operations Center and for the Emergency Operations Plan. **Timeline:** Ongoing; update when any information changes **Responsible Party:** Emergency Management, Technology Services **Funding Source:** General fund **Plan Goals Addressed:** Protect Life and Property, Public Awareness **Priority:** Low

5.10 LANDSLIDE/MUDSLIDE/SUBSIDENCE - EXISTING MITIGATION ACTIVITIES

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

5.10.1 STATE GUIDELINES

The California Division of Mines and Geology (CDMG) has developed 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 the data and developed various hazard maps for use in planning and mitigation hazards.

5.10.2 CITY CODES AND GENERAL PLAN POLICIES

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.

Because much of the City is located in hillside areas with steep slopes, Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of landslide/mudslide/subsidence on the community. General Plan Policies C 2.5.1 – 2.5.4 under the General Plan Circulation Element Objective 2.5, General Plan Policy CO 2.1.1 under General Plan Conservation and Open Space Element Objective 2.1, General Plan Policies S 1.1.1 – 1.1.3 under General Plan Safety Element Objective 1.1, and General Plan Policy S 1.2.2 under General Plan Safety Element Objective 1.2 all relate directly to mitigation strategies that the City requires of new developments related to landslide/mudslide/subsidence management.

5.10.3 LANDSLIDE/MUDSLIDE/SUBSIDENCE STRATEGIES AND ACTION PLANS

Table 5 – 12: Landslide/Mudslide/Subsidence Mitigation Goals and Action Items

Goal L001: Increase knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.
Landslide/Mudslide/Subsidence Action No. 1: *Develop public information to emphasize risks when building on potential or historical landslide areas.* **Action Item L001-01:** A development prerequisite requires the mitigation of landslides as recommended by geological studies. **Timeline:** Case-by-case during permit plan check review **Responsible Party:** Engineering Services **Funding Source:** General fund, permit fees **Plan Goals Addressed:** Protect Life and Property, Public Awareness, Participation and Implementation **Priority:** High
Landslide/Mudslide/Subsidence Action No. 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.* **Action Item L001-02:** Maps are available from the CA Department of Conservation's Division of Mine and Geology for earthquake-induced landslide and liquefaction hazard zones. Hazard zone information mapped-out and available for public dissemination. **Timeline:** Case-by-case **Responsible Party:** Public Works **Funding Source:** General fund, permit fees **Plan Goals Addressed:** Protect Life and Property, Public Awareness, Participation and Implementation **Priority:** High
Landslide/Mudslide/Subsidence Action No. 3: *Placement of utilities outside of landslide areas.* **Action Item L001-03:** Encourage design and placement of utilities outside of landslide areas to decrease the risk of service disruption. **Timeline:** Case-by-case as development projects are submitted **Responsible Party:** Building & Safety, Planning **Funding Source:** Permit fees **Plan Goals Addressed:** Protect Life and Property, Public Awareness, Participation and Implementation **Priority:** High
Goal L002: Continue public education information program that includes material for residents with information on how to protect their property from landslides and debris flows.
Landslide/Mudslide/Subsidence Action No. 4: *Provide information on plant ground cover for slopes and building of retaining walls.*

Action Item L002-01: Community Development's Planning Division addresses this issue in Santa Clarita's Unified Development Code for required landscaping on hillsides, including both cut and fill slopes. In addition, the Urban Forestry division provides information pertaining to proper planting selections to residents as requested, to include how to select proper ground cover, shrubs, and trees suitable for slope stabilization.

Timeline: Case-by-case as development projects are submitted
Responsible Party: Urban Forestry, Planning
Funding Source: Permit fees
Plan Goals Addressed: Protect Life and Property, Public Awareness, Participation and Implementation
Priority: High

Landslide/Mudslide/Subsidence Action No. 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).*

Action Item L002-02: An information booklet available through the County of Los Angeles Public Works Department and through their Coordinated Agency Recovery Effort (CARE) website. This is a multi-agency public outreach program to disseminate information about recovery efforts and potential storm impacts. www.dpw.lacounty.gov/care. The LADPW also utilizes an e-notification alert system for mud and debris flow; residents can register to receive updates from this system.

Timeline: Case-by-case as development projects are submitted
Responsible Party: Public Works, Planning
Funding Source: Permit fees
Plan Goals Addressed: Protect Life and Property, Public Awareness, Participation and Implementation
Priority: High

Landslide/Mudslide/Subsidence Action No. 6: *Provide information on installation of flexible pipe fittings to avoid gas or water leaks.*

Action Item L002-03: This information is available on the Southern California Gas website. Collateral materials have been requested from SCG.

Timeline: Case-by-case as development projects are submitted
Responsible Party: Public Works, Planning
Funding Source: Permit fees
Plan Goals Addressed: Protect Life and Property, Public Awareness, Participation and Implementation
Priority: High

Goal L003: Limit activities in identified potential and historical landslide areas through regulation and public outreach.

Landslide/Mudslide/Subsidence Action No. 7: *Analyze existing regulations regarding development in landslide prone areas.*

Action Item L003-01: The City's General Plan (June 2011) includes policies to preserve open space to meet the community's multiple objectives for resource protection for long-term community benefit. The general plan also included a land use map that contained land uses/residential densities in known areas prone to landslides. The plan proposed 27,000 acres of permanently-secured open space and an additional 147,000 acres of open space for National Forest areas.

Timeline: Complete as part of 2021 – 2029 General Plan update
Responsible Party: Community Development
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Natural Systems
Priority: High

Landslide/Mudslide/Subsidence Action No. 8: *Continue the open space designation efforts. Open space designations keep landslide prone areas undeveloped.*

Action Item L003-02: The City's General Plan that was adopted in 2013 proposed zoning maps designate appropriate open space parcels in addition to policies for the pursuit of additional open space. The City's Open Space District will allow for the continued acquisition and designation of open space areas and will increase the City's ability to keep landslide-prone areas undeveloped.

Timeline: Case-by-case as land becomes available
Responsible Party: Parks and Recreation, Community Services
Funding Source: City OSPD funds
Plan Goals Addressed: Protect Life and Property, Natural Systems
Priority: High

Goal L004: Identify and potentially improve if feasible landslide prone areas.

Landslide/Mudslide/Subsidence Action No. 9: *Consider vegetation management on landslide prone property.*

Action Item L004-01: In coordination with LACFD fuel modification guidelines, the City will consider best management practices for vegetation management on landslide-prone property.

Timeline: Annually in the Spring
Responsible Party: Special Districts
Funding Source: LMD funds
Plan Goals Addressed: Protect Life and Property, Natural Systems
Priority: High

Landslide/Mudslide/Subsidence Action No. 10: *Encourage public/private partnerships that educate and encourage homeowners to mitigate landslide potential.*

Action Item L004-02: Homeowners work with the City to mitigate landslide potential by either building slopes in landscaped maintenance districts or by requiring Homeowner Associations to submit landscape plans for common areas to the City for review and approval. On City maintained slopes on private property, vegetation is used to mitigate landslide potential through a combination of planting shrubs, groundcover, hydroseed mix, and trees.

Timeline: Case-by-case as development projects are submitted
Responsible Party: Special Districts, Planning
Funding Source: General fund, permit fees
Plan Goals Addressed: Protect Life and Property, Natural Systems
Priority: High

Goal L004: Review, monitor and update codes, regulations, and local ordinances.

Landslide/Mudslide/Subsidence Action No. 11: *Study ordinances including Zoning, Grading, Hillside, Subdivision, etc. and make recommendations to mitigate landslide prone areas.*

Action Item L004-01: In response to the adoption of the General Plan in 2011, the City's entire Unified Development Code is being rewritten and updated to reflect these goals and subject areas. Specifically, the update includes a review and modification of the City's hillside development ordinances in an effort to reduce development-related impacts upon hillsides throughout the City (UDC adopted June 11, 2013).

Timeline: 2021: The City is currently updating the General Plan with the updated 2021 – 2029 Safety Element due by end of 2021
Responsible Party: Planning
Funding Source: SB2 Planning grant
Plan Goals Addressed: Protect Life and Property, Public Awareness, Natural Systems
Priority: High

Landslide/Mudslide/Subsidence Action No. 12: *Continue to review and enforce building codes for construction standards, including minimum foundation requirements, in landslide prone areas.*

Action Item L004-02: Foundation recommendations are derived from geological reports and distributed to Building and Safety for inclusion on plans.

Timeline: Case-by-case as development projects are submitted
Responsible Party: Building & Safety
Funding Source: Permit fees
Plan Goals Addressed: Protect Life and Property, Natural Systems
Priority: High

Landslide/Mudslide/Subsidence Action No. 13: *Continue to* ***r****eview drainage control regulations to control drainage and reduce the risk of landslides resulting from saturated soils.*

Action Item L004-03: Grading and drainage plans are required and include recommendations from geological reports, e.g. planting of native vegetation, minimizing landscape watering, and inclusion of back drains.

Timeline: Case-by-case as development projects are submitted
Responsible Party: Engineering Services
Funding Source: Developer fees
Plan Goals Addressed: Protect Life and Property, Natural Systems
Priority: High

5.11 FLOOD - EXISTING MITIGATION ACTIVITIES

The City has adopted measures which govern development in the floodplain areas. The following table provides a summary of applicable codes and ordinances.

Table 5 - 13: Flood Mitigation Codes and Ordinances

References	Description
Chapter 18.01 of the Santa Clarita Municipal Code	Chapter 18.01 of the Santa Clarita Municipal Code includes Flood Resistant Construction requirements (effective on all new building permit applications received by the City on or after January 1, 2014) and is current through Ordinance 15-5 passed June 23, 2015.
Ordinance No. 08-11	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.
Chapter 11.60 of the Los Angeles County Code	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 2017. 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.
Uniform Building Code (UBC)	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.
Building Code Section 308(b)	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	Chapter 10.06 of the Municipal Code is the Floodplain Management Ordinance. This chapter prohibits any obstructions, alterations, and encroachments within channels, rivers, and washes.

5.11.1 SANTA CLARITA FLOODPLAIN MAINTENANCE AND FLOOD MITIGATION PLANS

Santa Clarita has implemented the following plans and mitigation strategies to manage potential flood and storm waters for the health and safety of the community.

5.11.1.1 SANTA CLARA RIVER PLAN

The Santa Clara River Plan was adopted to maintain the river's natural character, yet provide adequate safety through the use of appropriate non- structural flood/erosion control measures when necessary.

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.

5.11.1.2 EMERGENCY PREPAREDNESS COORDINATOR

The City's Emergency Management Coordinator is responsible for maintaining the Local Hazard Mitigation Plan and Emergency Response Plan as well as the City's Emergency Operations Plan. Duties also include coordinating with federal, state, and local agencies during response and recovery operations, and providing education and training to City officials and staff.

5.11.1.3 COMMUNITY RATING SYSTEM

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.

5.11.1.4 DEVELOPMENT SERVICES DIVISION: PUBLIC WORKS DEPARTMENT

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. Structures cannot be located inside of the floodway. Structures proposed to be built in the flood fringe area must 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. Required elevation certificates are issued and kept on file in the Development Services Division.

Figure 11: Storm Drain Debris Mitigation

The Public Works Department is also responsible for storm drain construction management within the City, which must be constructed per Los Angeles County Flood Control Design Standards and will be submitted to the County for review and approval and subsequently transferred to the Los Angeles County Flood Control District for maintenance. The City's Public Works - Storm Water Group maintains a small percentage of City storm drains.

5.11.2 GENERAL PLAN POLICIES

The topography of Santa Clarita consists primarily of the Santa Clara River Valley situated between the Santa Susana and San Gabriel Mountain ranges, which makes the City susceptible to flooding. Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of flooding on the community. General Plan Policies LU 7.3.4 – 7.3.5 under the General Plan Land Use Element Objective 7.3, and General Plan Policies S 2.1.1 – 2.1.6, S 2.2.1 – 2.2.2, S 2.3.1 – 2.3.2, S 2.4.1 – 2.4.2, and S 2.5.1 – 2.5.2 under General Plan Safety Element Objectives 2.1, 2.2, 2.3, 2.4, and 2.5, all relate directly to mitigation strategies that the City requires of new developments related to flood management.

5.11.3 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.

5.11.4 CALIFORNIA DEPARTMENT OF WATER RESOURCES REVIEW

The 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. Santa Clarita undergoes a review of the program approximately every five years and has continued to meet the requirements and remain in compliance.

5.11.5 FEDERAL RESOURCES - NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

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. Flood damage is reduced by nearly $1 billion a year through communities implementing sound floodplain management requirements and property owners purchasing flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance. Community participation in the NFIP is voluntary. Santa Clarita's participation in the NFIP is discussed in detail in Section 4 of this HMP.

5.11.6 FLOOD STRATEGIES AND ACTION PLANS

Table 5 – 14: Flood Mitigation Goals and Action Items

Goal F001: Continue participation in flood programs.
Flood Action No. 1: *. Continue the participation in the National Flood Insurance Program (NFIP) and the Community Rating System (CRS). This program consists of additional "activities" which are all defined by FEMA and have points associated with each activity.* **Action Item F001-01:** Santa Clarita is good member in-standing in NFIP and received updated April 2015 information on NFIP program changes. FEMA conducted a five-year audit in May 2018 and the City remains in good standing. **Timeline:** Next 5 year audit to occur in 2023 **Responsible Party:** Emergency Management, Engineering Services **Funding Source:** General fund **Plan Goals Addressed:** Protect Life and Property, Participation and Implementation **Priority:** High
Goal F002: Minimize damage and hazards to development in areas subject to risk resulting from flooding conditions.
Flood Action No. 2: *Continued clearance of the Santa Clara River of non-native plant species that may impede flood flow.* **Action Item F002-01:** The City spends between $100,000 and $200,000 each year to remove non- native plant species from the Santa Clara River. City staff's efforts to find grant funds resulted in securing over $400,000 for 2012. Staff expects approximately 100 acres of non-native species Arundo and Tamarisk to be removed in the demonstration area. **Timeline:** Annual review **Responsible Party:** Environmental Services, CIP **Funding Source:** General fund **Plan Goals Addressed:** Protect Life and Property, Natural Systems **Priority:** High
Flood Action No. 2: *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.* **Action Item F002-02:** The City has added a new development review process to address construction that does not require a building permit and continues to regulate all development in floodplains. All new developments must go through a multi-division review and must meet all regulations of the NFIP and CRS programs prior to issuance of any permits. **Timeline:** During plan check for new developments and remodels **Responsible Party:** Planning, Engineering Services, Building & Safety **Funding Source:** Permit fees **Plan Goals Addressed:** Protect Life and Property, Natural Systems **Priority:** High
Goal F003: Update existing 30-yr old Flood Insurance Rate Maps (FIRMs) to provide most current flood data to regulate development standards. Training/development goals and/or performance reviews.

Flood Action No. 3: *Coordinate review and implementation of new Flood Insurance Study.*

Action Item F003-01: In 2012, City contracted with FEMA's engineering consultant to conduct a more detailed FIS in downtown Newhall than previously performed by FEMA. This FIS was intended to address the decertified levee which created a new flood zone in downtown Newhall. The FIS was completed on June 2, 2021 to modify the 100-year flood data for the Santa Clara River and eight tributaries within the City.

Timeline: Completed 2021
Responsible Party: Engineering Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Public Awareness
Priority: High

5.12 MULTI-HAZARD - EXISTING MITIGATION ACTIVITIES

Multi-Hazard Mitigation strategies are necessary in the event of large scale disasters that result in trigger events or multiple disasters occurring simultaneously. An example would be an earthquake that triggers any combination of landslides, fires, hazardous materials release, energy and communication disruption, and damage to critical transportation infrastructure. In addition to the strategies and action plans Santa Clarita has adopted and implemented for individual hazards, the City has also developed plans for multi-hazard events.

5.12.1 GENERAL PLAN POLICIES

The location, topography and built environment of Santa Clarita makes the City susceptible to multi-hazard events. Santa Clarita has adopted General Plan objectives and policies (as outlined in section 5.1, Table 5-1) for land development to mitigate the impacts of multi-hazard events on the community. General Plan Policies LU 3.3.1, 3.3.2, 3.3.4, and 3.3.5 under the General Plan Land Use Element Objective 3.3, General Plan Policies C 2.5.1 – 2.1.4 under the General Plan Circulation Element Objective 2.5, General Plan Policy CO 1.1.1 under the General Plan Conservation and Open Space Element Objective CO 1.1, and General Plan Policies S 1.1.1 – 1.1.4 under General Plan Safety Element Objective 1.1, all relate directly to mitigation strategies that the City requires of new developments related to multi-hazard events.

5.12.2 MULTI-HAZARD STRATEGIES AND ACTION PLANS

Table 5 – 15: Multi-Hazard Mitigation Goals and Action Items

Goal MH001: Construct/enhance major transportation infrastructure to provide the necessary additional roads and mobility.
Multi-Hazard Action No. 1: *Complete the restriping of the Cross Valley Connector – Golden Valley segment between Centre Pointe Parkway and Sierra Highway to provide additional travel lanes.* **Action Item MH001-01:** Design is complete. City is seeking grant funding to construct this project. 3-11-20: No additional information is available at this time. **Timeline:** TBD when grant funding is available **Responsible Party:** Public Works **Funding Source:** Grants **Plan Goals Addressed**: Protect Life and Property, Participation and Implementation, Emergency Services **Priority**: High
Multi-Hazard Action No. 2: *Bridge Widening – Copper Hill Drive, San Francisquito Bridge.* **Action Item MH001-02:** City received $17,706 of Caltrans grant funding for planning study for Highway Bridge Program. Project complete. **Timeline:** Project is conditions of Tesoro Phase 2 **Responsible Party:** Public Works **Funding Source:** CalTrans grants, LMD and County Bridge and Thoroughfare funds

Plan Goals Addressed: Protect Life and Property, Participation and Implementation, Emergency Services
Priority: High

Goal MH002: Implement technologies to enhance public notification and support in the event of an emergency.

Multi-Hazard Action No. 3: *Design is complete. City is seeking grant funding to construct this project. 3-11-20: No additional information is available at this time.*

Action Item MH002-01: In 2012-2013 the maintenance program upgraded all batteries with backup systems. Cost: $70,000. All but 5 of the 201 signalized intersections in the City have Battery Backup Systems (BBS).

Timeline: Project completed and batteries will be replaced as needed
Responsible Party: Public Works
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: High

Multi-Hazard Action No. 4: *Consider new technology for mass emergency notifications.*

Action Item MH002-02: In 2011-2012, the City began using the Nixle text alert system. Community members are encouraged to register to receive texts; the City conducted a campaign to promote registration at its annual Emergency Expo. Ongoing promotion continues on the City's website, CERT program, and during community outreach events. Santa Clarita Transit has recently installed LED signs and plasma screens at bus stops and transit centers and content-controlled television in our buses. This equipment is intended to distribute city messages, including emergency notifications. New technology is under review.

Timeline: Currently under review
Responsible Party: Emergency Management, Technology Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: High

Goal MH003: Enhance School Emergency Communications Plan

Multi-Hazard Action No. 5: *Enhance Communications Plan by incorporating private schools and child-care facilities.*

Action Item MH003-01: City staff continues to conduct ongoing outreach events and workshops with private schools and daycare providers as part of SC emergency Preparedness working group.

Timeline: As needed
Responsible Party: Emergency Management
Funding Source: General fund, grants
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: High

Multi-Hazard Action No. 6: *Work with special needs communities and groups to identify alternate modes of communications.*

Action Item MH003-02: The City, in coordination with the Community and Law Enforcement Awareness Response Committee (CLEAR), the LACSD, and the Santa Clarita Valley Committee on Aging, contributed to the development of a special needs registry. Continuously maintained by the City and the Santa Clarita Valley Sheriff's Station, the registry assists law enforcement to identify individuals who cannot identify themselves due to a disability or special need, such as Alzheimer's, autism, or a speech disorder. Law enforcement personnel can view updates to the Registry in real-time. This registry has improved the effectiveness of search and rescue operations involving persons with disabilities or special needs. Santa Clarita Transit meets on a monthly basis with its Accessibility Advisory Group. Information is routinely distributed at these meetings. The AAC was established by the City of Santa Clarita Transit for the purpose of providing guidance on the quality of its programs and services for seniors and persons with disabilities. Staff also works closely with the Special Education program at the William S. Hart Union High School District.

Timeline: Quarterly meetings to discuss, revise, and update the Special Needs Registry
Responsible Party: Emergency Management, Communications, and LA County Sheriff's Dept.
Funding Source: General fund, and LACSD
Plan Goals Addressed: Protect Life and Property, , Public Awareness, Participation and Implementation, Emergency Services
Priority: High

Multi-Hazard Action No. 7: *Participate annually in communications exercises with school districts.*

Action Item MH003-03: Ongoing coordination occurs during the annual October Great Shakeout drill. Amateur radio capabilities, cell phone, and landline coordination is/are tested.

Timeline: "Great Shake Out" occurs annually and City hosts quarterly PIO meetings with all local agencies, including school districts
Responsible Party: Communications, and local school districts
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation, Emergency Services
Priority: High

Multi-Hazard Action No. 8: *Encourage schools to send annual letters to parents regarding emergency procedures.*

Action Item MH003-04: City staff are regularly invited to Parent-Teacher Association meetings to conduct outreach and provide materials on emergency preparedness as well as detailing how the City coordinates with community partners (i.e. schools) during emergencies.

Timeline: Annually
Responsible Party: Emergency Management
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Participation and Implementation, Emergency Services
Priority: High

Goal MH004: Establish a permanent Department Operations Center at the Transportation Maintenance Facility for Public Works. The facility serves as an alternate Emergency Operations Center.

Multi-Hazard Action No. 9: *Assess the facility's basic physical capabilities and identify the physical requirements for a DOC., i.e. space, layout, technology, etc.*

Action Item MH004-01: Original configuration of a DOC was completed during the initial design of the Transit Maintenance Facility. However, capabilities continue to be assessed and upgraded.

Timeline: Annual review
Responsible Party: Emergency Management, Risk Management, Planning
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: High

Goal MH005: Identify safe evacuation routes in high-risk natural disaster areas.

Multi-Hazard Action No. 10: *Identify potential debris removal resources.*

Action Item MH004-01: Streets Division purchased a front loader to deal with mass bulk items. In addition, a road blade scraper was also purchased to deal with mud and debris that block public right-of-ways. Streets' fleet includes: 7-yard dump truck, 10 - yard dump truck, and backhoe with loader bucket, bobcat skid steer with bucket and sweeper attachment, and a 3-yard front loader.

Timeline: Seasonally as necessary
Responsible Party: General Services
Funding Source: General fund
Plan Goals Addressed: Protect Life and Property, Emergency Services
Priority: High

5.13 PRIORITIZATION OF MITIGATION PROJECTS

The Planning Committee identified which plan goals were addressed by each action item and then ranked the strategies to determine the priorities for the City of Santa Clarita. The HMP Plan goals are:

- Protect Life and Property
- Enhance Natural Systems
- Augment Emergency Services
- Encourage Partnerships and Implementation
- Promote Public Awareness

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:

Table 5 – 16: Prioritized Plan Goals

Points	Category
5	Protect Life and Property
4	Enhance Natural Systems
3	Augment Emergency Services
2	Encourage Partnerships and Implementation
1	Promote Public Awareness

Mitigation strategies were further rated in terms of “high,” “moderate,” or “low” priority. Points for the plan goals were then totaled for each action item. The following scoring system reflect the High, Moderate and Low rating:

Table 5 – 17: Mitigation Rating

Rating	Rating Description
10 - 15	High
5 - 10	Moderate
0 - 5	Low/None

5.13.1 STAPLEE EVALUATION

In addition to the internal scoring system implemented to prioritize each mitigation activity, the qualitative STAPLEE method was used to further refine the prioritization of the mitigation activities. The STAPLEE method takes into account the **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental (STAPLEE) opportunities and constraints of implementation. The evaluation criteria are summarized below 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.

5.13.2 ECONOMIC ANALYSIS OF MITIGATION STRATEGIES AND ACTION ITEMS

FEMA's approaches to identify the benefits and costs associated with hazard mitigation strategies, measures, or projects include a Benefit/Cost Review and more detailed Benefit-Cost Analyses (BCA). Conducting an economic analysis for a mitigation activity can assist in determining whether a project is worth undertaking now in order to avoid disaster-related damages later.

5.13.2.1 BENEFIT-COST REVIEW

The Benefit-Cost Review process includes monetary as well as non-monetary costs and benefits associated with each action. Some projects can be extremely cost-effective but not as beneficial for the community at large. The Planning Committee considered a wide variety of questions, such as:

- How many people will benefit from the action?
- How large an area is impacted?
- How critical are the facilities that benefit from the action (e.g., is it more beneficial to protect the swim center than an administrative building, even though it costs more)?
- Environmentally, does it make sense to do this project for the overall community?

5.13.2.2 BENEFIT-COST ANALYSIS (BCA)

The Benefit-Cost Analysis is used to determine if the cost of investing in a specific mitigation project, i.e., the "cost" will result in reduced damages in the future, i.e., the "benefits" and if the loss prevented justifies the expenditure of funds for the project. If the benefit is greater than the cost, then the project is cost effective; if the benefit is less than the cost, then the project is not cost effective.

The Benefit-Cost Analysis is essentially the same for each type of hazard and associated mitigation project. The only differences are the types of data that are used (e.g., if the project is for earthquake, flood, wind, fire, or other hazard mitigation). To determine the Benefit-Cost, the project cost is compared to the anticipated dollar loss that will be prevented by the mitigation project. For example, if the project cost is $100,000 and the expected loss averted is $1,000,000, then the benefit exceeds the cost and is therefore cost effective. The ratio of the benefit versus the cost is 10:1 ($1,000,000 divided by $100,000). Priority is given to those projects with the highest Benefit-Cost Ratio or those projects with the greatest benefit to the community.

Benefit-Cost Analysis Exemptions:

The following categories of mitigation measures are exempt from the FEMA policy on Benefit- Cost analysis:

- 5% Initiative Projects: States, which receive a Presidential declaration, are eligible to use up to 5% of available HMGP funding at their discretion.
- Tornado Initiative: States, which receive a Presidential declaration, are eligible to use up to an additional 5% of available HMGP funding at their discretion.
- Substantial Damage Waivers for acquisition of substantially damaged structures in 100- year floodplain.
- Mitigation planning related grants.

5.13.2.3 BENEFIT-COST METHODOLOGY UTILIZED

DMA 2000 does not require Hazard Mitigation Plans to include BCA's for specific projects.15 Consequently a Benefit-Cost Review approach is used for the Hazard Mitigation Plan. Future projects will be evaluated using a similar process.

Specific projects and future actions involving federal grants requiring a more detailed Benefit- Cost Analysis are managed on a case-by-case basis at the City of Santa Clarita's discretion. In such cases, the City has submitted detailed BCA documentation (e.g., the McBean Bridge Project).

For the 2015 HMP, mitigation strategies and action items were reviewed and prioritized by the HMP Planning Committee which considered:

- The expected benefit to the community according to the following categories, ranked high, moderate, low or none based on the cost factor, and resource, funding and time constraints:
  - Protect Life and Property
  - Increase Public Awareness
  - Preserve Natural Systems
  - Strengthen Partnerships and Encourage Implementation
  - Maintain and Improve Emergency Services
  - Scope of Impact (i.e., the degree to which the project benefits the community)
- Costs: total estimated expense including ongoing maintenance requirements
- Constraints: the availability of resources, if funds were already budgeted or if additional budget funding was required, and the timeline for completion (if known)
- Other considerations included whether projects were already in progress or part of another effort (e.g., part of a County-wide program or existing city initiative)

6.0 PLAN REVIEW, EVALUATION, IMPLEMENTATION, AND MAINTENANCE

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 HMP annually and producing a plan revision every five years. This section describes how the City has and will continue to integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how the City of Santa Clarita government intends to implement the mitigation strategies outlined in this Plan in conjunction with existing planning mechanisms such as the City's General Plan, Zoning Code, Capital Improvement Projects, Fair Housing Plan, "Green" City projects, Water Conservation projects, and Building and Safety Codes.

6.1 CHANGES IN PRIORITIES

The hazards have been prioritized in part using the results of a public survey at which 380 community members provided feedback in relation to hazards facing the community based on level of concern from not concerned, not very concerned, neutral, somewhat concerned, and very concerned. The weighted average of the results ranked hazards as follows:

- Wildfire weighted average = 3.58
- Earthquake weighted average = 3.47
- Energy Disruption: Gas/Electric Power weighted average = 3.28
- Pandemic/Epidemic weighted average = 3.23
- Severe Weather: Wind weighted average = 3.09
- Severe Weather: Heat weighted average = 2.96
- Drought weighted average = 2.87
- Utility Failure: Water weighted average = 2.74
- Telecommunications (IT) Failure weighted average = 2.60
- Climate Change weighted average = 2.49
- Cyber Attack weighted average = 2.27
- Civil Disturbance weighted average = 2.24
- Terrorism weighted average = 2.11
- Hazardous Materials Release weighted average = 2.08
- Severe Storm/Rain weighted average= 2.06
- Landslide/Mudslide weighted average = 1.64
- Liquefaction weighted average = 1.59

- Sinkholes weighted average = 1.55
- Flood weighted average = 1.48
- Other (unspecified) weighted average = 1.48
- Dam Failure weighted average = 1.36

During the Risk Assessment analysis, some of the related categories were analyzed together based on causation, impact, and/or weighted average of level of community concern:

- Severe Weather: Extreme Wind and Extreme Heat are analyzed together
- Cyber Attack and Terrorism are analyzed together as Man-Made hazards
- Landslide/Mudslide, Severe Storm/Rain, Liquefaction, and Sinkholes are analyzed as Landslide/Mudslide/Subsidence
- Flood and Dam Failure are analyzed together

Additionally, noting that the weighted average level of community concern regarding Pandemic/Epidemics may be artificially elevated due to the review of this Plan update and public outreach coinciding with the COVID-19 Pandemic, the ranking was moved from the fourth place ranking to sixth place ranking. Although Pandemics have the potential to cause severe impacts to human life, occurrence is relatively low and acknowledging that this Plan is established as a five-year guidance tool, Pandemics were moved to more accurately reflect the overall long term hazards impacting the City.

Other factors impacting the ranking include 1) the increased frequency of occurrence due to climate change when considering wildfire, energy disruption, severe weather, and drought; 2) the potential for multiple event types to result in energy disruption and; 3) the City's involvement in the National Flood Insurance Program and success in completing mitigation efforts related to floods and dam failure. Weighing these factors, the Risk Assessment ranking results are as follows: 1) Wildfire 2) Earthquake 3) Energy Disruption 4) Drought 5) Severe Weather: Extreme Heat & Extreme Wind 6) Pandemic 7) Man-Made Hazards: Cyber Attack & Terrorism 8) Hazardous Materials Release 9) Landslide/Mudslide/Subsidence, and 10) Flood.

The 10 hazards identified in this HMP reflect changes in the concerns of the City and residents. The 2010 HMP analyzed the hazards posed by earthquakes, floods, hazardous materials, severe weather, and wildfire. Concerns related to Drought, Man-Made Hazards: Cyber Attack and Terrorism, Energy Disruption, and Pandemic have been considered and included in this HMP to further protect residents, businesses, schools and other organizations and institutions, and critical infrastructure.

6.2 MAINTENANCE RESPONSIBILITIES

The Hazard Mitigation Plan will be monitored and updated by the City of Santa Clarita emergency management team, which includes the City Management Analyst, Emergency Operations Analyst, and the Interim Director of Neighborhood Services and/or appropriate City departments in coordination with the Planning and Steering Committees. The City's emergency management team will act as the **convener** to facilitate the Hazard Mitigation Plan activities such as monitoring and evaluating the progress of mitigation projects, and presenting Plan updates to the Steering Committee. City Council is responsible for the adoption of the Plan and any substantive changes to the Plan.

6.3 HAZARD MITIGATION PLAN UPDATES AND ONGOING FORMAL REVIEW PROCESS

Santa Clarita's 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, environmental changes, or programs that may affect mitigation priorities. The evaluation process includes a fixed schedule and identifies the participating responsible agencies and organizations. The convener will be responsible for contacting the Steering Committee members and organizing the annual meeting. The Steering Committee will review the goals and action items to determine relevance to changing situations in the city, or in State or Federal policy to ensure current and expected conditions are addressed. The Steering Committee will also review the risk assessments presented in the Plan to determine if this information should be updated to reflect newly available data. The coordinating agencies and organizations responsible for the various action items will report on the status of their projects, the success of implementation and coordination efforts, difficulties encountered, suggested strategy revisions.

The Hazard Mitigation Plan will be updated every five years and submitted to the Cal-OES Hazard Mitigation Officer and the Federal Emergency Management Agency, in compliance with FEMA requirements. The five-year update shall include revisions to the Community Profile (changes in local population, demographics, and new development), an update to the Risk Assessments, mitigation project updates, and a description of how the City integrated public participation throughout the plan maintenance process. All Plan updates will be submitted to the Steering Committee members for review prior to presentation to the City Council.

6.4 CONTINUED PUBLIC INVOLVEMENT

Santa Clarita is committed to involving the public in reviews and updates to the Hazard Mitigation Plan. The City's emergency management team works with the Planning and Steering Committees to coordinate public workshops. Current and draft revisions are made available to the public via the City's website (https://www.santa-clarita.com/city-hall/departments/recreation-community-services-and-open-space/emergency-management/hazard-mitigation-plan) and includes contact information for directing

public comments and concerns to the emergency management team and/or the appropriate city departments. Copies of the Plan are also catalogued and kept with various departments in the City.

Public meetings are held after each annual evaluation or as deemed necessary by the Management Analyst, Emergency Operations Analyst, Interim Director of Neighborhood Services and/or Hazard Mitigation Planning or Steering Committees. The meetings provide a public forum to provide input, express concerns and comments related to the Hazard Mitigation Plan. These meetings are advertised on Santa Clarita's public access channel, web page, social media accounts, CERT programs, and area newspapers.

7.0 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. The City Council is 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, additional mitigation strategies are added, and at least every five years to comply with federal requirements (44 CFR 201 and 206). The approved Hazard Mitigation Plan will be significant in the future growth and development of the community. See Appendix F for Plan Adoption documents.

APPENDIX A: BIBLIOGRAPHY & RESOURCES

COMMUNITY PROFILE RESOURCES

LOCAL RESOURCES

City of Santa Clarita
23920 Valencia Blvd., Suite 300
Santa Clarita, CA 91355
(661) 259-2489
https://www.santa-clarita.com/home

Santa Clarita Valley Historical Society
24101 Newhall Ave.
P.O. Box 221925
Newhall, CA 91322
(661) 254-1275
https://scvhs.org/wp/

Santa Clarita Valley Economic Development Corporation
26455 Rockwell Canyon Rd., Suite 263
Santa Clarita, CA 91355
(661) 288-4400
scvedc@scvedc.org

NATIONAL RESOURCES

United States Census Bureau
4600 Silver Hill Rd.
Washington, DC 20233
(301) 763-4636
https://www.census.gov/en.html

WILDFIRE RESOURCE DIRECTORY

LOCAL AND REGIONAL RESOURCES

Los Angeles County Fire Department Division III, North Regional Operations Bureau
19190 Golden Valley Road
Santa Clarita, CA 91387
(661) 298-5280

Los Angeles County Fire Department
1320 N. Eastern Ave.
Los Angeles, CA 90063
(323) 881-2411
https://fire.lacounty.gov/

STATE RESOURCES

California Division of Forestry & Fire Protection
1416 9th Street
PO Box 944246
Sacramento, CA 94244-2460
(916) 653-5123
https://www.fire.ca.gov/

CAL FIRE
1416 9th Street
PO Box 944246
Sacramento, CA 94244-2460
(916)653-5123
https://www.fire.ca.gov/

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

National Interagency Fire Center (NIFC)
National Weather Service and Office of Aircraft National Interagency Fire Center.
3833 S. Development Ave.
Boise, Idaho 83705
(208) 387-5512
https://www.nifc.gov/

United States Fire Administration (USFA) of the Federal Emergency Management Agency
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

InciWeb
http://inciweb.nwcg.gov

ADDITIONAL RESOURCES

Firewise - The National Wildland/Urban Interface Fire program
Firewise
1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000
http://www.firewise.org/

Fire Tracker
Southern California Public Radio
474 S. Raymond Ave.
Pasadena, CA 91105

National Fire Protection Association (NFPA)
NFPA, Public Fire Protection Division
1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000
https://www.nfpa.org/

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An International Collection of Wildland- Urban Interface Resource Materials, (Information Report NOR-344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.
Canadian Forest Service, Northern Forestry Centre, I-Zone Series
Phone: (780) 435-7210
http://www.prefire.ucfpl.ucop.edu/uwibib.htm

Federal Wildland Fire Policy, Wildland/Urban Interface Protection
U.S. Forest Service
1400 Independence Ave., SW
Washington, D.C. 20250-1111
(800) 832-1355
http://www.fs.usda.gov

EARTHQUAKE RESOURCE DIRECTORY

LOCAL AND REGIONAL RESOURCES

Los Angeles County, Office of Emergency Management
County of Los Angeles Chief Executive Office
(323) 980-2260
https://ceo.lacounty.gov/emergency-management/

Los Angeles County Public Works Department
900 S. Fremont Ave.
Alhambra, CA 91803
(626) 458-5100
http://ladpw.org

Southern California Earthquake Center (SCEC)
3651 Trousdale Parkway, Suite 169
Los Angeles, CA 90089-0742
(213) 740-5843
www.scec.org

Southern California Earthquake Data Center (SCEDC)
California Institute of Technology
252 S. Mud
Pasadena, CA 91125

STATE RESOURCES

California Department of Conservation: Southern California Regional Office
655 S. Hope Street, #700
Los Angeles, CA 90017-2321
(213) 239-0878
www.consrv.ca.gov

California Department of Transportation (Caltrans)
120 S. Spring Street
Los Angeles, CA 90012
(213) 897-3656
www.dot.ca.gov/

California Division of Mines and Geology (DMG)
801 K Street, MS 12-30
Sacramento, CA 95814
(916) 445-1825
www.consrv.ca.gov/cgs/index.htm

California Office of Emergency Services (Cal-OES)
3650 Schriever Avenue
Mather, California 95655-4203
(916) 845-8510

http://www.caloes.ca.gov/

California Planning Information Network
1400 Tenth Street
Sacramento, CA 95814
(916) 322-2318
www.calpin.ca.gov

California Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814
(916) 653-5656
http://resources.ca.gov/

California Seismic Safety Commission
1755 Creekside Oaks Dr. # 100
Sacramento, CA 95833
(916) 263-5506
http://www.seismic.ca.gov

California State Legislature
http://leginfo.legislature.ca.gov/

South Carolina Earthquake Education and Preparedness (SCEEP)
College of Charleston
66 George Street
Charleston, South Carolina 29424
(843) 805-5507
http://scearthquakes.cofc.ed

NATIONAL RESOURCES

Building Seismic Safety Council (BSSC)
1090 Vermont Ave., NW, Suite 700
Washington, DC 20005
(202) 289-7800
www.bssconline.org

Federal Emergency Management Agency, Hazus - MH
500 C Street SW
Washington, DC 20472
(202) 646-2500

Federal Emergency Management Agency, Mitigation Division
500 C Street, S.W.
Washington, D.C. 20472
(202) 566-1600
www.fema.gov/fima/planhowto.shtm

Federal Emergency Management Agency, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607
(510) 627-7100
www.fema.gov

The Geological Society of America
3300 Penrose Place
Boulder, CO 80301-1806
303-357-1000
http://gsabulletin.gsapubs.org

Institute for Business & Home Safety
4775 E. Fowler Avenue
Tampa, FL 33617
(813) 286-3400
www.ibhs.org

United States Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
(650) 853-8300
www.usgs.gov/

Western States Seismic Policy Council (WSSPC)
125 California Avenue, Suite D201, #1
Palo Alto, CA 94306
(650) 330-1101
www.wsspc.org/home.html

PUBLICATIONS

Burby, R, *"Cooperating with Nature: Confronting Natural Hazards with Land Use Planning for Sustainable Communities"* (1998), Joseph Henry Press
FEMA, *"Public Assistance Debris Management Guide"* (July 2000).

Jones, L: Bernknopf, R: Cox, D; Goltz, J: Hudnut, K; Mileti, D; Perry,S; Ponti, D; Porter, K; Reichle, M; Seligson, H; Shoaf, K; Treiman, J; and Wein, A., *"The ShakeOut Scenario"* (2008), USGS Open File Report 2008-1150

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ENERGY DISRUPTION RESOURCES

STATE RESOURCES

Southern California Edison
2244 Walnut Grove
Rosemead, CA 91770
https://www.sce.com/

Southern California Gas
P.O. Box 3150
San Dimas, CA 91773
https://www.socalgas.com/

NATIONAL RESOURCES

American Journal of Public Health
American Public Health Association
800 I Street, NW
Washington, DC 20001

Electricity Consumers Resource Council
1101 K Street, NW Suite 700
Washington, D.C. 20005
(202) 682-1390
https://elcon.org/

Federal Communications Commission
445 12th Street SW
Washington, DC 20554
(888) 225-5322
https://www.fcc.gov/

Injury, International Journal of the Care of the Injured
245 Peachtree Center Avenue, Suite1900
Atlanta, GA 30303
(404) 669-9400

National Association of State Energy Officials (NASEO)
2107 Wilson Blvd., Suite 850
Arlington, VA 22201
(703) 299-8800
http://www.naseo.org

National University System Institute for Policy Research
11355 North Torrey Pines Road
La Jolla, CA 92037-1011
(858) 642-8498

http://www.nusinstitute.org/

DROUGHT RESOURCE DIRECTORY

LOCAL RESOURCES

Santa Clarita Valley Water
27234 Bouquet Canyon Rd.
Santa Clarita, CA 91350
(661) 297-1600
https://yourscvwater.com/

Santa Clarita Valley Signal
24000 Creekside Road
Valencia CA 91355
(661) 259-1234
https://signalscv.com/

STATE RESOURCES

State of California, California Department of Water Resources
Department of Water Resources
1416 9th Street
Sacramento, CA 95814
(916) 653-5791
http://www.water.ca.gov

California-Nevada Climate Applications Program (CNAP)
Climate Research Division, Scripps Institution of Oceanography University of California - San Diego
9500 Gilman Drive
La Jolla, CA 92093-0224
(858) 534-4507
http://meteora.ucsd.edu/cnap/

NATIONAL RESOURCES

Environmental Protection Agency (EPA)
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
http://www.epa.gov/climatechange/science/future.html

National Centers for Environmental Information
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
(828) 271-4800
http://www.ncdc.noaa.gov

National Centers for Environmental Prediction
Climate Prediction Center
5830 University Research Court
College Park, Maryland 20740
http://www.cpc.ncep.noaa.gov

National Integrated Drought Information System (NIDIS)
The National Drought Mitigation Center
3310 Holdrege Street
P.O. Box 830988
Lincoln, NE 68583–0988
(402) 472–6707

USGS California Water Science Center
6000 J Street, Placer Hall
Sacramento, CA 95819
(916) 278-3000
http://ca.water.usgs.gov/data/drought/

PUBLICATIONS

"2014 National Climate Assessment Report" (2014), U.S. Global Change Research Program

Farr,T., Jones,C., Liu,Z., "Progress Report: Subsidence in the Central Valley, California" (2015) Jet Propulsion Laboratory / California Institute of Technology

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SEVERE WEATHER: EXTREME HEAT & WIND RESOURCE DIRECTORY

STATE RESOURCES

California Division of Forestry & Fire Protection
1416 9th Street
PO Box 944246
Sacramento California 94244-2460
916-653-5123
http://www.fire.ca.gov/php/index.

NATIONAL RESOURCES

National Weather Service
Los Angeles/Oxnard Weather Forecast Office
520 North Elevar Street
Oxnard, CA 93030
Forecast and weather info: 805-988-6610
Administrative issues: 805-988-6615
E-mail: Webmaster.LOX@noaa.gov
http://weather.noaa.gov/

ADDITIONAL RESOURCES

International Society of Arboriculture
P.O. Box 3129
Champaign, IL 61826-3129
Phone: 217.355.9411
Fax: 217.355.9516
Web: www.isa-arbor.com
E-mail: isa@isa-arbor.com

PUBLICATIONS

Windstorm Top Local News Story of 2011, December 29, 2011
Juliette Funes
Pasadena Star News
911 E Colorado Blvd
Pasadena, CA 91106

PANDEMIC RESOURCE DIRECTORY

COUNTY RESOURCES

County of Los Angeles Public Health Acute Communicable Disease Control
313 N. Figueroa Street, Room 212
Los Angeles, CA 90012
(213) 240-7941
http://publichealth.lacounty.gov/ACD/

Los Angeles County Health Services – Emergency Medical Services Agency
10100 Pioneer Blvd, Suite 200
Santa Fe Springs, CA 90670
(562) 378-1500
https://dhs.lacounty.gov/more-dhs/departments/ems/

STATE RESOURCES

California Department of Public Health
P.O. Box 997377, MS 0500
Sacramento, CA 95899-7377
(916) 558-1784
https://www.cdph.ca.gov/

NATIONAL RESOURCES

Department of Health and Human Services
Centers for Disease Control and Prevention
200 Independence Avenue, S. W.
Washington, D.C. 20201
1-877-696-6775
https://www.hhs.gov/

Department of Homeland Security
650 Massachusetts Avenue NW
Washington, D.C. 20001
(202) 282-8000
https://www.dhs.gov/

INTERNATIONAL RESOURCES

World Health Organization (WHO)
Avenue Appia 20
1211 Geneva
Phone: +41-22-7912111
https://www.who.int/

PUBLICATIONS

"Past Pandemics." World Health Organization, World Health Organization, 25 Apr. 2020
Washam, Matthew MD. "What Parents Need to Know About Coronavirus." Nationwide Children's Hospital, Nationwide Children's Hospital, 23 Mar. 2020

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CYBER ATTACK RESOURCES

STATE RESOURCES

California Office of Emergency Services, California Cybersecurity Integration Center
3650 Schriever Avenue
Mather, CA 95655
http://www.oes.ca.gov

NATIONAL RESOURCES

The White House, U.S. Department of Homeland Security (DHS)
2707 Martin Luther King Jr. Ave., SE
Washington, DC 20528
(240) 492-2420
https://www.dhs.gov/

Cybersecurity & Infrastructure Security Agency
245 Murray Lane
Washington, DC 20528
(888) 282-0870
https://www.cisa.gov/

National Cybersecurity and Communications Integration Center (NCCIC)
https://www.cybersecurityintelligence.com/

United States Computer Emergency Readiness Team (US-CERT)
245 Murray Lane SW, Building 410
Washington, DC 20598
(888) 282-0870
https://www.usa.gov/federal-agencies/computer-emergency-readiness-team

National Institute of Standards and Technology (NIST)
100 Bureau Drive
Gaithersburg, MD 20899
(301) 975-2000
https://www.nist.gov/

PUBLICATIONS

"CISA, MS-ISAC, NGA & NASCIO Recommend Immediate Action to Safeguard Against Ransomware Attacks." Department of Homeland Security, 8 Nov. 2019, www.dhs.gov/news/2019/07/29/cisa-ms-isac-nga-nascio-recommend-immediate-action-safeguard-against-ransomware.

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Romanow, Mateusz *"10 Years of Data Breaches Mark Vulnerable Businesses."* Cybersecurity Magazine, 2 April, 2020, https://www.securitymagazine.com/articles/92056-years-of-data-breaches-mark-vulnerable-businesses

TERRORISM AND ACTIVE SHOOTER RESOURCES

FEDERAL RESOURCES

Department of Homeland Security
12th & C Street SW
Washington, DC 20024
(202) 282-8000
https://www.dhs.gov/

Federal Bureau of Investigations
935 Pennsylvania Avenue, NW
Washington, D.C. 20535-0001
(202) 324-3000
www.fbi.gov

Office of U.S. Attorneys
United States Department of Justice
950 Pennsylvania Avenue, NW, Room 2242
Washington, DC 20530-0001
(202) 514-2000
https://www.justice.gov/usao

U.S. Department of State
2201 C St. NW
Washington DC 20520
(202) 647-4000
https://www.state.gov/

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Blair, J. Pete, and Schweit, Katherine W. (2014). *"A Study of Active Shooter Incidents, 2000 - 2013",* Texas State University and Federal Bureau of Investigation, U.S. Department of Justice, Washington D.C.

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HAZARDOUS MATERIALS RESOURCE DIRECTORY

LOS ANGELES COUNTY RESOURCES

Los Angeles County Fire Department, Health Hazardous Materials Division
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
(Wastewater Treatment, 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
(Hazardous Waste Collection Programs)
1 (888) CLEAN-LA / 1 (888) 253-2652
www.888cleanla.com

STATE RESOURCES

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

California Environmental Protection Agency (CAL/EPA)
(916) 323-2514
www.calepa.ca.gov

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

California Office of Emergency Services (Cal-OES)
3650 Schriever Avenue
Mather, CA 95655
(916) 845-8510
http://www.oes.ca.gov

FEDERAL RESOURCES

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

National Office of Housing and Urban Development (HUD)
51 7th Street S.W.
Washington, DC 20410
1-800-HUDS-FHA (1-800-483-7342)
www.hud.gov/hhchild.html

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

U.S. Department of Transportation, Pipeline & Hazardous Materials Safety Administration (PHMSA)
East Building, 2nd Floor
1200 New Jersey Ave.,
SE Washington, DC 20590

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
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)
1-800-638-2772
www.cpsc.gov

LANDSLIDE RESOURCE DIRECTORY

LOS ANGELES COUNTY RESOURCES

Los Angeles County Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803
Telephone: (626) 458-5100
https://dpw.lacounty.gov/

STATE RESOURCES

Department of Conservation Headquarters
801 K Street, MS 24-01
Sacramento, CA 95814
(916) 322-1080
https://www.conservation.ca.gov/

Department of Water Resources
1416 9th Street
Sacramento, CA 95814
(916) 653-5791
https://water.ca.gov/

California Office of Emergency Services (Cal-OES)
3650 Schriever Avenue
Mather, CA 95655
(916) 845-8510
http://www.oes.ca.gov

California Department of Transportation (Caltrans)
120 S. Spring Street
Los Angeles, CA 90012
(213) 897-3656
www.dot.ca.gov/

PUBLICATIONS

Barrows, A. and Smith, T., *"DMG Note 13"* (No Date), California Department of Conservation, California Geological Survey.

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

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

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"USGS Landslide Program Brochure". National Landslide Information Center (NLIC), United States Geologic Survey.

FLOOD RESOURCES

LOCAL AND REGIONAL RESOURCES

City of Santa Clarita
23920 Valencia Blvd., Suite 300
Santa Clarita, CA 91355
(661) 259-2489
https://www.santa-clarita.com/home

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

NATIONAL RESOURCES

National Weather Service
Los Angeles/Oxnard Weather Forecast Office
520 North Elevar Street
Oxnard, CA 93030
Forecast and weather info: 805-988-6610
Administrative issues: 805-988-6615
E-mail: Webmaster.LOX@noaa.gov
http://weather.noaa.gov/

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

APPENDIX B: ACRONYMS

BFE: Base Flood Elevation

Cal-ARP: California Accidental Release Prevention Program

Cal-EMA: California Emergency Management Agency

Cal-OES: California Office of Emergency Services

CBC: California Building Code

CDC: Centers for Disease Control

CDMG: California Division of Mines and Geology

CDPH: California Department of Public Health

CEQA: California Environmental Quality Act

CERT: Community Emergency Response Team

CFC: California Fire Code

CGS: California Geologic Survey

CIP: Capital Improvement Plan

CISA: Cybersecurity and Infrastructure Security Agency

CNG: Compressed Natural Gas

CPG: Comprehensive Preparedness Guide

CPRI: Calculated Priority Risk Index

CRS: Community Rating System

CSIS: Center for Strategic and International Studies

CUPA: Certified Unified Program Agency

DCS: Distributed Control System

DHS: Department of Homeland Security

DFIRM: Detailed Flood Insurance Rate Maps

DMA: Disaster Mitigation Act

DNS: Domain Name System

DTSC: Department of Toxic Substances Control

DWR: Department of Water Resources

DOT: Department of Transportation

EMS: Emergency Medical Service

ENSO: El Niño Southern Oscillation

EOC: Emergency Operation Center

ESP: Emergency Survival Program

FCC: Federal Communications Commission

FEMA: Federal Emergency Management Agency

FHBM: Flood Hazard Boundary Maps

FIRM: Flood Insurance Rate Maps

GIS: Geographic Information Systems

HMBP: Hazardous Materials Business Plan

HMD: Hazardous Materials Division

HMP: Hazard Mitigation Plan

HPL: High Potential Loss

JRIC: Joint Regional Intelligence Center

LACFCD: Los Angeles County Flood Control District

MPH: Miles per hour

NASEO: National Association of State Energy Officials

NGO: Non-Governmental Organization

NFIP: National Flood Insurance Program

NOAA: National Oceanic and Atmospheric Administration

NSF: National Science Foundation

NWS: National Weather Service

OSHPD: Office of Statewide Health Planning and Development

PGA: Peak Ground Acceleration

PHMSA: Pipeline and Hazardous Materials Safety Administration

RCRA: Resource Conservation and Recovery Act

RDF: Rapid Deployment Force

RMP: Risk Management Plan

SCADA: Site Control and Data Acquisition

SCAG: Southern California Association of Governments

SCE: Southern California Edison

SCEC: Southern California Earthquake Center

SCECT: Santa Clarita Emergency Communications Team

SCV: Santa Clarita Valley

SCVWD: Santa Clarita Valley Water Division

SECURE: Santa Clarita Educated Communities United in Response to Emergencies

SFHA: Special Flood Hazard Area

SPCC: Spill Prevention Control and Countermeasure Plan

SRL: Severe Repetitive Loss

SWAT: Special Weapons and Tactics

TEW: Terrorism Early Warning Group

TLD: Top Level Domain

UDC: Unified Development Code

USACE: United States Army Corps of Engineers

USAR: Urban Search and Rescue

USCB: United States Census Bureau

USDA: United States Department of Agriculture

USFA: United States Fire Administration

USFS: United States Forest Service

USGS: United States Geological Survey

UST: Underground Storage Tanks

VHFHSZ: Very High Fire Hazard Severity Zone

WGA: Western Governors Association

APPENDIX C: GLOSSARY

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. Other similar terms include 50 Year Flood and 500 Year Flood.

Acceleration: The rate of change of velocity with respect to time. Acceleration due to gravity at the earth's surface is 9.8 meters per second squared. That means that every second that something falls toward the surface of earth, its velocity increases by 9.8 meters per second.

Acclimatization: The climatic adaptation of an organism to be accustomed to a new environment. The adjustment of sweat-salt concentrations to help an organism lose water to regulate temperature.

Asset: Any manmade or natural feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

Base Flood: Flood that has a 1 percent probability of being equaled or exceeded in any given year. Also known as the 100-year flood.

Base Flood Elevation: 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.

Beaufort Scale: One of the first scales to estimate wind speeds and the effects was created by Britain's Admiral Sir Francis Beaufort (1774-1857). He developed the scale in 1805 to help sailors estimate the winds via visual observations. The scale starts with 0 and goes to a force of 12. The Beaufort scale is still used today to estimate wind strengths.

Bedrock: The solid rock that underlies loose material, such as soil, sand, clay, or gravel.

Building: A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.

Community Rating System (CRS): An NFIP program that provides incentives for NFIP communities to complete activities that reduce flood hazard risk. When the community completes specified activities, the insurance premiums of policyholders in these communities are reduced.

Contour: A line of equal ground elevation on a topographic (contour) map.

Critical Facility: Facilities that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.

Debris: The scattered remains of assets broken or destroyed in a hazard event. Debris caused by a wind or water hazard event can cause additional damage to other assets.

Debris Flow: A landslide in which a mass of coarse-grained soil flows downslope as a slurry. Material involved is commonly a loose combination of surficial despots, rock fragments, and vegetation.

Debris Slide: A slide of coarse grained soil, commonly consisting of a loose combination of surficial deposits, rock fragments, and vegetation. Strength of the material is low, but there may be a very low strength zone at the base of the soil or within the weathered bedrock.

Duration: How long a hazard event lasts.

Earthquake: A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of earth's tectonic plates.

El Niño and La Niña: El Niño and La Niña are opposite phases of what is known as the *El Niño- Southern Oscillation* (ENSO) cycle. The ENSO cycle is a scientific term that describes the fluctuations in temperature between the ocean and atmosphere in the east-central Equatorial Pacific (approximately between the International Date Line and 120 degrees West).

> El Niño means *The Little Boy*, or *Christ Child* in Spanish. El Niño was originally recognized by fishermen off the coast of South America in the 1600s, with the appearance of unusually warm water in the Pacific Ocean. The name was chosen based on the time of year (around December) during which these warm waters events tended to occur.

El Niño and La Niña episodes typically last nine to 12 months, but some prolonged events may last for years. While their frequency can be quite irregular, El Niño and La Niña events occur on average every two to seven years. Typically, El Niño occurs more frequently than La Niña.

Typical El Niño effects are likely to develop over North America during the upcoming winter season. Those include warmer-than-average temperatures over western and central Canada, and over the western and northern United States. Wetter-than-average conditions are likely over portions of the U.S. Gulf Coast and Florida, while drier-than-average conditions can be expected in the Ohio Valley and the Pacific Northwest.

La Niña means *The Little Girl* in Spanish. La Niña is also sometimes called *El Viejo*, *anti-El Niño*, or simply "*a cold event.*" La Niña is the *cold phase* of ENSO. La Niña episodes represent periods of below-average sea surface temperatures across the east-central Equatorial Pacific. Global climate La Niña impacts tend to be opposite those of El Niño impacts. In the tropics, ocean temperature variations in La Niña also tend to be opposite those of El Niño.

During a La Niña year, winter temperatures are warmer than normal in the Southeast and cooler than normal in the Northwest.

Erosion: Wearing away of the land surface by detachment and movement of soil and rock fragments, during a flood or storm or over a period of years, through the action of wind, water, or other geologic processes.

Essential Facility: Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include: government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations.

Extent: The size of an area affected by a hazard or hazard event.

Fault: A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are differentially displaced parallel to the plane of fracture.

Federal Emergency Management Agency (FEMA): Independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery.

Flash Flood: A flood event occurring with little or no warning where water levels rise at an extremely fast rate.

Flood: A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.

Flood Depth: Height of the flood water surface above the ground surface.

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.

Flood Hazard Area: The area shown to be inundated by a flood of a given magnitude on a map.

Flood Insurance Rate Map (FIRM): Map of a community, prepared by the Federal Emergency Management Agency that shows both the special flood hazard areas and the risk premium zones applicable to the community.

Flood Insurance Study (FIS): A study that provides an examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations in a community or communities.

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.

Frequency: A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100- year recurrence interval is expected to occur once every 100 years on average, and would have a 1 percent chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered.

Fuel: The material that feeds a fire, it is the key factor in wildfire behavior.

Fuel Loading: The volume or amount of available vegetative fuel.

Geographic Information Systems (GIS): A computer software application that relates physical features on the earth to a database to be used for mapping and analysis.

Ground Motion: The vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter, but soft soils can further amplify ground motions.

Hazard: A source of potential danger or adverse condition. Hazards in this plan include naturally occurring events such as floods, earthquakes, tornadoes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. A natural event is a hazard when it has the potential to harm people or property.

Hazard Event: A specific occurrence of a particular type of hazard.

Hazard Identification: The process of identifying hazards that threaten an area.

Hazard Mitigation: Sustained actions taken to reduce or eliminate long-term risk from hazards and their effects.

HAZUS (Hazards U.S.): A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA.

Hydrology: The science of dealing with the waters of the earth. A flood discharge is developed by a hydrologic study.

Infrastructure: Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, and includes an area's transportation system such as airports, heliports, highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, drydocks, piers, and regional dams.

Intensity: A measure of the effects of a hazard event at a particular place.

Interface: The expansion of populations into the hills and mountains and forest lands.

Landslide: Downward movement of a slope and materials under the force of gravity.

Lateral Spreads: Develop on gentle slopes and entail the sidelong movement of large masses of soil as an underlying layer liquefies in a seismic event. The phenomenon that occurs when ground shaking causes

loose soils to lose strength and act like viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength.

Liquefaction: Results when the soil supporting structures liquefies. This can cause structures to tip and topple.

Magnitude: A measure of the strength of a hazard event. The magnitude (also referred to as severity) of a given hazard event is usually determined using technical measures specific to the hazard.

Mercalli Scale: This scale, composed of increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects. It was developed in 1931 by the American seismologists Harry Wood and Frank Neumann.

Mitigation Plan: A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the state and includes a description of actions to minimize future vulnerability to hazards.

National Flood Insurance Program (NFIP): Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum floodplain management regulations in 44 CFR §60.3.

National Weather Service (NWS): Prepares and issues flood, severe weather, and coastal storm warnings and can provide technical assistance to Federal and state entities in preparing weather and flood warning plans.

Pandemic: A pandemic is the worldwide spread of a new disease.

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

Probability: A statistical measure of the likelihood that a hazard event will occur.

Recurrence Interval: The time between hazard events of similar size in a given location. It is based on the probability that the given event will be equaled or exceeded in any given year.

Relative Humidity: The amount of water vapor in the air at any given time is usually less than required to saturate the air. The relative humidity is the percent of saturation humidity, generally calculated in relation to saturated vapor density.

Repetitive Loss Property (RLP): A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than 10 days apart) of at least $1,000 each have been paid within any 10-year period since 1978.

Richter Scale: A numerical scale of earthquake magnitude devised by seismologist C.F. Richter in 1935.

Risk: The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Riverine: Of or produced by a river.

Santa Ana Winds: Warm, dry winds that blow from the east or northeast (offshore). These winds occur below the passes and canyons of the coastal ranges of Southern California and in the Los Angeles Basin.

Scale: A proportion used in determining a dimensional relationship; the ratio of the distance between two points on a map and the actual distance between the two points on the earth's surface.

Seismicity: Describes the likelihood of an area being subject to earthquakes.

Special Flood Hazard Area (SPHA): An area within a floodplain having a 1 percent or greater chance of flood occurrence in any given year (100-year floodplain); represented on Flood Insurance Rate Maps by darkly shaded areas with zone designations that include the letter A or V.

Stafford Act: The Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100- 107, was signed into law November 23, 1988, and amended the Disaster Relief Act of 1974, PL 93-288. The Stafford Act is the statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and its programs.

Substantial Damage: Damage of any origin sustained by a structure in a Special Flood Hazard Area, whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage.

Surface Faulting: The differential movement of two sides of a fracture – in other words, the location where the ground breaks apart. The length, width, and displacement of the ground characterize surface faults.

Tectonic Plate: Torsionally rigid, thin segments of the earth's lithosphere that may be assumed to move horizontally and adjoin other plates. It is the friction between plate boundaries that cause seismic activity.

Topographic: Characterizes maps that show natural features and indicate the physical shape of the land using contour lines. These maps may also include manmade features.

Vulnerability: Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power – if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.

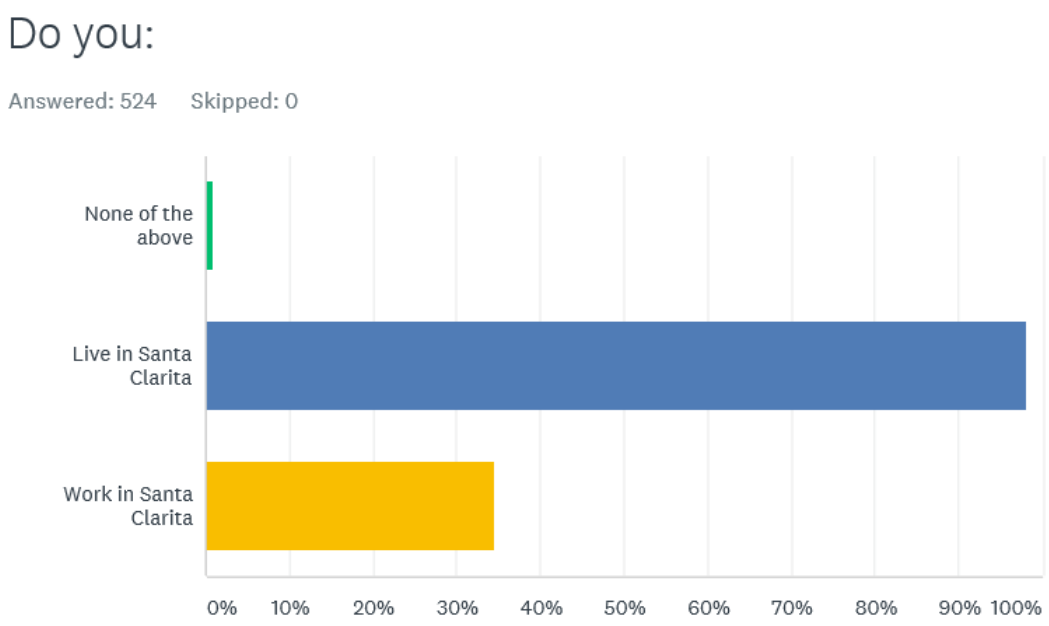
Wildfire: An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.

Zone: A geographical area shown on a Flood Insurance Rate Map (FIRM) that reflects the severity or type of flooding in the area.

APPENDIX D: PUBLIC OUTREACH SURVEY & RESULTS

1. Zip Code _____ and Community Name or Location _____

2. Do you: ☐ Live or ☐ Work in Santa Clarita?

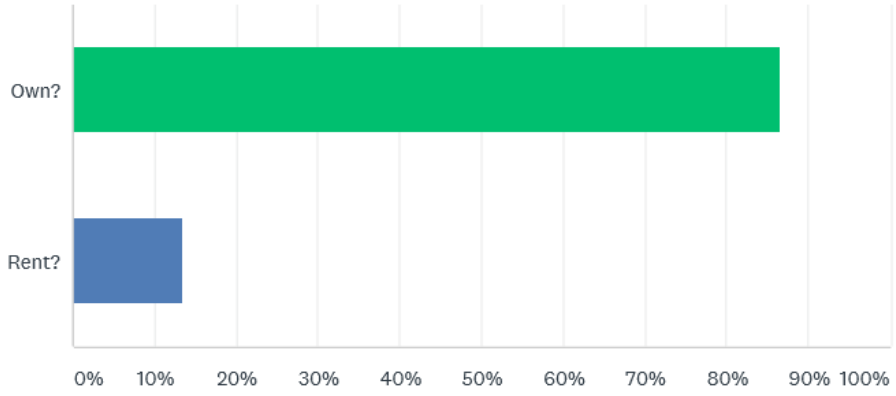


ANSWER CHOICES	RESPONSES	
None of the above	0.76%	4
Live in Santa Clarita	98.09%	514
Work in Santa Clarita	34.54%	181
Total Respondents: 524		

3. If you live in Santa Clarita, do you: ☐ Own or ☐ Rent?

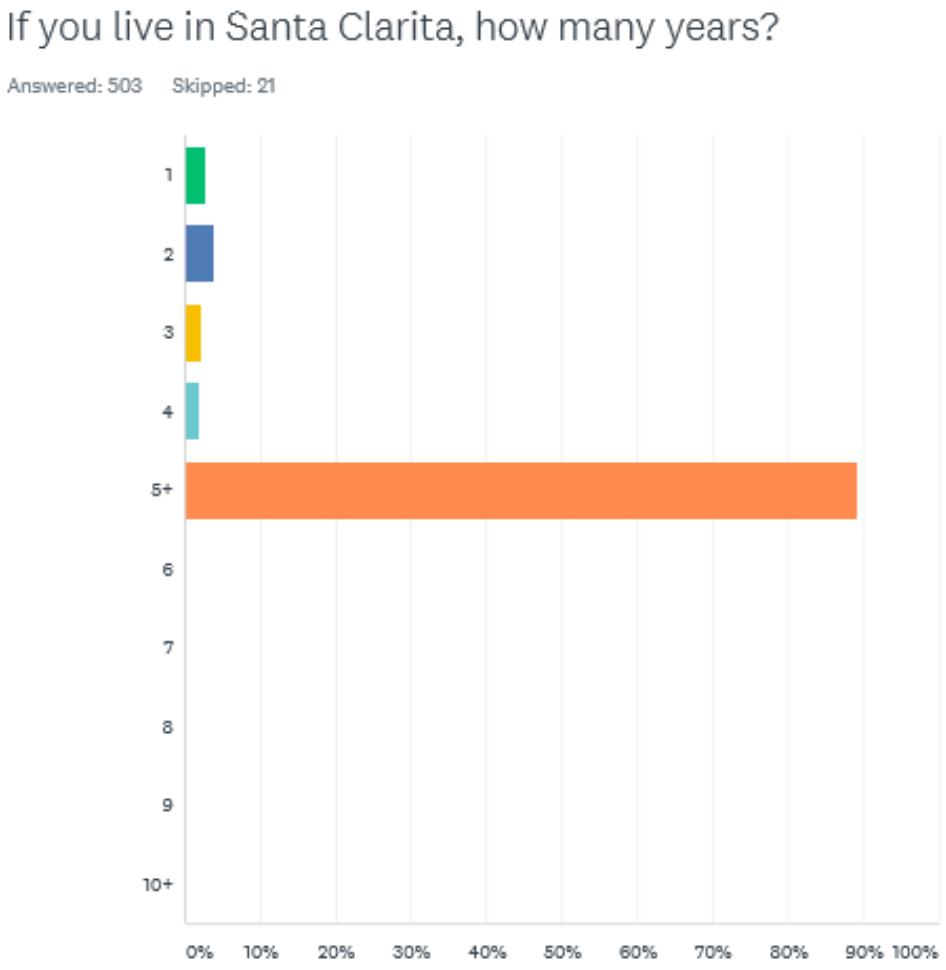
If you live in Santa Clarita, do you: (Choose one)

Answered: 512 Skipped: 12



ANSWER CHOICES	RESPONSES	
Own?	86.52%	443
Rent?	13.48%	69
Total Respondents: 512		

4. If you live in Santa Clarita, how many years? _____



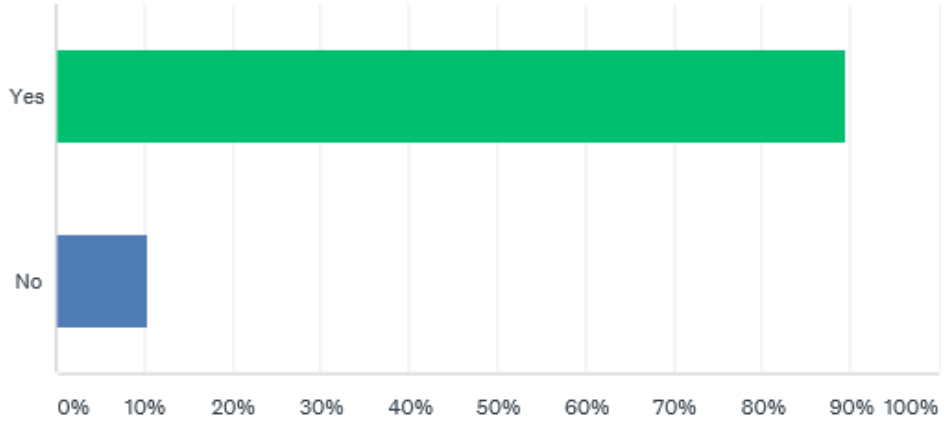
ANSWER CHOICES	RESPONSES	
1	2.78%	14
2	3.78%	19
3	2.39%	12
4	1.79%	9
5+	89.26%	449
6	0.00%	0
7	0.00%	0
8	0.00%	0
9	0.00%	0
10+	0.00%	0
TOTAL		503

5. If you have lived in Santa Clarita for 5 years or more, have you or someone in your household directly experienced a natural disaster such as an earthquake, severe windstorm, flood, wildfire, or other type of natural disaster while in Santa Clarita?

☐ Yes ☐ No (**IF NO, skip to question 7**)

If you have lived in Santa Clarita for 5 years or more, have you or someone in your household directly experienced a natural disaster such as an earthquake, severe windstorm, flood, wildfire, or other type of natural disaster while in Santa Clarita?

Answered: 455 Skipped: 69



ANSWER CHOICES	RESPONSES	
Yes	89.45%	407
No	10.55%	48
Total Respondents: 455		

6. **If "YES"**, which of these natural disasters have you or someone in your household experienced in the past five years? (**Please check all that apply**)

☐ Drought
☐ Severe Weather: Extreme Heat
☐ Severe Weather: Extreme Wind
☐ Flood
☐ Hazardous Materials Release
☐ Telecommunications (IT) Failure
☐ Civil Disturbance
☐ Terrorism

- ☐ Landslide/Mudslide
- ☐ Dam Failure
- ☐ Severe Storm/Rain
- ☐ Pandemic/Epidemic
- ☐ Earthquake
- ☐ Wildfire
- ☐ Other: _____

- ☐ Cyber Attack
- ☐ Energy Disruption: Gas/Electric Power
- ☐ Utility Failure: Water
- ☐ Climate Change
- ☐ Sinkholes
- ☐ Liquefaction
- ☐ Other: _____

ANSWER CHOICES		RESPONSES	
Drought		67.46%	199
Severe Weather: Extreme Heat		77.63%	229
Severe Weather: Extreme Wind		80.68%	238
Flood		4.75%	14
Landslide/Rain		9.83%	29
Pandemic/Epidemic		82.37%	243
Earthquake		68.81%	203
Wildfire		80.00%	236
Hazardous Material Release		1.02%	3
Telecommunication (IT) Failure		26.44%	78
Civil Disturbance		7.12%	21
Terrorism		0.68%	2
Cyber Attack		1.69%	5
Energy Disruption: Gas/Electric Power		68.81%	203
Utility Failure: Water		7.46%	22
Climate Change		23.39%	69
Sinkholes		5.08%	15
Liquefaction		0.68%	2
Other (please specify)	Responses	4.41%	13
Total Respondents: 295			

7. What is the most effective way for you to receive information? (**Please check up to three**)

Newspapers, Television, Radio:
- ☐ Newspaper stories/ads
- ☐ Television news/ads
- ☐ Radio News/ads

Internet:
- ☐ Email newsletters
- ☐ Online news outlets
- ☐ City website
- ☐ Social media (e.g. Facebook, Twitter, Instagram, etc.)

Other Methods:
- ☐ Mail/Utility Bill
- ☐ Fire Department
- ☐ Fact sheet/Brochure
- ☐ Library
- ☐ Public workshops/Meetings
- ☐ College/University/Schools
- ☐ Outdoor advertisements (billboards, etc.)
- ☐ Other: _____

ANSWER CHOICES		RESPONSES	
Social Media (e.g. Facebook, Twitter, Instagram, ect.)		75.00%	285
Email newsletters		43.42%	165
Online news outlets		42.89%	163
City web site		23.16%	88
Television news/ads		17.63%	67
Mail/Utility Bill		15.79%	60
Radio News/ads		12.37%	47
Other (please specify)	Responses	10.79%	41
Newspaper stories/ads		8.95%	34
Fire Department		4.47%	17
Outdoor advertisements (billboards, ect.)		3.16%	12
Fact sheet/Brouchure		1.58%	6
Public workshops/Meetings		1.58%	6
College/University/Schools		0.79%	3
Library		0.26%	1
Total Respondents: 380			

8. How concerned are you about the following hazards?

Natural Disaster	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	Not Concerned
Drought	☐	☐	☐	☐	☐
Severe Weather: Heat	☐	☐	☐	☐	☐
Severe Weather: Wind	☐	☐	☐	☐	☐
Flood	☐	☐	☐	☐	☐
Landslide/Mudslide	☐	☐	☐	☐	☐
Dam Failure	☐	☐	☐	☐	☐
Severe Storm/Rain	☐	☐	☐	☐	☐
Pandemic/Epidemic	☐	☐	☐	☐	☐
Earthquake	☐	☐	☐	☐	☐
Wildfire	☐	☐	☐	☐	☐
Hazardous Materials Release	☐	☐	☐	☐	☐
Telecommunications (IT) Failure	☐	☐	☐	☐	☐
Civil Disturbance	☐	☐	☐	☐	☐
Terrorism	☐	☐	☐	☐	☐
Cyber Attack	☐	☐	☐	☐	☐
Energy Disruption: Gas/Electric Power	☐	☐	☐	☐	☐
Utility Failure: Water	☐	☐	☐	☐	☐
Climate Change	☐	☐	☐	☐	☐
Sinkholes	☐	☐	☐	☐	☐
Liquefaction	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐

	NOT CONCERNED	NOT VERY CONCERNED	NEUTRAL	SOMEWHAT CONCERNED	VERY CONCERNED	TOTAL	WEIGHTED AVERAGE
Wildfire	1.05% 4	1.58% 6	3.16% 12	26.32% 100	67.89% 258	380	3.58
Earthquake	1.05% 4	1.58% 6	5.26% 20	33.68% 128	58.42% 222	380	3.47
Energy Disruption: Gas/Electric Power	1.05% 4	4.21% 16	8.42% 32	38.42% 146	47.89% 182	380	3.28
Pandemic/Epidemic	4.47% 17	4.74% 18	8.42% 32	27.63% 105	54.74% 208	380	3.23
Severe Weather: Wind	1.32% 5	6.05% 23	12.63% 48	41.84% 159	38.16% 145	380	3.09
Severe Weather: Heat	2.11% 8	7.89% 30	17.89% 68	36.58% 139	35.53% 135	380	2.96
Drought	5.53% 21	6.84% 26	13.95% 53	42.89% 163	30.79% 117	380	2.87
Utility Failure: Water	3.68% 14	12.37% 47	17.11% 65	40.26% 153	26.58% 101	380	2.74
Telecommunications (IT) Failure	6.58% 25	12.11% 46	20.53% 78	36.05% 137	24.74% 94	380	2.60
Climate Change	14.47% 55	9.21% 35	19.47% 74	26.32% 100	30.53% 116	380	2.49
Cyber Attack	8.16% 31	18.68% 71	25.26% 96	33.68% 128	14.21% 54	380	2.27
Civil Disturbance	8.95% 34	22.11% 84	21.32% 81	30.79% 117	16.84% 64	380	2.24
Terrorism	13.16% 50	20.53% 78	24.47% 93	25.79% 98	16.05% 61	380	2.11
Hazardous Materials Release	12.63% 48	19.47% 74	27.89% 106	27.63% 105	12.37% 47	380	2.08
Severe Storm/Rain	10.79% 41	21.58% 82	28.68% 109	29.47% 112	9.47% 36	380	2.05
Landslide/Mudslide	18.95% 72	30.00% 114	24.47% 93	21.05% 80	5.53% 21	380	1.64
Liquefaction	21.58% 82	22.89% 87	34.74% 132	16.05% 61	4.74% 18	380	1.59
Sinkholes	22.63% 86	27.63% 105	26.84% 102	18.16% 69	4.74% 18	380	1.55
Flood	20.53% 78	34.74% 132	25.79% 98	14.47% 55	4.47% 17	380	1.48
Other	31.05% 118	4.21% 16	55.53% 211	4.21% 16	5.00% 19	380	1.48
Dam Failure	31.05% 118	28.16% 107	21.05% 80	13.42% 51	6.32% 24	380	1.36

9. Planning ahead for responding to disasters can help lessen their impact. To help the City prioritize its disaster preparedness efforts, please tell us how important each of the following goals is to you.

Goal	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Protecting private property	☐	☐	☐	☐	☐
Protecting critical facilities (hospitals, fire stations, etc.)	☐	☐	☐	☐	☐

Preventing development in hazard areas	☐	☐	☐	☐	☐
Protecting natural environment	☐	☐	☐	☐	☐
Protecting historical/cultural landmarks/museums	☐	☐	☐	☐	☐
Promoting cooperation among public and private organizations, and citizens	☐	☐	☐	☐	☐
Protecting and reducing damage to utilities	☐	☐	☐	☐	☐
Strengthening emergency services (police, fire, ambulance)	☐	☐	☐	☐	☐
Protecting major employers	☐	☐	☐	☐	☐
Protecting small businesses	☐	☐	☐	☐	☐
Protecting K-12 schools	☐	☐	☐	☐	☐
Protecting Colleges/Universities	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐

	NOT IMPORTANT	NOT VERY IMPORTANT	NEUTRAL	SOMEWHAT IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Protecting critical facilities (hospitals, fire stations, etc.)	0.26% 1	0.79% 3	1.58% 6	9.21% 35	88.16% 335	380	3.84
Strengthening emergency services (police, fire, ambulance)	0.53% 2	0.53% 2	7.63% 29	21.58% 82	69.74% 265	380	3.59
Protecting and reducing damage to utilities	0.00% 0	1.58% 6	6.84% 26	25.79% 98	65.79% 250	380	3.56
Protecting private property	0.53% 2	2.11% 8	6.05% 23	25.79% 98	65.53% 249	380	3.54
Protecting natural environment	2.11% 8	1.32% 5	9.47% 36	28.95% 110	58.16% 221	380	3.40
Preventing development in hazard areas	1.58% 6	2.63% 10	9.21% 35	27.89% 106	58.68% 223	380	3.39
Protecting K-12 schools	2.37% 9	1.84% 7	12.11% 46	27.11% 103	56.58% 215	380	3.34
Promoting cooperation among public and private organizations, and citizens	1.05% 4	1.58% 6	12.89% 49	36.05% 137	48.42% 184	380	3.29
Protecting small businesses	1.32% 5	1.58% 6	13.16% 50	34.21% 130	49.74% 189	380	3.29
Protecting historical/cultural landmarks/museums	1.84% 7	3.16% 12	14.74% 56	36.05% 137	44.21% 168	380	3.18
Protecting Colleges/Universities	3.16% 12	3.95% 15	24.21% 92	32.63% 124	36.05% 137	380	2.94
Protecting major employers	4.74% 18	7.89% 30	30.53% 116	39.47% 150	17.37% 66	380	2.57
Other	23.16% 88	1.84% 7	63.16% 240	3.95% 15	7.89% 30	380	1.72

10. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, how important is it to protect the following community assets?

Community Assets: Potential Disaster Impact	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Human: Loss of life and/or injuries	☐	☐	☐	☐	☐
Economic: Business closures and/or job losses	☐	☐	☐	☐	☐
Infrastructure: Damage or loss of bridges, utilities, schools, etc.	☐	☐	☐	☐	☐
Cultural Historic: Damage or loss of libraries, museums, fairgrounds, etc.	☐	☐	☐	☐	☐
Environmental: Damage or loss of forests, rangeland, waterways, etc.	☐	☐	☐	☐	☐
Governance: Ability to maintain order and/or provide public amenities and services	☐	☐	☐	☐	☐

	NOT IMPORTANT	NOT VERY IMPORTANT	NEUTRAL	SOMEWHAT IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Human: Loss of life and/or injuries	0.00% 0	0.26% 1	2.11% 8	5.00% 19	92.63% 352	380	3.90
Economic: Business closures and/or job losses	0.53% 2	0.79% 3	6.84% 26	35.00% 133	56.84% 216	380	3.47
Infrastructure: Damage or loss of bridges, utilities, schools, etc.	0.26% 1	0.26% 1	4.74% 18	25.53% 97	69.21% 263	380	3.63
Cultural Historic: Damage or loss of libraries, museums, fairgrounds, etc.	2.11% 8	3.95% 15	21.58% 82	45.00% 171	27.37% 104	380	2.92
Environmental: Damage or loss of forests, rangeland, waterways, etc.	1.32% 5	2.63% 10	13.16% 50	33.16% 126	49.74% 189	380	3.27
Governance: Ability to maintain order and/or provide public amenities and services	0.53% 2	1.58% 6	5.00% 19	30.00% 114	62.89% 239	380	3.63

11. What actions have you taken to prepare for your household from potential disasters? Check all that apply.

☐ Purchased homeowners/Renters insurance
☐ Purchased flood insurance

☐ Floodproofing (elevating furnace, water heaters, electric panels
☐ Installed retrofits such as high impact windows or doors to withstand high winds; fire resistant siding roofing or window screens, etc.
☐ Installed/maintained firebreaks around the home

☐ Attended meetings or received written information on natural disasters or emergency preparedness
☐ Talked with family members about what to do in case of a disaster or emergency
☐ Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster
☐ Prepared a "Disaster Supply Kit" (extra food, water, batteries, medications, first aid, etc.)

ANSWER CHOICES	RESPONSES	
Purchased homeowners/Renters insurance	92.63%	352
Talked with family members about what to do in case of a disaster or emergency	80.79%	307
Prepared a "Disaster Supply Kit" (extra food, water, batteries, medications, first aid, etc.)	76.32%	290
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster	59.21%	225
Attended meetings or received written information on natural disasters or emergency preparedness	29.74%	113
Installed/maintained firebreaks around the home	28.68%	109
Floodproofing (elevating furnace, water heaters, electric panels	25.53%	97
Installed retrofits such as high impact windows or doors to withstand high winds; fire resistant siding roofing or window screens, etc.	19.47%	74
Purchased flood insurance	11.32%	43
None of the above	1.58%	6
Total Respondents: 380		

12. In order to help local government agencies prioritize the mitigation project types to reduce disruptions of services and to strengthen the community. Please let us know how you rank the following strategies to address pre- and post-disaster damage.

Strategy	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	☐	☐	☐	☐	☐
Replace inadequate or vulnerable bridges and causeways	☐	☐	☐	☐	☐
Install or improve protective structures, such as floodwalls or levees	☐	☐	☐	☐	☐
Government buys flood-prone properties and returns them to a natural condition	☐	☐	☐	☐	☐
Assist property owners with securing funding to mitigate impacts to their property caused by disasters	☐	☐	☐	☐	☐
Work on improving the damage resistance of utilities (electricity, communications, water/wastewater facilities, etc.	☐	☐	☐	☐	☐
Strengthen City codes, ordinances, and plans to require high risk management standards	☐	☐	☐	☐	☐
Provide better information about hazard risk and high-hazard areas	☐	☐	☐	☐	☐
Inform property owners of ways they can mitigate damage to their properties	☐	☐	☐	☐	☐

	NOT IMPORTANT	NOT VERY IMPORTANT	NEUTRAL	SOMEWHAT IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Work on improving the damage resistance of utilities (electricity, communications, water/wastewater facilities, etc.	0.53% 2	0.26% 1	6.05% 23	23.42% 89	69.74% 265	380	3.62
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	0.79% 3	0.79% 3	5.26% 20	26.32% 100	66.84% 254	380	3.58
Replace inadequate or vulnerable bridges and causeways	0.00% 0	0.53% 2	7.89% 30	31.05% 118	60.53% 230	380	3.52
Inform property owners of ways they can mitigate damage to their properties	0.79% 3	1.84% 7	16.58% 63	35.53% 135	45.26% 172	380	3.23
Provide better information about hazard risk and high-hazard areas	0.53% 2	3.16% 12	18.16% 69	33.68% 128	44.47% 169	380	3.18
Assist property owners with securing funding to mitigate impacts to their property caused by disasters	3.16% 12	6.84% 26	18.42% 70	35.00% 133	36.58% 139	380	2.95
Install or improve protective structures, such as floodwalls or levees	2.63% 10	6.32% 24	21.84% 83	35.79% 136	33.42% 127	380	2.91
Strengthen City codes, ordinances, and plans to require high risk management standards	3.16% 12	4.74% 18	25.00% 95	37.37% 142	29.74% 113	380	2.86
Government buys flood-prone properties and returns them to a natural condition	9.74% 37	9.74% 37	36.84% 140	26.32% 100	17.37% 66	380	2.32

13. Please feel free to provide any additional comments: *Comments were provided directly to the City to address any immediate resident concerns.*

APPENDIX E: HAZUS REPORT

FEMA

RiskMAP
Increasing Resilience Together

Hazus: Earthquake Global Risk Report

Region Name:	CitySantaClarita
Earthquake Scenario:	M7.2-San Gabriel v10
Print Date:	July 22, 2020

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

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

HAZUS EARTHQUAKE - WIND - FLOOD - TSUNAMI

FEMA

Table of Contents

General Description of the Region

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

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

California

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

The geographical size of the region is 296.16 square miles and contains 51 census tracts. There are over 74 thousand households in the region which has a total population of 223,184 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 63 thousand buildings in the region with a total building replacement value (excluding contents) of 29,147 (millions of dollars). Approximately 94.00 % of the buildings (and 84.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 3,869 and 1,499 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 63 thousand buildings in the region which have an aggregate total replacement value of 29,147 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 89% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

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

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 238 beds. There are 72 schools, 8 fire stations, 2 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 18 hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

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

The total value of the lifeline inventory is over 5,368.00 (millions of dollars). This inventory includes over 222.45 miles of highways, 137 bridges, 3,282.08 miles of pipes.

Table 1: Transportation System Lifeline Inventory

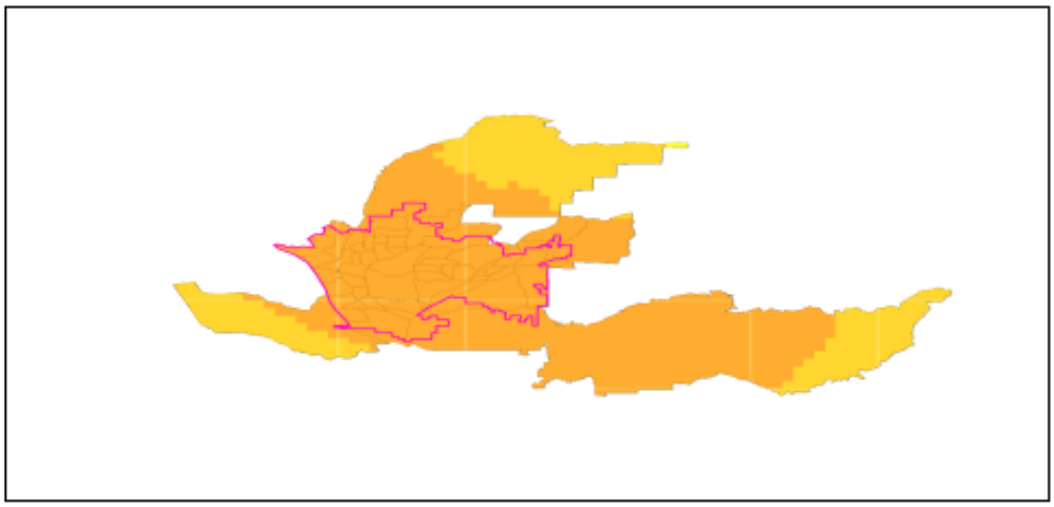
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	137	994.2512
	Segments	176	2538.8552
	Tunnels	1	9.0891
		Subtotal	3542.1955
Railways	Bridges	6	34.3241
	Facilities	1	2.6630
	Segments	50	129.1977
	Tunnels	0	0.0000
		Subtotal	166.1848
Light Rail	Bridges	0	0.0000
	Facilities	3	10.9837
	Segments	5	128.4182
	Tunnels	0	0.0000
		Subtotal	139.4019
Bus	Facilities	1	1.8306
		Subtotal	1.8306
Ferry	Facilities	0	0.0000
		Subtotal	0.0000
Port	Facilities	0	0.0000
		Subtotal	0.0000
Airport	Facilities	2	20.1368
	Runways	0	0.0000
		Subtotal	20.1368
		Total	3,869.70

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	64.7797
	Facilities	1	39.2940
	Pipelines	0	0.0000
		Subtotal	104.0737
Waste Water	Distribution Lines	NA	38.8678
	Facilities	4	654.4468
	Pipelines	0	0.0000
		Subtotal	693.3146
Natural Gas	Distribution Lines	NA	25.9119
	Facilities	0	0.0000
	Pipelines	9	78.2792
		Subtotal	104.1911
Oil Systems	Facilities	3	0.3540
	Pipelines	0	0.0000
		Subtotal	0.3540
Electrical Power	Facilities	3	597.2400
		Subtotal	597.2400
Communication	Facilities	1	0.1180
		Subtotal	0.1180
		Total	1,499.30

Earthquake Scenario

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



Scenario Name	M7.2-San Gabriel v10
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	7.23
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	

Direct Earthquake Damage

Building Damage

Hazus estimates that about 26,220 buildings will be at least moderately damaged. This is over 41.00 % of the buildings in the region. There are an estimated 2,587 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

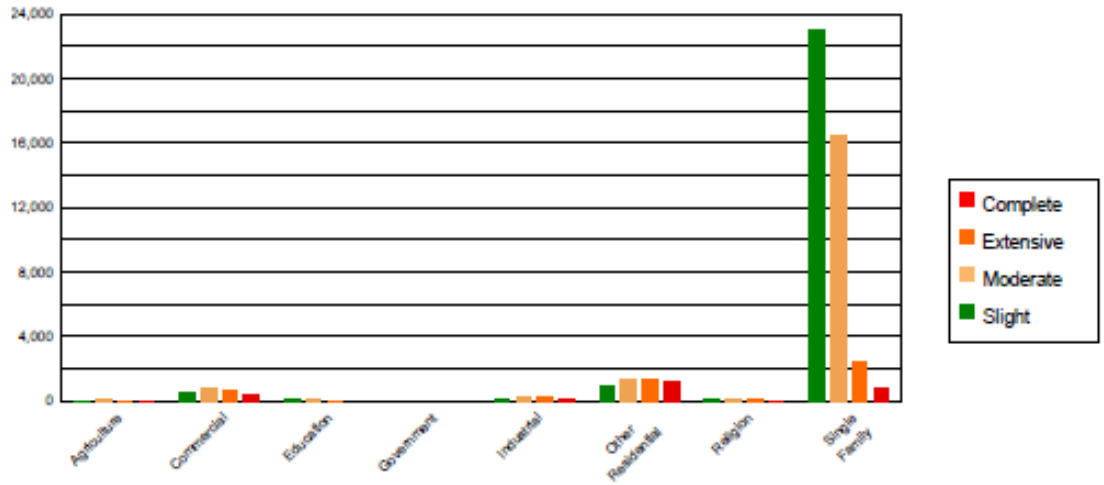


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	16.17	0.13	25.38	0.10	29.98	0.16	16.85	0.36	10.62	0.41
Commercial	259.39	2.06	450.57	1.83	802.44	4.23	638.14	13.66	408.46	15.78
Education	16.83	0.13	26.48	0.11	31.62	0.17	17.88	0.38	9.19	0.36
Government	4.78	0.04	6.57	0.03	10.20	0.05	8.47	0.18	5.98	0.23
Industrial	67.70	0.54	129.26	0.52	263.57	1.39	225.57	4.83	154.89	5.99
Other Residential	469.62	3.73	954.91	3.88	1256.66	6.63	1298.10	27.79	1232.72	47.63
Religion	23.18	0.18	37.66	0.15	51.05	0.27	36.46	0.78	22.64	0.88
Single Family	11723.29	93.18	23000.77	93.38	16515.83	87.10	2429.72	52.02	743.38	28.73
Total	12,581		24,632		18,961		4,671		2,588	

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

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	12166.23	96.70	23921.05	97.12	17130.26	90.34	2454.29	52.54	765.74	29.59
Steel	58.87	0.47	100.84	0.41	272.13	1.44	276.47	5.92	177.70	6.87
Concrete	81.37	0.65	153.58	0.62	221.77	1.17	178.26	3.82	119.55	4.62
Precast	50.90	0.40	99.33	0.40	237.49	1.25	208.62	4.47	136.34	5.27
RM	197.89	1.57	228.35	0.93	459.85	2.43	394.62	8.45	182.02	7.03
URM	9.60	0.08	23.04	0.09	60.85	0.32	63.09	1.35	79.78	3.08
MH	16.10	0.13	105.44	0.43	579.01	3.05	1095.84	23.46	1126.75	43.54
Total	12,581		24,632		18,961		4,671		2,588	

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

Essential Facility Damage

Before the earthquake, the region had 238 hospital beds available for use. On the day of the earthquake, the model estimates that only 86 hospital beds (36.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 67.00% of the beds will be back in service. By 30 days, 95.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	1	0	0	0
Schools	72	15	0	0
EOCs	0	0	0	0
PoliceStations	2	1	0	0
FireStations	8	3	0	0

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Transportation Lifeline Damage

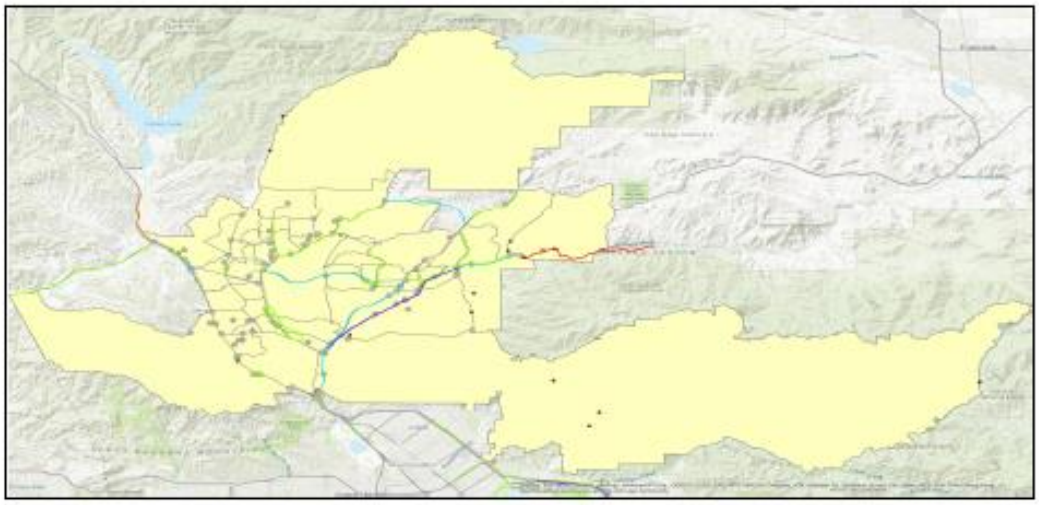


Table 6: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	176	0	0	175	175
	Bridges	137	21	2	120	131
	Tunnels	1	0	0	1	1
Railways	Segments	50	0	0	49	49
	Bridges	6	0	0	6	6
	Tunnels	0	0	0	0	0
	Facilities	1	1	0	1	1
Light Rail	Segments	5	0	0	5	5
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	3	3	0	2	3
Bus	Facilities	1	1	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	2	1	0	2	2
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

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

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

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	1	1	0	0	1
Waste Water	4	4	0	0	4
Natural Gas	0	0	0	0	0
Oil Systems	3	3	0	0	2
Electrical Power	3	3	0	0	3
Communication	1	1	0	1	1

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

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	2,013	2251	563
Waste Water	1,208	1131	283
Natural Gas	62	21	5
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	74,175	53,740	50,804	43,303	0	0
Electric Power		51,923	33,024	14,131	2,850	70

Induced Earthquake Damage

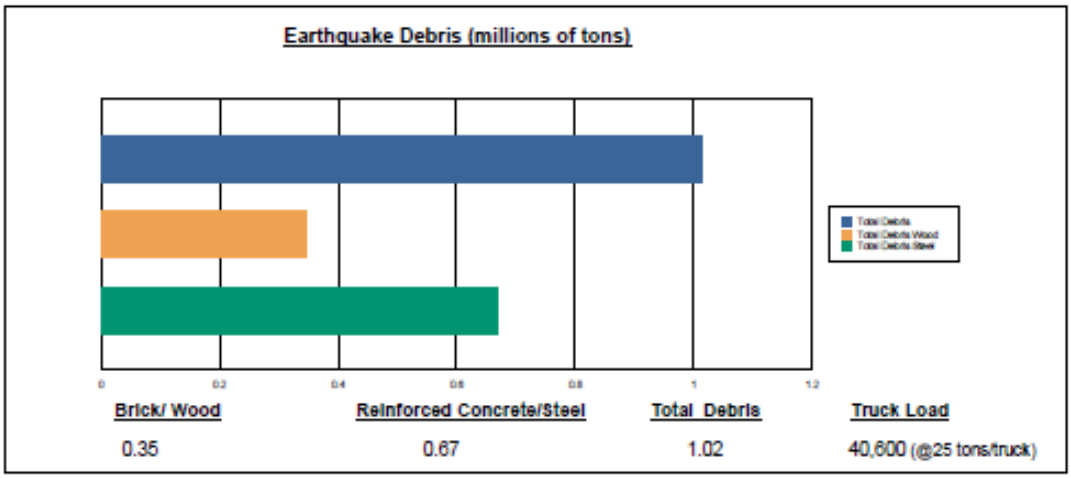
Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 2 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

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

The model estimates that a total of 1,015,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 34.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 40,600 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.



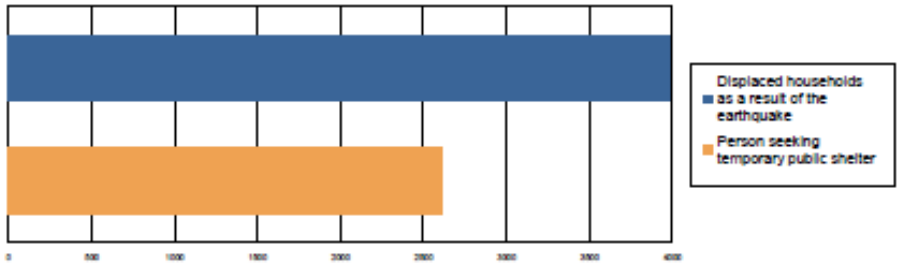
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.35	0.67	1.02	40,600 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 3,986 households to be displaced due to the earthquake. Of these, 2,606 people (out of a total population of 223,184) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
3,986	2,606

Casualties

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

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

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

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

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	31.27	9.30	1.54	3.05
	Commuting	0.16	0.24	0.37	0.07
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	34.97	10.15	1.58	3.11
	Other-Residential	388.91	98.67	11.37	21.48
	Single Family	387.68	63.78	3.64	6.33
	Total	**843**	**182**	**18**	**34**
2 PM	Commercial	1739.91	516.68	85.63	168.56
	Commuting	1.42	2.12	3.30	0.65
	Educational	469.25	138.10	23.19	45.38
	Hotels	0.00	0.00	0.00	0.00
	Industrial	257.63	74.62	11.69	22.75
	Other-Residential	70.23	17.81	2.06	3.78
	Single Family	68.64	11.33	0.75	1.11
	Total	**2,607**	**761**	**127**	**242**
6 PM	Commercial	1226.22	362.67	60.30	117.08
	Commuting	27.47	41.00	63.93	12.65
	Educational	53.13	15.60	2.61	5.13
	Hotels	0.00	0.00	0.00	0.00
	Industrial	161.02	46.64	7.31	14.22
	Other-Residential	146.00	37.18	4.42	8.13
	Single Family	151.48	25.06	1.65	2.45
	Total	**1,765**	**528**	**140**	**160**

Economic Loss

The total economic loss estimated for the earthquake is 6,303.88 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

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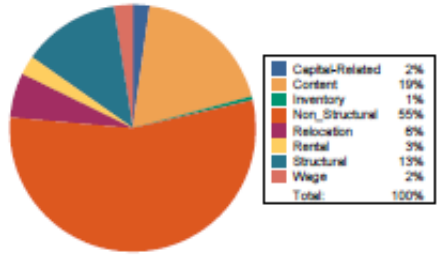
Building-Related Losses

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

The total building-related losses were 5,712.48 (millions of dollars); 13 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 63 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

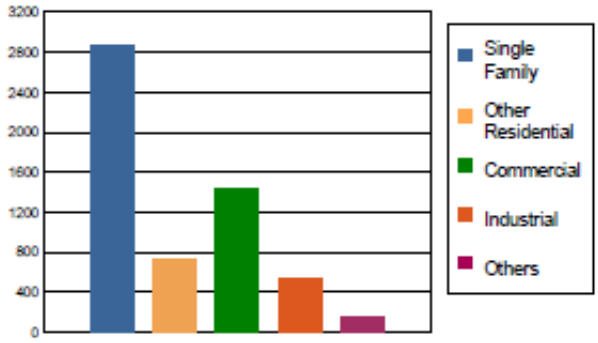


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	2.4099	121.8310	8.7479	3.5288	136.5176
	Capital-Related	0.0000	1.0264	115.0595	5.2771	1.0463	122.4093
	Rental	49.1553	31.2958	64.8561	3.1262	2.1304	150.5638
	Relocation	179.0606	31.3118	94.6307	13.8001	16.5328	335.3360
	Subtotal	**228.2159**	**66.0439**	**396.3773**	**30.9513**	**23.2383**	**744.8267**
Capital Stock Losses							
	Structural	370.0655	85.6297	189.4611	66.5781	22.5397	734.2741
	Non_Structural	1755.1055	475.2683	580.4498	243.7642	73.6170	3,128.2048
	Content	511.5972	108.7256	260.2023	160.5434	33.1069	1,074.1754
	Inventory	0.0000	0.0000	5.9140	24.7752	0.3076	30.9968
	Subtotal	**2636.7682**	**669.6236**	**1036.0272**	**495.6609**	**129.5712**	**4967.6511**
	Total	**2864.98**	**735.67**	**1432.40**	**526.61**	**152.81**	**5712.48**

Transportation and Utility Lifeline Losses

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

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

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2538.8552	0.0000	0.00
	Bridges	994.2512	115.2169	11.59
	Tunnels	9.0891	0.8208	9.03
	Subtotal	**3542.1955**	**116.0377**	
Railways	Segments	129.1977	0.0000	0.00
	Bridges	34.3241	4.2082	12.26
	Tunnels	0.0000	0.0000	0.00
	Facilities	2.6630	1.0142	38.08
	Subtotal	**166.1848**	**5.2224**	
Light Rail	Segments	128.4182	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	10.9837	4.9509	45.07
	Subtotal	**139.4019**	**4.9509**	
Bus	Facilities	1.8306	0.7390	40.37
	Subtotal	**1.8306**	**0.7390**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	20.1368	7.7629	38.55
	Runways	0.0000	0.0000	0.00
	Subtotal	**20.1368**	**7.7629**	
	Total	**3,869.75**	**134.71**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	39.2940	10.5416	26.83
	Distribution Lines	64.7797	10.1293	15.64
	Subtotal	104.0737	20.6709	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	654.4468	233.4003	35.66
	Distribution Lines	38.8678	5.0882	13.09
	Subtotal	693.3146	238.4885	
Natural Gas	Pipelines	78.2792	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	25.9119	1.7432	6.73
	Subtotal	104.1911	1.7432	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.3540	0.1007	28.45
	Subtotal	0.3540	0.1007	
Electrical Power	Facilities	597.2400	195.6489	32.76
	Subtotal	597.2400	195.6489	
Communication	Facilities	0.1180	0.0341	28.90
	Subtotal	0.1180	0.0341	
	Total	1,499.29	456.69	

HAZUS

FEMA

Appendix A: County Listing for the Region

Los Angeles, CA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Los Angeles	223,184	24,620	4,526	29,147
Total Region		**223,184**	**24,620**	**4,526**	**29,147**

APPENDIX F: PLAN ADOPTION DOCUMENTS